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Corporate Board Diversity and Human Capital Disclosure: Evidence from Listed Manufacturing Firms in Nigeria, 2011–2025

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ABSTRACT

Corporate governance reforms worldwide have intensified attention on board composition and its role in improving corporate transparency. However, human capital, often regarded as one of a firm's most valuable yet least visible assets, continues to be inconsistently disclosed in corporate reporting, particularly in emerging markets. Despite increasing calls for greater workforce transparency, empirical evidence on how different board diversity attributes influence voluntary human capital disclosure remains limited and inconclusive, especially in African emerging economies such as Nigeria's manufacturing sector. This study examines the effect of corporate board diversity on human capital disclosure among listed manufacturing companies in Nigeria over fifteen years (2011–2025). The study draws on Resource-Based Theory, Stakeholder Theory, and Agency Theory to explain variations in voluntary disclosure behavior. Using a principle-based sampling procedure, the study selects a balanced panel of 58 manufacturing firms listed on the Nigerian Exchange, resulting in 870 firm-year observations. A content-analysis-based disclosure index is developed to measure the extent of human capital disclosure reported in the firms' annual reports. The study compares four candidate dynamic panel estimators through a systematic model selection procedure, leading to the adoption of the two-step system Generalized Method of Moments (GMM) estimator to address potential endogeneity and capture the dynamic nature of disclosure behavior. The findings reveal that human capital disclosure is highly persistent over time. Board gender diversity has a strong and positive effect on disclosure, whereas director independence and multiple directorships both have significant negative effects. Board nationality diversity and financial expertise demonstrate positive but statistically insignificant associations with human capital disclosure, while firm size is positively and significantly related to disclosure. Overall, the findings indicate that the relationship between board diversity and human capital disclosure is not uniformly positive. Rather, the effect depends on the specific characteristics and attributes of board members, suggesting that disclosure behavior is influenced more by underlying governance processes than by diversity alone. The study contributes novel long-term evidence from an under-researched emerging market and provides practical recommendations for regulators, corporate boards, and manufacturing firms

Keywords:

Corporate board diversity; human capital disclosure; board gender diversity;

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corporate governance; dynamic panel
GMM, listed manufacturing firms

seeking to strengthen workforce-related transparency and improve voluntary
human capital disclosure.

1. Introduction

Today's global economy has moved from an industrial economy to a knowledge economy, where human resources are considered to be one of the pillars on which the value creation, innovation, and competitiveness of organizations are built. Employees' knowledge, skills, innovation potential, and technical capabilities are increasingly perceived as strategic assets for sustained performance, and the literature indicates that human capital is a key intangible asset that strengthens the value of an organization by creating, developing, and investing in employees [1,2]. The definition of human capital, as provided by Aggarwal and Verma [3], is the education, experience, skills, knowledge, and competencies that are materially helpful in improving an organization's performance and competitive edge in the workforce. Although significant, traditional accounting systems show tangible assets in their balance sheets and human resources only as an expense, and a consensus-based accounting framework for human resource disclosures of companies in their annual reports does not exist [3,4].

The amount of human capital information a firm decides to reveal is integral to its corporate governance, and especially to the board of directors. A board is the most fundamental internal governance mechanism that forms, develops, and utilizes a firm's intellectual capital, which includes a firm's capital embedded in people [5,6]. The board oversees and guides the company's affairs on a strategic level; it is the responsibility of the board to provide strategic direction and oversight, and, according to Fama and Jensen [7], an effective board of directors can reduce agency costs by ensuring that the interests of the board are aligned with those of the shareholders, thereby fostering greater transparency and improved disclosure. As long as boards are diverse in terms of gender, nationality, independence, directorship load, and financial expertise, they are theoretically likely to be more diverse in the perspectives, networks, and monitoring powers that they bring to bear on disclosure decisions, such as what the firm reports on its workforce.

The manufacturing sector is one of the largest sectors on Nigeria's Nigerian Exchange (NGX) and is closely related to human capital development, as technical skills and labor skills play a major role in the productivity of the manufacturing sector [8]. However, the release of human capital data is still inconsistent and poorly regulated in Nigerian companies. Nigeria's human capital development is low, at 0.539, ranking the country 161st of 189 countries [9], indicative of underinvestment in human capital that regulatory changes like the Corporate Governance Code by the Financial Reporting Council of Nigeria and the Companies and Allied Matters Act have started to address by introducing provisions on board diversity and beneficial ownership transparency.

Despite the rising interest in corporate governance in general, very little research has focused on understanding the effect of board diversity on human capital disclosure. Existing studies have concentrated on traditional board characteristics (size, CEO duality, and ownership structure) and their relation to other intellectual capital disclosures, with inconclusive results [10,11]. Although research findings show that there is a relationship between board diversity and human capital disclosure, direct evidence connecting board diversity specifically to human capital disclosure in emerging market countries like Nigeria is limited [11-14]. Previous studies conducted on board diversity in Nigeria have also tended to focus on gender diversity and board independence, so that *board* nationality diversity, multiple directorships, and financial expertise have been relatively under-researched.

Against this backdrop, a significant gap remains in the existing literature. Although previous studies have explored the relationship between corporate governance and disclosure, evidence on how different dimensions of board diversity influence human capital disclosure remains limited, particularly in emerging African economies such as Nigeria. Much of the existing research has focused on only a few board characteristics, broader forms of intellectual capital or non-financial disclosure, and shorter periods of analysis. As a result, important dimensions of board diversity have received relatively little attention, while the dynamic and potentially endogenous nature of human capital disclosure has not been adequately addressed. To address these gaps, this study examines the effect of corporate board diversity on human capital disclosure among listed manufacturing companies in Nigeria over the fifteen years from 2011 to 2025. Specifically, it investigates the roles of board gender diversity, board nationality diversity, board independence, multiple directorships, and board financial expertise. The study makes an important contribution by providing long-term evidence from an under-researched emerging market and offering a more detailed examination of the different dimensions of board diversity. It also adopts a systematic approach to selecting an appropriate dynamic-panel Generalized Method of Moments (GMM) estimator. The findings are expected to enrich the existing literature and provide useful insights for regulators, corporate boards, and manufacturing firms seeking to improve workforce-related transparency and strengthen voluntary human capital disclosure.

1.1 Concept of Human Capital Disclosure

Human capital is the sum of the knowledge, skills, abilities, innovation, and competence of staff members that a business can draw on to generate value. Usman *et al.*, [16] define it as the knowledge, skills, abilities, and attitudes of personnel that contribute to the success of the organization, whereas Huang *et al.*, [17] point out that more and more institutional investors are using human capital information alongside financial information when making investment decisions. Human capital disclosure (HCD) is the voluntary reporting of information relating to a firm's intangible human resources its values, culture, employee competencies, skills, and management philosophy [5]. Stakeholder theory gives a natural perspective on the understanding of HCD, as the disclosure of information about HCD should be directed at a network of stakeholders who have a shared interest in the information and whose information needs differ [5].

Disclosure of human capital usually includes employee training and development, workplace practices, employee welfare, and human resource initiatives in line with the organization's strategy, and such disclosure helps to eliminate information asymmetry and instill more confidence in stakeholders [18]. Human capital is difficult to measure as it resides in employees who may leave the organization, and it has been under-reported in the past [19,20]. Despite this, firms make voluntary human capital disclosures for two reasons: firstly, to enhance the informativeness of their annual reports, and secondly, to reduce information bias among investors [5].

1.2 Concept of Board Diversity

Board diversity is about the composition of the board, and the range of attributes, experiences, skills, and perspectives that each director brings to the organization [21]. In Upper Echelons reasoning, diversity ensures the board has the ability to innovate and make better *decisions*, while Resource Dependence reasoning implies that diversity allows the firm to tap into valuable external resources, expertise, and networks that enhance governance [21]. In the present study, the concept

of board diversity is interpreted through five lenses: gender, nationality, independence, multiple directorships, and financial expertise.

In general, the governance literature has associated board diversity with various firm outcomes, not just disclosure. Carter *et al.*, [15] report that a diversity of board members is associated with increased firm value among US firms, whereas Daily, Dalton, and Cannella [22] suggest that diversified boards create more varieties of views and problem-solving styles in board discussion, which improves the overall quality of board deliberation. Likewise, bear *et al.*, [23] discover that gender-diverse boards are linked to companies' social responsibility performance and their reputation, which suggests potential links to the reporting of socially related issues, like their own workforce. In principle, a more diverse board is better able to perform the duties outlined by Hillman and Dalziel [24] and Pfeffer and Salancik [25] as directors, such as providing information, expertise, and external legitimacy to the firm.

1.3 Board Gender Diversity and Human Capital Disclosure

Gender diversity on the board is the percentage of female directors on the board. Previous research indicates that female directors are linked to increased monitoring and oversight, which in turn leads to more accountable management and transparent human capital reporting [5,26-28]. In addition to oversight, women are hypothesized to also provide a variety of viewpoints and a stronger focus on the interests of stakeholders in the boardroom, so companies with higher numbers of women are expected to provide more information regarding human capital [10]. However, empirical results are mixed: Nalikka [29] reports no significant relationship between directors' gender and the disclosure level of intellectual capital in firms listed on the Helsinki Stock Exchange, and Herli *et al.*, [30] similarly report no significant association between directors' gender and the disclosure level of intellectual capital among firms in Indonesia, whereas Nadeem [31] reports a positive and significant effect in the case of Chinese firms. Differences in the institutional and regulatory environment may explain this variation.

1.4 Board Nationality Diversity and Human Capital Disclosure

The other factor likely to impact HCD is the diversity of nationalities on the board, as this enhances the firm's ability to engage a wider range of stakeholders, such as employees and customers [32]. Boards with diverse national and cultural backgrounds can have different perspectives that make the board more responsive to the needs of the workforce and better able to develop inclusive policies that address the specific needs of minority groups [33]. A board's nationality also matters from a resource-dependence perspective, insofar as it provides access to information and international best practice for the firm, compared to directors with only local enterprise experience [5]. International board members can also be instrumental in opening up firms to external resources and legitimacy as they expand internationally [34,35].

1.5 Board Independence and Human Capital Disclosure

In accordance with Agency Theory, the greater the proportion of independent directors on the board, the more effective their monitoring is expected to be Gul *et al.*, [36], which should boost voluntary disclosure. The disclosure-enhancing effect of formal independence is supported by some empirical findings, where intellectual/human capital disclosure is positively related to board independence [10,20], but is insignificant or negative in others [14,37], which indicates that the effect

of formal independence on disclosure is more a matter of institutional monitoring quality than of the substantive engagement of independent directors as a governance attribute.

1.6 Board Multiple Directorship and Human Capital Disclosure

Board multiple directorships measure the number of times each director serves on the boards of multiple firms. The “busyness hypothesis” under Agency Theory suggests that a director's involvement in more boards leads to greater time demands and, as a result, a decline in monitoring capacity and support for voluntary disclosure, while the Resource-Based view suggests that multiple directorships increase the board's networks, experience, and disclosure-relevant skills. In contrast to the prediction of the busyness hypothesis, Azman and Kamaluddin [38] find a positive, significant effect of cross-directorships on the intellectual capital disclosure of Malaysian government-linked companies, citing that multi-board directors bring additional information and experience to the companies.

1.7 Board Financial Expertise and Human Capital Disclosure

The common measure of financial expertise on boards is the number of directors who are affiliated with a recognized professional accounting body. Theoretically, financially expert directors should help improve the technical capacity of the board to assess and report on firm performance, and previous research shows that financial expertise is associated with better financial reporting [12]. (Whether that technical competence extends to other areas of reporting, including human capital disclosure, is less well documented; the relatively low average proportion of financially expert directors on many boards in emerging markets may also reduce the potential effect of this skill on reporting outcomes at board level.

1.8 Theoretical Framework

Three theories contribute to the study's expectations and provide some understanding of the link between board diversity and human capital disclosure: Resource-Based Theory, Stakeholder Theory, and Agency Theory.

Barney's [39] Resource-Based Theory (RBT) posits that a firm's competitive advantage is mainly attributable to the valuable, rare, and hard-to-imitate resources it has and can mobilize. In the context of the boardroom, the theory suggests that board diversity is a board-specific resource: a mix of male and female, national or international, independent or other directors, with various external networks and financial qualifications, can increase the range of skills and perspectives available for strategic decision-making, such as decisions on voluntary disclosure [40,41]. It is theorized that diversity of this nature enhances the board's overall capacity to identify and communicate the value found in the firm's workforce.

Based on Freeman's [42] Stakeholder Theory, organizations should seek to generate value for all those affected by their operations or who can influence those operations, such as the surrounding community, customers, and employees. Organizations need to provide information to satisfy stakeholder information needs, since stakeholders have an interest in organizational activities and a right to information [43], including information on human capital. Diverse boards, and gender-diverse boards in particular, are hypothesized to be more attuned to the interests of a broad stakeholder group, including employees, and thus more likely to engage in comprehensive human capital reporting.

Agency Theory, developed by Jensen and Meckling [44], explains the conflict between principals (shareholders) and agents (managers), where managers are not always interested in maximizing shareholder wealth and thereby create agency costs and information asymmetry. Because managers can pursue objectives that do not necessarily benefit shareholders [45], a monitoring system is needed to limit managers' discretion, the most important internal one being the board. The disclosure-enhancing function of board independence, as stated by Fama and Jensen [7], is not always realized in practice (as the empirical review above shows), and the opposite effect can occur as the number of directorships held by a director grows, according to the busyness hypothesis.

All three theories predict, in turn, that board diversity contributes to (1) the board's ability to disclose information (Resource-Based Theory); (2) the board's responsiveness to stakeholder information needs, including those of its workforce (Stakeholder Theory); and (3) the board's capacity and willingness to monitor the firm, which ultimately shapes its willingness to provide voluntary disclosure (Agency Theory). As the results below suggest, these theoretical lenses do not necessarily converge in their implications for each of the five board-diversity variables; the empirical analysis therefore examines each of the five variables in relation to all three theoretical lenses.

2. Methodology

Given that this study is aimed at examining the relationship between a set of explanatory variables related to board diversity and disclosure of human capital over time, it is appropriate to use a correlational, longitudinal research design. The population consists of all manufacturing companies listed on the Nigerian Exchange (NGX). The study is conducted on a census basis, covering the entire population of manufacturing companies because the number of such companies is relatively small; this approach removes sampling error and ensures all manufacturing companies are represented equally. The panel spans 15 years (2011–2025) and contains 870 firm-year observations.

2.1 Data Source and Human Capital Disclosure Index

Information was gathered from the audited annual reports of the sampled companies. The content-analysis index of human capital disclosure is a dichotomous index constructed, without weighting, on the basis of seven items developed by Isa *et al.*, [5]: entrepreneurial spirit, skills/knowledge, employee capabilities, career development plans, recruitment policies, internal rotation of employees, and external rotation of employees. Each item is scored 1 if disclosed and 0 if not, based on prior human capital disclosure studies finding that an unweighted approach is less subject to the added complexity of assigning differential item weights than weighted alternatives [3,4,51]. Each firm-year's Human Capital Disclosure Index (HCDI) value is the ratio of the number of items disclosed to the total number of items in the index.

2.2 Variable Measurement

Table 1

Variable measurement

Variable	Type	Measurement
Human Capital Disclosure (HCD)	Dependent	Ratio of human capital disclosure items reported to total items in the index (7 items) [5]
Board Gender Diversity (BGD)	Independent	Ratio of female directors to total board members (Al-Musali and Ismail [21])

Table 1 (Continued)

Variable	Type	Measurement
Board Nationality Diversity (BND)	Independent	Ratio of foreign directors to total board members [11]
Board Independence (BIN)	Independent	Ratio of independent directors to total board members [21]
Board Multiple Directorship (BMD)	Independent	Number/proportion of directors also serving as directors of other companies [11]
Board Financial Expertise (BFE)	Independent	Ratio of directors who are members of a professional accounting body (e.g., ICAN, ANAN, ACCA) to total board members [11].
Firm Size (FSZ)	Control	Natural log of total assets [5].
Profitability (ROA)	Control	Profit before interest and tax divided by total assets [11]

2.3 Model Specification and Estimation Strategy

Because current-period human capital disclosure is likely to be strongly influenced by the firm's own prior-period disclosure (a dynamic, path-dependent process) and because several board-diversity variables may be endogenous to unobserved firm characteristics, the study specifies a dynamic panel model with a lagged dependent variable:

$$HCD_{it} = \alpha HCD_{i,t-1} + \beta_1 BGD_{it} + \beta_2 BND_{it} + \beta_3 BIN_{it} + \beta_4 BMD_{it} + \beta_5 BFE_{it} + \beta_6 FSZ_{it} + \beta_7 ROA_{it} + e_{it} \quad (1)$$

where $HCD_{i,t-1}$ is the firm's own lagged disclosure score, i indexes firms, t indexes years, and e_{it} is the idiosyncratic error term. Pooled OLS estimates of a dynamic panel model of this kind are upward-biased on the lagged dependent variable because the omitted firm-specific effect is positively correlated with it, while the within (fixed-effects) estimator is downward-biased for the same coefficient because the demeaning transformation induces a negative correlation between the lagged regressor and the transformed error term, a problem known as Nickell bias [46]. Generalized Method of Moments (GMM) estimators, which instrument the lagged dependent variable (and other potentially endogenous regressors) with their own deeper lags, are designed to overcome both biases simultaneously and are therefore preferred for models of this type [47].

However, GMM is a family of estimators, and there is no convention on which one to use: One-Step System GMM, Two-Step System GMM, One-Step Difference GMM, or Two-Step Difference GMM each has to be explicitly and defensibly chosen. This study uses a five-step procedure. First, the coefficient on the lagged dependent variable is checked against the pooled-OLS and fixed-effects bounds, since Blundell and Bond [47] demonstrate that the coefficient on the lagged dependent variable is poorly estimated in Difference GMM when the dependent variable is highly persistent and lagged-level instruments are weak. Second, Arellano-Bond serial-correlation tests are checked, requiring significant AR(1) and insignificant AR(2) in the residuals of the first-differenced model. Third, the Sargan and Hansen tests of over-identifying restrictions are examined, noting that the Hansen test is robust to heteroscedasticity while the Sargan test is not, and that both tests can become uninformative with p -values close to 1.000 if the number of instruments is large relative to the number of cross-sectional units [49]. Fourth, this instrument-proliferation concern is tested directly via the instrument-to-group ratio. Fifth, the relative efficiency of the one-step and two-step variants is compared, since the latter offers more reliable standard errors for inference through an optimal weighting matrix obtained from the one-step residuals, together with the finite-sample correction of Windmeijer [50]. The results of this selection procedure, and the selection of the Two-

Step System GMM estimator as the model used for hypothesis testing, are given in the results section below.

Before the dynamic panel GMM estimation, descriptive statistics (mean, standard deviation, minimum, and maximum) are reported for all variables, followed by correlation analysis, Shapiro-Wilk normality tests, the Breusch-Pagan/Cook-Weisberg heteroscedasticity test, and variance inflation factors for multicollinearity. The analyses were carried out in STATA.

3. Results and Discussion

3.1 Descriptive Statistics

Table 2

Descriptive statistics (2011–2025, N = 870)

Variable	Obs	Mean	Std. Dev.	Min	Max
HCD	870	0.4233	0.3380	0.0000	1.0000
BGD	870	0.1176	0.1463	0.0000	0.6700
BND	870	0.1447	0.2041	0.0000	0.8300
BIN	870	0.3435	0.1905	0.0019	0.9000
BMD	870	0.1037	0.1703	0.0000	0.8333
BFE	870	0.1153	0.1319	0.0000	0.6203
FSZ	870	16.3720	2.3154	10.9600	22.3709
ROA	870	0.0465	0.3496	-2.6300	6.3300

Source: STATA 15 output (2026).

The sampled firms report, on average, 42.3 percent of the items in the index that have human capital disclosures (mean HCD = 0.4233), with wide variation across firms (SD = 0.3380). Average representation for female directors is 11.8 percent of board seats (BGD), though some companies have all-male boards. The average proportion of foreign directors on the boards of companies (BND) is 14.5 percent, while the average proportion of independent directors (BIN) is 34.4 percent, fairly close to the minimum proportion recommended under the Nigerian Code of Corporate Governance. The average figures for multiple directorship (BMD) and financial expertise (BFE) are 10.4 percent and 11.5 percent, respectively. Firm size (FSZ, log of total assets) varies from 10.96 to 22.37, reflecting a mix of small and large manufacturing firms, while average profitability (ROA) ranges from -2.63 to 6.33, indicating significant cross-firm variation in profitability, including firms with negative profits.

3.2 Correlation Analysis

Spearman rank-order correlations are used, as the Shapiro-Wilk test (below) rejects normality for all study variables, and Spearman correlations are robust to non-normality and outliers. Board gender diversity is moderately correlated with human capital disclosure ($r = 0.4019$), and board nationality diversity is moderately correlated with human capital disclosure ($r = 0.3868$); firm size shows the highest pairwise correlation with disclosure of all variables ($r = 0.4526$), consistent with the visibility hypothesis. The correlation between board independence and disclosure is small and negative ($r = -0.0780$), and both board multiple directorship and board financial expertise are weakly positive ($r = 0.1808$ and $r = 0.2582$, respectively), both of which are counterintuitive results discussed below in relation to the multivariate GMM results. The bivariate association of ROA with disclosure is nearly

zero ($r = -0.0202$). The pairwise correlation of each explanatory variable does not exceed the conventional 0.80 threshold for multicollinearity, as reported below.

3.3 Regression Diagnostics

Most of the study variables are bounded, ratio-scale variables, and the profitability variable in particular has extreme values; all eight study variables reject the Shapiro-Wilk null of normality at the 1 percent level. This non-normality strengthens the use of Spearman correlation over other methods and further supports GMM as the key estimation technique, given that it does not require normally distributed residuals. Multicollinearity is not a major concern in this model: a Breusch-Pagan/Cook-Weisberg test of the static OLS model shows no evidence against the null of constant variance ($\chi^2(1) = 9.74$, $p = 0.4313$), and the mean variance inflation factor across all regressors is 1.26, with no individual VIF exceeding 1.44, both well below the conventional threshold of 10.

3.4 GMM Estimator Selection

The model contains a lagged dependent variable and potentially endogenous board-diversity regressors, which bias the pooled OLS estimates upward and the fixed-effects estimates downward [46], so the study takes a five-step, principle-based approach to selecting among the four candidate GMM estimators.

Table 3

Persistence-bounds test: coefficient on lagged HCD

Estimator	Coefficient on HCD_Lag	Interpretation
Pooled OLS (upper bound)	0.9677	Upward-biased benchmark
Fixed Effects (lower bound)	0.6946	Downward-biased (Nickell) benchmark
One-Step System GMM	0.9677	At/outside upper bound
Two-Step System GMM	0.9686	Marginally outside upper bound
One-Step Difference GMM	0.5907	Below lower bound
Two-Step Difference GMM	0.6001	Below lower bound

Source: STATA 15 output (2026).

Both variants of Difference GMM fall below the fixed-effects lower bound, the classic symptom of weak lagged-level instruments when the dependent variable is highly persistent [47,48], (which rules out Difference GMM for this model. Both System GMM variants sit at or just outside the pooled-OLS upper bound, favouring System GMM over Difference GMM. All four candidate estimators pass the essential Arellano-Bond requirement of insignificant AR (2) in the first-differenced residuals. The Sargan test rejects the null of instrument validity for One-Step System GMM ($\chi^2(446) = 590.56$, $p = 0.000$), while both the Sargan and Hansen statistics fail to reject validity for Two-Step System GMM ($p = 1.000$ for both) — though, following Roodman [49], a Hansen p-value this close to 1.000 is itself a caution flag, since it can reflect weak instrument power rather than genuine validity when the instrument count is large relative to the number of firms. With 688 instruments against 58 firms for the System GMM specifications (compared with 629 instruments for Difference GMM), instrument proliferation is a real concern here and is treated as an explicit limitation of the study rather than glossed over. Finally, the Two-Step estimator is preferred over One-Step for its efficiency gain from

the optimal weighting matrix, with standard errors made reliable for inference by the Windmeijer [50] finite-sample correction. On balance, the Two-Step System GMM estimator is adopted as the model for hypothesis testing, with One-Step System GMM and the OLS/fixed-effects bounds retained as robustness benchmarks.

3.5 Two-Step System GMM Results

Table 4

Two-step system GMM results: board diversity and human capital disclosure

Variable	Coef.	z	P> z
HCD_Lag	0.9686	114.69	0.000
BGD	0.0132	2.30	0.021
BND	0.0059	1.22	0.224
BIN	-0.0387	-15.45	0.000
BMD	-0.0399	-4.75	0.000
BFE	0.0056	0.89	0.374
FSZ	0.0036	8.64	0.000
ROA	0.0006	0.48	0.630
_cons	-0.0212	-4.22	0.000
Wald chi2(8)	2.08e+06	—	0.000
AR(2) test, z (p)	0.04	—	0.967
Hansen test, chi2(679) (p)	49.72	—	1.000
Groups / Observations	58 / 812	—	—
Instruments	688	—	—

Source: STATA 15 output (2026).

The lagged dependent variable is large, positive, and highly significant ($\alpha = 0.9686$, $z = 114.69$, $p < 0.001$), indicating that human capital disclosure is highly persistent: a firm's own prior-period disclosure is a very strong predictor of its current-period disclosure. This is consistent with Resource-Based Theory, under which disclosure routines are firm-specific capabilities that develop slowly, and with Stakeholder Theory, under which stable stakeholder relationships sustain disclosure practices over time. Because the dynamic specification nets this persistence out, the coefficients on the board-diversity variables below reflect genuine cross-sectional variation rather than disclosure inertia. Board Gender Diversity is positive and statistically significant ($\beta = 0.0132$, $z = 2.30$, $p = 0.021$): all else equal, a higher proportion of female directors is associated with more human capital disclosure. This is consistent with all three theoretical strands: Resource-Based Theory, in that gender diversity expands the board's pool of perspectives and skills relevant to communicating workforce value; Stakeholder Theory, in that female directors are reported to be more attentive to a broader range of stakeholder interests, including employees; and, to a lesser extent, Agency Theory, in that female directors have been linked to stronger monitoring and reduced information asymmetry. Empirically, the result agrees with Isa *et al.*, [5], Tejedo-Romero *et al.*, [28], and Kusumawardani *et al.*, [10], all of whom report positive, significant associations between board gender diversity and human or intellectual capital disclosure, though it contrasts with Herli *et al.*, [30] and Nalikka [29], who report

no significant association in other institutional settings, a divergence plausibly explained by cross-country variation in regulatory pressure and the overall representation of women on boards.

Board Nationality Diversity is positive but statistically insignificant ($\beta = 0.0059$, $z = 1.22$, $p = 0.224$). The direction is consistent with theoretical expectations under both Resource-Based Theory (internationally diverse boards should provide access to globally sourced reporting knowledge) and Stakeholder Theory (foreign directors may be more attuned to international stakeholder expectations), but the relationship is not robust over the longer, fifteen-year sample. This is consistent with Ali and Oudat [12] and Al-Musali and Ismail [21], both of whom likewise report a statistically insignificant relationship between board nationality diversity and intellectual/human capital disclosure, and with Rashid et al. [52], who find no significant effect of nationality diversity on intellectual capital disclosure among Malaysian firms. The insignificance plausibly reflects the still-limited average share of foreign directors on Nigerian manufacturing boards, which may simply be too small, on average, to generate a statistically detectable board-level effect.

Board Independence has a negative and highly significant coefficient ($\beta = -0.0387$, $z = -15.45$, $p < 0.001$): a higher proportion of independent directors is associated with lower, not higher, human capital disclosure. This directly challenges the classical Agency Theory expectation that independent directors strengthen monitoring and thereby raise voluntary disclosure; a plausible explanation is that formally independent directors in Nigerian manufacturing firms adopt a more conservative, compliance-oriented posture that constrains voluntary, non-mandatory reporting such as human capital disclosure, so that formal independence does not necessarily translate into the substantive engagement that Resource-Based and Stakeholder theorizing would predict. The result is directionally consistent with Al-Musalli and Ismail [53], who likewise find a negative association between board independence and intellectual capital, and with Rahman *et al.*, [54] and Kamath [55], though those studies find the negative relationship to be statistically weaker; it contrasts with a larger body of work reporting a significant positive association, including Kusumawardani *et al.*, [10], and Ali and Oudat [12] and Raimo *et al.*, [13], underscoring that the disclosure-enhancing value of independence depends heavily on institutional context and on whether independent directors are substantively, and not merely formally, engaged.

Board Multiple Directorship is negative and significant ($\beta = -0.0399$, $z = -4.75$, $p < 0.001$): firms whose directors hold more outside directorships disclose less human capital information. This is consistent with the Agency Theory “busyness hypothesis”, under which competing demands on a director's time erode monitoring capacity and reduce support for voluntary disclosure, and runs counter to the more optimistic Resource-Based prediction that multiple directorships enrich the board's networks and disclosure-relevant skills. The finding contrasts with Azman and Kamaluddin [38], who report a positive effect of cross-directorships on intellectual capital disclosure among Malaysian government-linked companies, a difference that plausibly reflects variation in institutional quality and in the formal or informal limits placed on the number of boards a single director may serve on.

Board Financial Expertise is positive but not statistically significant ($\beta = 0.0056$, $z = 0.89$, $p = 0.374$), suggesting that financial specialists on the board do not, by themselves, reliably predict non-financial disclosure outcomes: financial expertise appears to be a narrowly domain-specific resource that strengthens financial reporting quality without extending naturally into voluntary human capital reporting. The direction, though not the significance, of this result is consistent with Ali and Oudat [12], who report a significant positive effect of financial expertise on intellectual capital performance among Bahraini banks; the weaker result here may reflect the relatively modest average share of financially expert directors (11.5 percent) on Nigerian manufacturing boards.

Firm size has a positive and highly significant coefficient ($\beta = 0.0036$, $z = 8.64$, $p < 0.001$), the only control variable that remains significant in the extended sample: larger firms disclose more human capital information, consistent with the visibility hypothesis under Stakeholder Theory (larger firms face greater public and regulatory scrutiny) and with Resource-Based Theory (larger firms have more organizational slack to institutionalize comprehensive reporting). This is consistent with Isa *et al.*, [5], who report a significant positive relationship between firm size and human capital disclosure among Nigerian listed companies. Return on assets, by contrast, is small, positive, and statistically insignificant ($\beta = 0.0006$, $z = 0.48$, $p = 0.630$) over the extended fifteen-year panel, whereas it was significant over the shorter eleven-year panel, suggesting that the direct association between profitability and disclosure weakens and becomes less reliable once a longer horizon spanning multiple economic cycles is considered.

3.6 Test of Hypotheses

Table 5
Summary of hypotheses testing (5% Significance Level)

Hypothesis	Statement	Coef. (p-value)	Decision
H01	BGD has no significant effect on HCD	0.0132 (0.021)	Rejected
H02	BND has no significant effect on HCD	0.0059 (0.224)	Not rejected
H03	BMD has no significant effect on HCD	-0.0399 (0.000)	Rejected
H04	BIN has no significant effect on HCD	-0.0387 (0.000)	Rejected
H05	BFE has no significant effect on HCD	0.0056 (0.374)	Not rejected

The null hypotheses for board gender diversity, board independence, and board multiple directorships are all rejected, confirming statistically significant effects of these three attributes on human capital disclosure, positive for gender diversity, negative for both independence and multiple directorships. The null hypotheses for board nationality diversity and board financial expertise cannot be rejected, indicating that, under the Two-Step System GMM specification and the extended fifteen-year panel, these two attributes do not have statistically detectable effects on disclosure.

3.7 Discussion of Findings

Taken together, the results show that the influence of board diversity on human capital disclosure is attribute-specific rather than uniformly positive. Disclosure itself is highly persistent, consistent with a path-dependent process in which firms that have historically reported human capital information are overwhelmingly likely to continue doing so a pattern that aligns with Resource-Based Theory's view of disclosure routines as firm-specific capabilities and Stakeholder Theory's emphasis on stable, long-run stakeholder relationships. Board gender diversity emerges as a genuine, positive, and theoretically well-supported driver of disclosure, offering a concrete governance lever for manufacturing firms seeking to improve how they communicate about their workforce. Board nationality diversity, while directionally positive, does not clear the bar of statistical significance in this longer sample, plausibly reflecting the still-limited average presence of foreign directors on Nigerian boards.

By contrast, both board independence and board multiple directorships are found to have robust negative effects on disclosure, cutting against the classical Agency Theory expectation that these attributes straightforwardly strengthen monitoring and voluntary transparency. The practical

implication is that formal independence, as currently defined and incentivized on Nigerian manufacturing boards, does not automatically translate into more expansive human capital reporting, and that governance reform should look beyond headcounts of independent directors toward ensuring those directors bring substantive expertise in sustainability and human capital reporting. The negative multiple-directorship effect supports the busyness hypothesis and suggests that regulatory or internal limits on the number of outside board seats a director may hold could help preserve directors' capacity for meaningful engagement. Board financial expertise shows only a weak, statistically inconclusive association with disclosure, indicating that financial specialists alone are not a sufficient lever for improving non-financial transparency; boards seeking to strengthen human capital disclosure specifically may need to complement financial expertise with human-resource or sustainability expertise. Firm size remains the most consistent control variable, reaffirming the visibility hypothesis, while profitability's earlier significance does not survive the extension of the panel to fifteen years, suggesting that its relationship with disclosure is less stable than previously believed.

4. Conclusion and Recommendations

The overall findings support the conclusion that the influence of corporate board diversity on human capital disclosure among listed manufacturing firms in Nigeria is material but attribute-specific: disclosure is a governance outcome that reflects the particular composition, orientation, and incentives of the board, rather than a purely mechanical reporting exercise.

- The strong persistence of human capital disclosure over time reflects an institutionalized, low-inertia disclosure regime, consistent with Resource-Based Theory's view of disclosure as a firm-specific capability and Stakeholder Theory's emphasis on stable, long-run stakeholder relationships.
- Board gender diversity is confirmed as a significant, positive driver of human capital disclosure, supporting Resource-Based Theory's view of diversity as a board-specific capability and Stakeholder Theory's prediction that gender-diverse boards are more attentive to workforce-related stakeholder interests.
- Board nationality diversity, while positively signed, is not statistically significant in the extended sample, implying that the disclosure-enhancing effect of internationally diverse boards documented elsewhere does not yet have a strong empirical basis in the Nigerian manufacturing setting, likely reflecting still-limited foreign representation on Nigerian boards.
- Contrary to the classical Agency Theory prediction, board independence has a significant negative effect on disclosure, indicating that formal independence is not, on its own, accompanied by the substantive engagement in transparency processes that the theory would predict.
- Board multiple directorships has a significant negative effect, consistent with the busyness hypothesis under Agency Theory, implying that directors with extensive outside directorships are less able to support voluntary disclosure efforts.
- Board financial expertise shows no statistically significant relationship with human capital disclosure, indicating that financial expertise alone is not sufficient to advance non-financial, workforce-related transparency.

4.1 Recommendations

- Manufacturing firms should continue to increase female representation on their boards through appointments and renewals, and regulators such as the Securities and Exchange Commission should

strengthen requirements for gender balance in corporate governance codes, including measurable diversity targets.

- Because the disclosure effect of board nationality diversity is currently statistically inconclusive, firms, the Nigerian Exchange, and corporate governance institutes should focus not only on appointing foreign directors but on ensuring their meaningful engagement in board deliberations on workforce and disclosure matters.
- Firms should look beyond the numerical share of independent directors and proactively assess independent directors' substantive capability in sustainability reporting and human resource matters, with nomination committees taking responsibility for ensuring independence does not inadvertently constrain voluntary disclosure.
- Firms should adopt internal governance policies complementing any regulatory limits restricting the number of external board seats a single director may hold, to preserve directors' capacity for meaningful engagement in disclosure processes.
- Boards should supplement financial expertise with human-resource, sustainability, or organizational-development expertise, whether through direct board appointments or dedicated advisory and governance committees, to strengthen the board's collective capacity for human capital transparency specifically.

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