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Digital Corporate Board: A Veritable Tool for Enhancing Board Performance among Listed Consumer Goods Firms in Nigeria

Adekunle Emmanuel Adegboyegun*, Zanne Ronelle Koppeschaar

Department of Financial Governance, College of Accounting Sciences, University of South Africa, South Africa.
*Email: adegbae@unisa.ac.za

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ABSTRACT

The adoption of digital corporate board has become a revolutionary mechanism for improving corporate governance and board effectiveness in emerging economies. Whilst digital transformation, IT governance, and technological preparedness describe broader organizational processes, digital corporate board construct isolates the board governance aspect. This paper explores the impact of digital corporate board on board performance in Nigeria. The study rested on ex-post facto research design and utilized secondary data covering the period between 2014 and 2024. The study population consists of all the Nigerian quoted consumer goods companies as at 31st December, 2024, and the entire population selected as sample size using census sampling technique. Annual reports of sampled firms were used for data collection and descriptive statistics, and robust regression analysis employed in the data analysis. The study findings revealed that board technology competency and E-portal system adoption have significant and positive impacts on board performance. The adverse influence of digital committee presence is, however, not statistically significant in board effectiveness. The study concludes that most digital board characteristics are vital in promoting the performance of corporate boards. The study suggests that organizations should focus on adding tech literates on their boards, conduct regular digital literacy training, digitalized the boardroom through adoption of E-board portal, and initiate a digital committee that is capable of bridging technology with strategic thinking. To guarantee sustainable growth in the consumer goods industry, Policy makers should formulate guidelines to standardize digital governance practices, augment oversight onus, and enhance disclosure of digital board strategies.

Keywords: Digital Corporate Board, Board Performance, Board Technology Expertise, Digital Committee Presence, E-board Portals, Consumer Goods Firms
JEL Classifications: M14, M15, Q55

1. INTRODUCTION

Corporate board performance is a fundamental element of firm success and a determining factor of shareholders value. Poor performance of boards is an international issue, and such challenges as poor oversight, lacks of board diversity, and conflicts of interest have brought about financial scandals and decreased stakeholders' trust. Blame on global risks like technological disrupts and polarization, which are highlighted by the World Economic Forum (2025), contribute to these challenges. The problems are more intense in Nigeria, as a result of ineffective institutional structures and inadequate implementation of governance codes, which tend to create suboptimal financial performance of listed companies. Ogbaisi and Ukinamemen (2020) stated that the boards in Nigeria exhibited a lack of independence and size imbalance, which are contributing factors to financial distress in industries with incompetent monitoring causing agency problems and low profitability. The unstable economic environment, high inflation, and scarcity of resources increase these challenges, making it difficult to make effective decisions and align the strategies (Owonifari et al., 2023).

An effective board gives strategic direction, effectively monitors the management and enforces compliance, ultimately enhancing

the value of firm. A board is commonly gauged by its success in terms of firm finances and stock market value. The digital board is an era that has been brought about by the rapid growth of technology which has basically transformed the face of corporate governance. This is one of the global trends and companies are moving towards digitalization to improve board efficiency and decision making. Abakpa and Dvoulety (2025) posited that digital boards are now the norm in developed economies and higher-order platforms are taking the place of meeting face-to-face, providing real-time information access, meetings at a distance, and safeguarding documents.

In Nigeria, while the adoption of digital technologies in corporate governance is still evolving, the COVID-19 pandemic has intensely spurred the change (Lateef and Akinsulore, 2021). Digital board is not just about adoption of technology but business transformation; it is a radical change in the operating mode of boards, as paper-based processes give way to a more flexible and nimbler, data-driven, and collaborative board model. The digitalization of a board is operationalized using a number of important proxies, including board technology experience, the existence of a digital committee, the use of e-board portal, and the disclosure of a board-level digital strategy (Ifegwu et al., 2023).

Board performance is a multidimensional concept and it is known as the effectiveness and the efficiency with which the board of directors carries out its oversight, strategic and advisory functions in order to improve shareholder value and corporate sustainability. It entails the ability of the board to check the management on the status of legal and ethical practices, and offer strategic direction to protect long-term corporate goals (Sagir et al., 2023). Board performance measurement is important to gauge the effectiveness of governance, especially in unstable business environments where the standard of oversight determines the resilience of the organization (Naciti, 2019). Although, corporate governance plays a very important role by ensuring that boards appropriately guide and manage their organizations to generate long-term value. Nevertheless, in a digital disruption time where everything is fast, the traditional board organization might not be sufficient to address the dynamics of the contemporary economy. Nigerian boards are seen to be working in non-digitized traditional ways that may not support their operations to deliver the agile and technologically savvy supervision to survive and grow competitively (Okonmah and Alade, 2025)

The key issues of most corporations are the absence of adequate knowledge and experience digital experts on their boards, and these contribute to making bad strategic choices when investing in technologies, ineffective control over cybersecurity risks and inability to take opportunities of digitalization (Smaili et al., 2023). This is coupled with the absence of a formal digital committee, thus, vital discussion regarding digital strategy, transformation projects, and upcoming technology risks are silenced in the general board meetings. The use of outdated tools contributes to delays in the information flow, security risks, and decreased involvement of the digital directors, which affects the effectiveness of the decision-making process of the board. According to Celestin and Mishra, 2025, there is existence of uncertainty among investors and other stakeholders due to the absence of transparency in terms of a board being digitalized. A board that does not clearly discloses its digital strategies, risks possibility of lack of direction or interest in going through the digital economy.

Despite a growing amount of research on digital board and firm performance nexus, there is a significant contextual gap. Much of the empirical research has been done in developed economies, including the USA, UK, Italy and Germany (Rubino and Napoli, 2020; Cathles, 2020; Weber, 2024; Valaskova et al., 2025), and in large Asian markets, such as China and India (Goel et al., 2022; Lu et al., 2022; Sahoo et al., 2023; Chen et al., 2023; Chen et al., 2024). There is a shortage of research that explicitly considers these dynamics in the institutional, regulatory, and economic environment that is specific to sub-Saharan Africa especially Nigeria. The results that were achieved in developed markets might not be necessarily applicable to this region because of the natural disparities in corporate governance standards, technological base and market maturity.

Generally, the performance of boards has been assessed through financial metrics, with the Return on Assets (ROA) and Return on Equity (ROE) becoming the most popular ones (Adegboyegun and Igbekoyi, 2022; Bawuah, 2024). The traditional financial indicators are used in most works (Adegboyegun et al., 2022; Odubuasi et al., 2022) about corporate performance but it is becoming increasingly questioned that these metrics do not necessarily reflect the overall performance of an entity. Unlike traditional financial metrics, this research took into account the Tobin Q, a more specialized valuation measure, which relates the market value of an entity to its replacement cost of assets (Adegboyegun et al., 2025).

In the majority of studies, the influence of one or another characteristic of a digital board was investigated. Lee et al. (2024) and Alam et al. (2025) emphasized on the digital expertise of the board only, whereas, Bel-Oms and Grau-Grau (2025) discussed the existence of a digital committee only. This is an unsophisticated method of producing the picture of a board in a digital posture. This gap is what is aimed to be filled in the current research through the simultaneous analysis of three properties that are different, yet interconnected. This broader picture approach offers a more realistic insight into the overall impact of different aspects of board digitalization on board performance.

The general intent of the research is to examine the impact of digital corporate board on board performance among listed consumer goods firms in Nigeria, between the year 2014 and 2024. This paper examines three major aspects of the digital board; they are board technology expertise, the existence of a digital committee and the use of E-board portal. The research has relevance to the management of corporate organizations and policy makers in the corporate governance realm because it allows the enhancements in stakeholders' engagement, better collaboration and productivity, and flexibility and accessibility.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Board Performance

Board performance is a complex concept used to describe the effectiveness and efficiency of board in terms of its oversight, strategic and advisory duties to maximize shareholder value and corporate sustainability. It involves the ability of the board to oversee the management, adhere to the legal and ethical standards, and offering a strategic direction which aligns with the long-term corporate goals (Sagir et al., 2023). Board performance measurement plays a key role in determining the effectiveness of the governance mechanism especially in a business environment that is very unstable where the quality of the governance has a direct impact on the entity resilience (Naciti, 2019). Whilst Tobin's Q continues to be a prevailing proxy of board performance because of its measurable association with company performance (Ishaq et al., 2021), such reliance creates a paradox in the literature. However, theorists have called to extend conceptualizations which would encompass strategic choices, risk management, and stakeholder involvement (Mouawad et al., 2025; Adegboyegun et al., 2025). The preference for Tobin's Q is due to the fact that these non-financial dimensions are difficult to operationalize. Board performance has been deemed to be multidimensional, but measurement practices still favour financial proxies, which might obscure the board contribution to long-term sustainability and resilience (Naciti, 2019; Sagir et al., 2023). Although, there are numerous indicators of board well-being, Tobin's Q is chosen because it is an effective performance metrics that proves the prospects of continuous growth and financial success in the long-term. In this study, board performance is considered as the effectiveness of the board of directors in carrying out its governance and oversight functions.

2.2. Digital Corporate Board

Digital corporate board is a set of digitalization-related characteristics, forms and technologies which are integrated into the board of directors to improve its governance and strategic potentials. It is the willingness and ability of the board to adapt to the vagaries of the digital economy (Abidi et al., 2023). Literature is unanimous about the fact that board digitalization is not a voluntary step but a key to efficient governance (Chen, et al., 2024; Richard, 2024). Such core traits as digital proficiency, specialized committees, and E-board portals are continuously found as mechanisms that enhance control and strategic orientation (Ifegwu et al., 2023; Naciti, 2019). However, there is a sense of fundamental contradictions behind this agreement. Digital tools are praised to increase efficiency and transparency, but at the same time, they also create vulnerabilities, especially as applied to cyber risks (Idris et al., 2025). Furthermore, researchers diverge on the board role: some emphasize its traditional oversight function, but others think that it needs to evolve into an architect of digital transformation (Weber, 2024). These diverge views bring out an important gap in literature. Though, digital boards are conceptually oriented on the necessity, their real influence on governance and resilience is not well tapped. This study views digital corporate board as the process of employing technology and technological tools to promote better governance, stakeholder engagement, productivity, effectiveness, efficiency, accountability and transparency. In advancement to existing literature, this paper investigates digital corporate board traits on three areas of focus that comprise board technology expertise, digital committee presence and the use of E-board portal.

2.2.1. Board technology expertise

Board technology expertise is linked to the presence of one or more directors on a company board who possess professional experience, professional knowledge, and skills in information technology, digital transformation, or cybersecurity, or related fields. It is not the general computer literacy but in-depth understanding of the skill to access the emerging technologies to create business value (Smaili et al., 2023). The literature refers to board technology expertise as an uncompromising determinant of the correspondence between the governance and the realities of the digital era (Adegboyegun et al., 2022; Smaili et al., 2023). IT or cybersecurity experience does not only enhance accountability of digital approaches but also indicates the company commitment to innovativeness and resilience to investors and other stakeholders (Alotaibi and Al-Dubai, 2024; Sahoo et al., 2022). However, there exist massive inconsistencies to this consensus. On the one hand, digital expertise has the merit of the strategic questioning and the proactive decision-making (Chen et al., 2023); on the other hand, there is a question, whether the digital expertise is measured in terms of the substantive betterment of the governance, or it is a symbol of the preparedness. Moreover, the conflict between the conventional boards of directors dominated by finance and digitally literate directors is an indication of a bigger dilemma, namely the need to strike a balance between financial responsibility and technological intelligence when it comes to the composition of the boards. These inconsistencies mean that despite the growing significance of the concept of digital expertise, the actual impact of this concept on the workability of governance is controversial. In this study, board technology expertise is considered as the availability of directors with technology-related skills and experience on the board.

2.2.2. Digital committee presence

According to Obeitoh et al. (2024), a digital committee is a formal board sub-committee, also referred to as a technology or cybersecurity committee, that is assigned the responsibility to oversee the digital transformation concerns, technology strategy, and cybersecurity risk. The creation of digital committees is a broader institutionalization of technology management, which means that the digital transformation and cybersecurity have become too central to be considered peripheral issues (Obeitoh et al., 2024; Obiora and Jeroh, 2023). By ensuring that the relevant professionals are installed on the board committees, it enhances the quality of the oversight and the standard of the CIO and CTO perspective in the strategic deliberation to create an extensive insight into technical factors (Alam, 2025; Abakpa and Dvoulety, 2025). However, this consensus masks some serious contradictions. On one hand, the committees are responsive and react better to the fluctuating technological risks (Appah and Tebepah, 2023), yet on the other hand, also create the issues related to the accountability: The complete board is the ultimate responsibility, but the specialization creates the risks of

fragmentated control. Also, even though the process of creating digital committees is often conceptualized as a sign of the maturity of governance and the digital committees are capable of delivering material benefits to the performance of firms, the literature is split on whether digital committees can result in material benefits to the performance of firms or represent a symbolic demonstration of preparedness (Bel-Oms and Grau-Grau, 2025). In this study, digital committee presence is understood as the presence of the formal committee that is responsible to supervise digital initiatives and strategy.

2.2.3. Use of e-board portals

Kumar (2023) described E-board portals as secured and cloud-based platforms that enable boards of directors to access meeting materials, interact with each other besides undertaking their governance functions in an online environment. E-board portals are widely presented as a hallmark of governance modernization and replacing the paper-based procedures with centralized, cloud-based procedures to make them more efficient and collaborative (Kumar, 2023; Onwuzuruoha and Akinola, 2025). All this is because of their features, such as real-time updates, annotation, and secure sharing of documents, enabling the directors to spend more time on strategic dialogue and enhancing the institutional memory (Obodozie and Nwabufo, 2025; Govenda, 2024). However, this agreement is full of significant contradictions. Although portals reduce risks related to the conventional means of communication by implementing encryption and multi-factor authentication (Elsayed et al., 2024; Pantelides, 2025), they also pose new issues, such as the dependence on digital infrastructure and the possibility that less tech-savvy directors will not be able to use them. Additionally, despite the fact that their introduction is usually discussed as the best proof of the modernization process, the literature is split on the idea of the E-portals having a beneficial impact on the effectiveness of governance or being rather a way of demonstrating the digital readiness. These strains underscore the necessity of empirical analysis of the expected governance results that are linked with portal adoption. E-board portals usage is considered in this study as the use of secure digital platforms for board communication, documents sharing, and meetings.

2.3. Theoretical Underpinning

This study is conceptualized using the Resource Dependence Theory (RDT) which views digital board features as mechanisms through which firms manage environmental uncertainties and lessening dependence on external actors (Pfeffer and Salancik, 2003). The knowledge of technology is essential, and internalizing it through board technology reduces reliance on outside consultants and allows boards to comprehend technological risks and opportunities in a more effective manner (Adegboyegun and Igbekoyi, 2022; Alotaibi and Al-Dubai, 2024). Equally, the creation of digital committees institutionalizes specialized management, whereby cybersecurity and digital transformation are approached as central governance roles as opposed to peripheral issues, hence minimizing exposure to external shocks (Obeitoh et al., 2024). By comparison, E-board portals offer safe internal infrastructure that reduces the use of unsafe external communication networks to increase efficiency and transparency in board procedures (Elsayed et al., 2024). All these characteristics support the main argument of RDT that the structure of an organization transforms in order to deal with resource dependencies and justify the postulates that digital board characteristics have a positive impact on board performance in the Nigerian consumer goods companies. Although, the theory of RDT has been negatively criticized due to its deterministic focus on environmental limitations (Zehir et al., 2019), the current paper adds a new dimension to the theory by emphasizing the role of agency in boards: Boards strategically implement digital features not only to cope with external factors, but to actively define their technological destinies.

2.4. Empirical Review

2.4.1. Board technology expertise and board performance

Ma et al. (2023) examined the impact of digital transformation on corporate risk-taking of Chinese A-share-listed companies. The Chinese A-share spanned 2010-2019 were samples. The analysis based on panel-data regression was conducted. Measurement of digital transformation and corporate risk-taking were done through text mining of corporate disclosures, and financial volatility and investment indicator respectively. The regression analysis indicated a strong and positive association meaning that tech-savvy boards are more likely to support strategic risks that incorporate innovation and growth, which may result in increased long-term performance.

Chen et al. (2024) investigated the relationship between board digitalization and corporate green innovation in China among the Chinese A-share listed companies. The data used multi-year panel spanning the 2010s into early 2020s. This research used panel-data regression analysis based on text mining and dual mechanism analysis. It operationalized the intensity of digital transformation through corporate disclosures, model the positive and negative pathways, and employed firm-level financial data to empirically investigate how digitalization influences performance under different financial and R&D conditions. The paper presents empirical evidence that the Chinese digital transformation has counterproductive impacts on the performance of firms. Although it is true that the digitalization can enhance productivity and innovation, it also adds to the operational costs and can deter performance of firms. Their two-way mechanism analysis identifies both ups and downs, moderated by financial and intensity of R&D.

Opuni-Frimpong et al. (2025) evaluated the influence of governance structure centered on cybersecurity on the financial outcomes and the operational effectiveness of banks in Ghana. The population included all the universal banks in Ghana. A purposive sample of 15 banks was selected spanned 2020-2023. The study employed mixed-method research approach that incorporated both secondary data on bank cyber incidents in bank publications and survey data from senior IT managers. The research used a panel-data regression model, and provides empirical evidence that cybersecurity governance committees increase the performance of Ghanaian banks substantially. In their study, they discovered that committee attributes, including IT expertise, the size, meeting frequency and the gender diversity have a direct impact on the financial performance and efficiency. They posited that banks with a top IT expertise had significantly fewer reported cybersecurity

breaches, indicating that risk oversight and board performance are improved with top-level IT expertise presence.

Filatotchev et al. (2025) explored the connection between the digital technology orientation (DTO) of CEO, board characteristics, and value of the listed Euronext Lisbon stock exchange. The study entailed mass sample of publicly listed companies in different industries with regard to the interaction between the leadership orientation and the governance structures. To test the hypothesis of whether CEO digital orientation and board governance have an effect on firm value, this paper applied a multi-year panel, text mining and regression analysis. The researchers found that the company, in which the top officers are digital technology oriented to a considerable extent, is valued higher since the markets perceive the latter as the sign of readiness to innovate and adaptability. The study provides strong empirical results that the digital technology orientation of the CEOs increases the value of firms, but its success depends on the characteristics of the boards. Independent, digital competent and diverse boards can increase the signaling effect, but boards that are overly large may weaken it. Thus, we present our first hypothesis as follows:

H_1: Board technology expertise does not have a significant effect on the board performance of listed consumer goods firms in Nigeria.

2.4.2. Digital committee presence and board performance

Li and Zhang (2020) examined the interaction between digital transformation and the corporate governance framework to impact firm performance among Chinese A-share listed firms within the period of 2007-2020 (covering the emergence of digital adoption among the Chinese firms) by employing panel-data regression with text mining and governance indicators. They used the combination of digital intensity measures and corporate governance variables and employed robust regression analysis to capture both the moderated and the direct effect. Empirically, the study demonstrates that a stronger system of corporate governance, especially board independence, digital committee and IT expertise, minimizes the probability and intensity of a data breach. This indicates that digital committees are viewed by the investors as being indicative of better risk management.

Olutimehin et al. (2024) performed a thorough study on corporate governance and stakeholder engagement in Nigerian companies, investigating the existing practices and the possible opportunities of improvement. The study combined quantitative data (financial statements, regulatory submissions, corporate reports) with the qualitative data obtained through the stakeholder's surveys, interviews, and focus groups. This mixed-method approach allowed them to specify problematic issues and opportunities that can be used to design specific solutions. The authors stressed that the effective interaction with the stakeholders is crucial in order to embrace a variety of viewpoints and ensure the legitimacy of the initiatives offered. Ultimately, the study established that specialized oversight provided by the board committees such as audit, risk, technology and remuneration committees improves organizational performance and, thus, provided a definite connection between committee formations and better performance of Nigerian firms.

Olowofela et al. (2025) studied the influence of the presence of board technology committee on the operational efficiency of the deposit money banks in Nigeria. A panel-data regression design was used. Their design strictly tests the effect of the board structure, ownership concentration, and committees on the profitability and efficiency, while controlling for bank-specific traits. The panel regression results revealed that corporate governance structures such as board independence, concentration of ownership, board committees, and separation of CEO/Chair positions have a substantial positive effect on the performance of banks in Nigeria. Their results indicate that governance is an important factor in profitability and efficiency in the banking sectors of emerging economies. This implies that there is increased efficiency with regard to technology deployment and management with specialized oversight.

First announced in 2019 by Weill et al. (2025), using MIT CISR, 24% of company boards were reported to be digitally savvy, and digitally savvy boards showed significant performance benefits. In 2024, the analysis was reiterated with revised information and found that the initial criteria of being digital savvy could not differentiate board effectiveness any longer. But as soon as the framework was updated to capture the new technologies like artificial intelligence, the results reverted to performance premiums in the same fashion as in 2019. The briefing compared the two studies, factored in the standpoint of the interviews with non-executive directors and explored the leveraging of the board committees to handle the growing workloads. Altogether, the study proved that the digitally savvy boards, when measured on a modern scale, are firmly connected with better financial performance. Thus, we present our second hypothesis as follows:

H_2: The presence of a digital committee does not have a significant influence on the board performance of listed consumer goods firms in Nigeria

2.4.3. Use of E-board portals and board performance

Leblanc and Gillies (2010) offered a detailed discussion of the reality of boards of directors functioning in practice, beyond the formal framework, to explore the dynamics of the boardroom behaviour, communication and decision making. Information gathered in the form of in-depth interviews with directors, executives and professionals in the field of governance and board meetings observations. The patterns in boardroom interaction, information flow, and governing practices were determined through thematic analysis. This research was practice-based evidence that the effectiveness of the board structure is not necessarily determined by structures, but the quality of information, communication and cohesion among directors. It confirmed that the accessibility and security of the information can be enhanced using board portals, and the most important aspects of the board performance are the substance and clarity of information.

Even though not a statistical study, Govenda (2024) presented practical evidence from governance practice indicating that board portal adoption enhances reporting timeliness. This conforms to the empirical studies' findings conducted on the Nigerian listed firms where portal adoption was linked with shorter audit report lag. The report focused on the efficiency of modern board reporting

processes that are promoted by the board portal technology. It also pointed out the best practices that can be implemented by organizations to make the communication process more streamlined, enhance transparency, and faster decision-making. The research established that the audit report lag was much lower in firms that utilized E-board portals.

Pantelides (2025) did a comparison to determine the suitability of board portals versus more general collaboration tools to support governance activities. The study emphasizes that board portals are specifically designed to meet governance needs, whereas generic tools lack the tailored functionalities required for effective board operations. Though the research is practice-based rather than empirical, it provides practical evidence that governance-oriented portals would provide better results in board effectiveness. These observations are in line with survey findings from Singaporean listed companies, which reveal that the application of advanced portal features is a strong predictor of heightened board meeting effectiveness.

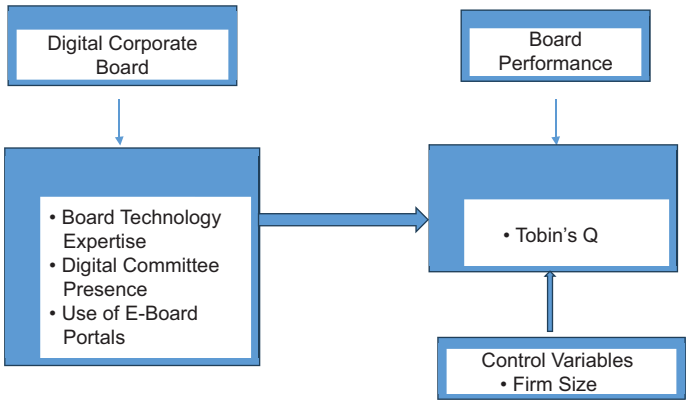
Onwuzuruoha and Akinola (2025) examined the impacts the adopting virtual meetings has had on corporate governance practices in Nigeria. Through qualitative and exploratory approach, it examined the issues, possibilities, and views of stakeholders with regard to the transition of the face-to-face boardroom sessions to an online platform. The research presented a finding that virtual meetings have the ability to enhance governance efficiency in Nigeria but does not necessarily enhance governance quality. Effectiveness depends on the quality of shared information and the reliability of technologies and regulatory support. This is consistent with the general results in governance literature where accessibility and timeliness are improved with the adoption of technology but needs to be supported by good governance practices in order to be effective. Thus, we present our third hypothesis as follows:

H_3: The use of E-board portals does not have a significant effect on the board performance of listed consumer goods firms in Nigeria.

2.5. Conceptual Framework

Figure 1 depicts the interactions between the dependent variable (board performance) and the independent variable (digital corporate board). The conceptual framework depicts how digital corporate board practices affect the performance of corporate boards in Nigerian listed consumer goods companies.

Figure 1: Conceptual framework



Source: Authors' Design (2025)

3. MATERIALS AND METHODS

In order to investigate how digital corporate board affects the board performance of consumer goods firms in Nigeria, this study utilizes an ex-post facto research design, drawing data from the annual reports of listed consumer goods companies in Nigeria. The entire population of 20 consumer goods firms operating in Nigeria is included in the study using a census sampling approach. The research spanned 11 years, from 2014 to 2024. While annual reports provide reliable data on board composition, committee structures, and financial performance, not all digital board features are consistently disclosed. Board technology expertise was identified through director biographies, and digital committee presence was extracted from governance disclosures. E-board portal usage, however, is not always reported in annual filings; in such cases, supplementary sources such as company websites and press releases were consulted. Where no evidence was available, portal usage was coded as absent. Missing data were handled through listwise deletion in regression analyses, and sensitivity checks confirmed that the exclusion of incomplete cases did not materially affect the results. This approach ensures that the study remains grounded in publicly available information while acknowledging the limitations of disclosure practices.

3.1. Model Specification

This study states the model in conformity with the study carried out by Obeitoh et al. (2024) on the moderating role of audit committee expertise on the relationship between board attributes and earnings quality, but modified by the removal of variables such as board size, board independence and gender diversity and by incorporating the effect of E-board portals usage. Earnings persistence and smoothen were also replaced by Tobin's Q, which is more of a specialized valuation tool. Despite recognized volatility in Nigerian equity markets, Tobin's Q is retained as the primary performance proxy because it reflects investors' forward-looking assessment of boards' strategic, oversight, and risk-management effectiveness—dimensions central to digital governance. To address market inefficiencies, the study employs winsorization of extreme values, and estimates models with firm and year fixed effects alongside controls for firm size. This approach preserves Q's conceptual alignment with governance impacts while mitigating volatility-induced bias and enhancing inferential validity. The functional form of the model is presented thus:

$$TQ_{it} = \beta_0 + \beta_1 BTE_{it} + \beta_2 DCP_{it} + \beta_3 EBP_{it} + \beta_4 Fsize_{it} + \mu_{it}$$

Equation 1

Where:
TQ = Tobin's Q
BTE = Board Technology Expertise
DCP = Digital Committee Presence
EBP = Use of E-Board Portals
Fsize = Firm size
$\beta_1 - \beta_4$ = coefficient of the variables
it = Time coefficient
μ = error term.
B_0 = constant or intercept.

The a priori expectation based on the literature reviewed and theories is predicted as $\beta1 > 0$, $\beta2 > 0$, $\beta3 > 0$, and $\beta4 > 0$.

3.2. Description and Measurements of Variables

Table 1 presents the description and measurement of the study variables, outlining how each variable is defined conceptually and operationally. This table ensures clarity and consistency in the study's methodology by specifying how each variable is assessed.

3.3. Data Analysis Techniques

For data analysis, the study employed both descriptive statistics, such as mean, median, variance, standard deviation, skewness, and kurtosis and inferential statistics, including panel regression analysis, correlational analysis, among others.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

This section outlines the characteristics of the variables employed, the data analysis procedures, and the findings of the study. The reported statistics provide a summary of the distribution of the variables.

4.1. Descriptive Statistics

Table 2 displays the descriptive statistics on the distribution and characteristics of the key variables used in analyzing the relationship between digital corporate board and board performance among listed consumer goods firms in Nigeria. Board technology expertise has a mean of 0.30 with a standard deviation of 0.4593. This indicates that roughly 30% of the sampled firms have at least one board member with technology-related qualifications or experience. The positive skewness (0.8729) indicates a right-skewed distribution. The mean of the digital committee presence is 0.0091 and standard deviation of 0.0951. This means that technological-oriented board teams are highly rare. The skewness (10.3445) and kurtosis (108.0092) are extreme and show a highly skewed distribution at the value of zero. Conversely, E-board portals depict a mean of 0.10 and standard deviation of 0.3007, meaning that <10% of companies engage digital sites for board communications, meetings and to manage documents. The skewness (2.6667) and kurtosis (8.1111) are positive, which proves that the use of digital portals is limited.

In addition, the mean of firm size 9.6643 with a standard deviation of 3.1942 represents another scale throughout the sample. The skew (−2.4594) is negative indicating left skewness, and that majority of the firms are very big. The value of 7.7404 of kurtosis shows that observations are heavily concentrated in the center. Similarly, Tobin's Q has a high standard deviation of 7.7736 and a mean of 2.5768. This means that there is a high difference in the market valuation. The distribution is skewed towards low performance because of the extreme skewness of 5.1621 and kurtosis of 32.0526. Generally, the descriptive statistics demonstrate that board digitalization remains nascent among Nigerian listed consumer goods companies.

4.2. Test of Variables

This part provides the necessary pre-estimation and post-estimation diagnostic tests done to ascertain the reliability and validity of the study results. Unit root tests, correlation analysis, and multi-collinearity tests were run to confirm the appropriateness of data

Table 1: Description and measurements of variables

S. No	Variables	Description	Measurement	Source
	Independent variables (Digital Board)			
1	Board Technology Expertise (BTE)	The presence of directors with technology-related skills and experience on the board.	Dummy variable: 1 if at least one board member has a technology-related qualification or experience, 0 otherwise.	(Ma et al., 2023; Xu et al., 2025)
2	Digital Committee Presence (DCP)	The existence of a formal committee dedicated to overseeing digital initiatives and strategy.	Dummy variable: 1 if the firm has a dedicated digital or technology committee, 0 otherwise.	(Olutimehin et al., 2024; Olowofela et al., 2025)
3	E-Board Portals (EBP)	The use of secure digital platforms for board communication, document sharing, and meetings.	Dummy variable: 1 if the firm uses an e-board portal, 0 otherwise.	(Pantelides, 2025; Onwuzuruoha and Akinola, 2025)
4	Dependent Variable: Board Performance	The effectiveness of the board of directors in carrying out its governance and oversight functions.	Can be a composite index using Tobin's Q	(Filatotchev et al., 2024; Adegboyegun et al., 2025)
5	Control Variable: Firm size	The asset base of the firm	measured as the natural logarithm of total assets.	(Cao et al., 2021; Ahrens et al., 2025)

Source: Authors' compilation (2025)

Table 2: Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
BTE	220	0.3000	0.4593	0	1	0.8729	1.7619
DCP	220	0.0091	0.0951	0	1	10.3445	108.0092
EBP	220	0.1000	0.3007	0	1	2.6667	8.1111
Fsize	220	9.6643	3.1942	0	12.1187	−2.4594	7.7404
TQ	220	2.5768	7.7736	0	64.1769	5.1621	32.0526

Source: Authors' computation (2025)

and assumptions of the model. Post-estimation tests (Hausman specification test and the heteroscedasticity diagnostics) were also run to ascertain the suitability and efficiency of the selected econometric model.

4.2.1. Pre-estimation test

The stationarity of the digital board attributes, firm size and Tobin's Q were evaluated with the help of the Harris-Tzavalis (HT) panel unit root test as shown in Table 3. The null hypothesis denotes that the panel series have unit roots and the alternative hypothesis states that the series is stationary. The findings show that the test statistic of board technology expertise is 0.0000 with z-value of −13.2196 and P = 0.0000. This causes a serious rejection of the null hypothesis at the 1% level of significance. This proves that board technology expertise is stationary. The digital committee presence variable presents 0.0000 of test statistic, 13.2196 of z-score, and 0.0000 of P-value. This leads to the rejection of the null hypothesis, and confirms the stationarity of digital committee presence. To utilize E-board portals, the test has P = 0.0000, z-score of −13.2196, P = 0.0000. This means that the null hypothesis is highly rejected, and use of digital platforms in communicating and documenting board activities is stationary.

Conversely, the test statistic of firm size is 0.7750, z-value is 0.4415 with a P = 0.6706. This is much greater than conventional significance levels, the null hypothesis cannot be rejected. This means that firm size is non-stationary, and it was modified. On the final note, Tobin's Q has a test score of 0.5293, z-value of −3.8907 and a P = 0.0000. The P-value is very high and, therefore, the null hypothesis is rejected. This implies that Tobin's Q is stationary at levels. Concisely, all the variables except firm size are stationary in levels, which is the major condition of valid estimation of panel data and justifying the soundness of subsequent regression analysis.

4.2.1.1. Correlation analysis

Table 4 illustrates the correlation analysis done to test the strength and direction of the linear relationships among the variables. The results are less than moderate correlations, and implies a low possibility of multi-collinearity. In particular, the relationship between board technology expertise and the presence of digital committee is 0.0418 with a P = 0.5374. Although, this is statistically insignificant, it means that the presence of technology-qualified directors does not always result in the establishment of a special digital board committee. Conversely, a moderately and significantly positive correlation is revealed by a coefficient of 0.5092 with a P = 0.0000 between board technology expertise and E-board portals. It means that companies where the board members have technological skills are significantly more inclined towards using the electronic board portals as the method of communication, meetings, and sharing documents. Similarly, the size of a firm is positively and significantly related to board technology expertise (r = 0.2730, P = 0.0000). This implies that larger companies would find it easier to appoint digitalized directors.

Firm size has a weak but statistically significant positive correlation with E-board portals at a correlation coefficient of 0. 1585 and a P = 0.0187. This shows that there is a mild propensity of bigger companies to utilize digital board tools. Nevertheless, Tobin's Q reveals statistically insignificant tie-in with all independent variables: Board technology expertise (r = 0.0493, P = 0.4666), digital committee presence (r = 0.0233, P = 0.7306), E-board portals (r = 0.0199, P = 0.7688), and the firm size (r = 0.0626, P = 0.3557). This implies that, when considered separately, none of the digital governance qualities or firm size shows any significant linear association with market-based firm valuation. The results shows that the relationship is mostly weak to moderate, implying low chances of multi-collinearity and the outcome supports the appropriateness of the variables in the regression model.

4.2.1.2. Multi-collinearity

Variance inflation factor (VIF) test was done to determine the chances of multi-collinearity of the independent variables. The findings in Table 5 indicate that all the variables have VIF values that are lower than the generally accepted value of 10. It means that there are no serious issues of multi-collinearity. Precisely, the VIF of board technology expertise is 1.42, E-board portals is 1.37, firm size is 1.08, and the least is 1.02 by the digital committee presence. The mean VIF of all the predictors is 1.22. This explains why it could be concluded that these variables are mostly independent of each other. The tolerance values (computed as 1/VIF) lie between 0.70 and 0.98. While this is substantially above the prescribed minimum of 0.10, it indicates robust distinctiveness among the predictor variables.

4.2.2. Post-estimation tests

The possible model specification errors were identified using Ramsey RESET test. The null hypothesis asserts that the model

Table 3: Harris-Tzavalis unit-root test

Variable	Statistic	Z-statistics	P-value
BTE	0.0000	−13.2196	0.0000
DCP	0.0000	−13.2196	0.0000
EBP	0.0000	−13.2196	0.0000
Fsize	0.7750	0.4415	0.6706
TQ	0.5293	−3.8907	0.0000

Source: Authors' computation (2025)

Table 4: Pairwise correlation

Variable	BTE	DCP	EBP	Fsize	TQ
BTE	1.0000				
DCP	0.0418	1.0000			
	0.5374				
EBP	0.5092	0.1277	1.0000		
	0.0000	0.0586			
Fsize	0.2730	0.0498	0.1585	1.0000	
	0.0000	0.4621	0.0187		
TQ	−0.0493	−0.0233	0.0199	−0.0626	1.0000
	0.4666	0.7306	0.7688	0.3557	

Source: Authors' computation (2025)

Table 5: Variance inflation factor

Variable	VIF	1/VIF
BTE	1.42	0.701952
EBP	1.37	0.729139
Fsize	1.08	0.923679
DCP	1.02	0.981590
Mean VIF	1.22	

Source: Authors' Computation (2025)

is specified correctly, and the alternative hypothesis posits the presence of omitted or mis-specified variables. Table 6 provides these results. The P-value exceeding 0.05 indicates the inadequacy of evidence to dismiss the null hypothesis and proves the model is stated correctly. An F-statistic of 51.59 and a P = 0.0000, is less than the 5% significance threshold, and indicates evidence of an omitted variable. The Breusch Pagan/Cook Weisberg test was performed to test whether the variance of the residuals is constant (homoscedasticity) or not. Homoscedasticity and heteroscedasticity are presumed by null and alternative hypothesis respectively. A significant chi-square test value with a P < 0.05 is evidence of the non-existence of homoscedasticity. Consequently, the null hypothesis of equal variance is discarded which proves the existence of strong heteroskedasticity.

To test the existence of normal distribution of the variables, the Shapiro-Wilk test was conducted. The null and alternative hypothesis posit that the data are normally, and not normally distributed respectively. The P-value above 0.05 helps in accepting the null hypothesis but a P-value lower than 0.05 results in rejection. All tests except firm size with a P = 0.0000 which has strong evidence against normality. Nonetheless, with F-statistic of 233.81 and P = 0.0000, Wooldridge autocorrelation test indicated that the first-order serial correlation is strong in the residual. Similarly, F-test was done to find out whether the fixed effects model is jointly equal to zero. The null hypothesis suggests that the effects of all individuals (firm-specific) are equal to zero. It means that a pooled OLS model is adequate. The alternative hypothesis presumes non-zero for some of the effects. This justifies the utilization of a fixed effect specification. With F-statistic and of 43.24 and P = 0.0000, the null hypothesis is rejected. This implies the fixed-effects model is preferred statistically to pooled OLS.

To further decide between the random effects model and pooled OLS, the Breusch-Pagan Lagrange Multiplier (LM) test was applied. The test yielded a statistic of 672.91 with a P = 0.0000. This leads to the rejection of the null hypothesis that the random effects variance component is zero. This result supports the random effects model over pooled OLS. To choose between fixed effects and random effects, the Hausman test was employed. The test produced a chi-square value of 0.22 and a P = 0.8970. While this is not statistically significant, it implies that the random effects estimator is consistent and efficient. Due to the presence of heteroskedasticity, autocorrelation and non-normality, robust regression analysis was implemented.

4.3. Digital Corporate Board and Board Performance among Listed Consumer Goods Firms in Nigeria

Preceded diagnostic model selection methods indicated that random-effects model was the most appropriate for this study. But panel-specific heteroskedasticity and autocorrelation were detected and this justified the use of a robust regression analysis. As a result, the evaluation of the effect of the variables was centered on the coefficients and the corresponding P-values of the robust regression. Table 7 provides these results. The overall regression equation revealed that Tobin's Q is very significant. The F-statistic of 32.26 and a P = 0.0000 states that the independent and control variables jointly is significant in their explanation of

Table 6: Summary of post-estimation test results

Test	F-statistics	P-value
Ramsey RESET test	51.59	0.0000
Breusch-Pagan/Cook-Weisberg test for Heteroscedasticity	37.56	0.0000
Wooldridge test for autocorrelation in panel data	233.86	0.0000
F test that all ui=0: F (45, 549)	43.24	0.0000
Breusch and Pagan Lagrangian multiplier test for random effects	672.91	0.0000
Hausman test	0.22	0.8970
The Shapiro-Wilk test: BTE	1.363	0.0864
EBP	5.719	0.0000
Fsize	9.766	0.0000
DCP	10.119	0.0000
TC	10.846	0.0000

Source: Authors' Computation (2025)

Table 7: Robust regression analysis

TC	Coefficient	Standard error	P>z
BTE	0.5702	0.0879	0.0000
DCP	−0.2607	0.3587	0.4680
EBP	0.3134	0.1317	0.0180
Fsize	0.0452	0.0110	0.0000
_cons	−0.0058	0.1079	0.9570
Wald chi2(3) =	32.26		
Prob>chi2=	0.0000		

Source: Authors' Computation (2025)

the substantial proportion of board performance variation. Board technology expertise has a positive and statistically significant effect (b = 0.5702) on the Tobin's Q (P = 0.0000). This implies that companies whose board members have some technological knowledge have a higher board performance. Also, The E-board portals usage positively and significantly relates to Tobin's Q (b = 0.3134, P = 0.0180). This implies that companies that use digital platforms for board meetings, communication and document sharing tend to possess high performance.

Conversely, the digital committee presence has a negative but non-significant coefficient (b = −0.2607, P = 0.4680). This implies that the existence of a technology-based board committee does not have a substantial impact on board performance. The control variable shows a positive and significant effect (b = 0.04520, P = 0.0000). This shows that larger companies posit better board performance. Overall, these results demonstrate that board digitalization, especially technological expertise, and adoption of E-board portals have beneficial impacts on its performance. The mere creation of a digital committee, does not bring any quantifiable board performance gains in this regard.

4.4. Discussion of Findings

The regression analysis showed that board technology expertise has a positive and statistically significant effect on board performance. This implies that a technologically competent board is better able to improve the board performance of a firm. This result aligns with prior studies such as Ma et al. (2023), and Opuni-Frimpong et al. (2025), which emphasized that technologically savvy boards contribute to stronger governance and greater competitiveness in an increasingly digital business environment. This finding is in line with the assumption of resource dependence

theory, which posits that board-level digital expertise has become a critical resource to manage and reduce a firm's dependence on the external environment. This does not align with Chen et al. (2024), who argued that digital transformation has paradoxical effects on firm performance.

The negative but statistically insignificant effect of digital committee presence suggests that the mere establishment of such committees does not automatically enhance board performance. This finding raises questions about whether these committees are symbolic rather than functional, particularly in contexts where firms lack the technical expertise or resources to make them effective. Unlike prior studies that reported positive impacts (Li and Zhang, 2020; Olutimehin et al., 2024; Olowofela et al., 2025; Weill et al., 2025), the Nigerian consumer goods sector may face unique challenges: Limited availability of directors with digital expertise, weak integration of committee recommendations into board strategy, and market inefficiencies that obscure governance effects in valuation metrics. These results highlight the importance of committee effectiveness, not just committee existence, and suggest that future research should examine the quality, capacity, and functional role of digital committees rather than their mere presence.

Also, the regression analysis carried out results in a significant positive relationship between the use of E-portal platforms and board performance. This suggests that firms that employ secure digital platforms for board activities such as communications, decision-making, and documentation improve board performance. This includes quicker access to critical information, more effective deliberation, and streamlined governance processes. This supports the view advanced by Leblac and Gillies (2010), Govenda (2024) and Pantelides (2025) that the adoption of e-board portals improves board process efficiency. This finding does not agree with the view of Onwuruoha and Akinola (2025), who indicated that the e-board portal did not automatically guarantee board performance.

In the same vein, firm size demonstrates a positive and significant effect on board performance. This suggests that larger firms generally achieve higher board performance. This is likely attributable to their investment in governance processes, internal control and digitalization of board processes. This finding is not consistent with the study of Cao et al. (2021) and Ahrens et al. (2025), who posit that larger boards in bigger firms may enhance monitoring and resource dependence, but the effectiveness is moderated by national governance quality and that larger boards may slow decision-making.

5. CONCLUSION AND POLICY IMPLICATIONS

This paper tested the impact of digital corporate board on the performance of boards of consumer goods firms in Nigeria. Literature regarding digital corporate boards and their impact on board performance was reviewed. Board technology expertise, digital committee presence and E-board portals data were collected from annual financial reports of 20 sample companies from 2014 to 2024. These data were analyzed using a robust regression analysis. The analysis indicates that board technology expertise positively influences board performance. This means that in the digital era, companies that have technologically skilled board members will be at a better position to make sound decisions that lead to improved value creation and competitiveness. Likewise, board performance is greatly enhanced by the adoption of E-board Portals, indicating that digital platforms advance board activities.

The presence of digital committee was however negatively correlated to board performance but statistically non-significant. This implies that merely establishing a digital committee does not automatically improve a firm's board performance. Firm size was discovered to have positive and significant association with board performance. This shows that bigger companies would do better in board digitalization and performance. In conclusion, the study confirms that board-level digital transformation through technology expertise and digital communication platforms serves as a critical driver of board performance.

Therefore, this study has advanced the existing contributions in literature by providing evidence on the subject matter from the consumer goods firms being a major sector in the economy. As regards policy recommendations, it is recommended that firms should prioritize the inclusion of technologically skilled and experienced personnel on their boards. Also, companies should conduct routine digital literacy trainings to keep their current directors abreast of the new technologies and how they may influence firm strategy and output. In addition, firms should embrace the use of E-board portals to streamline board processes. Although, having a digital committee might not necessarily ensure performance improvement, the empowerment of such committees will enhance its performance. Policymakers should establish guidelines to standardize digital governance practices, increase oversight onus, and fostering improved board-level digital strategy disclosure in order to sustainable growth in the consumer goods industry.

This study has some limitations that need to be acknowledged, despite the fact that it provides numerous insightful information. To start with, its focus on Nigerian consumer goods firms restricts the generalizability of the findings to other industries or regions. Second, the relatively small sample size may reduce statistical robustness, while reliance on annual reports limits the capture of qualitative dimensions of board practices. Third, the analysis of digital committees considered only their existence without evaluating effectiveness, and contextual governance conditions alongside rapid technological change may further influence outcomes and comparability across countries.

Building on these limitations, future research should broaden the scope beyond Nigerian consumer goods firms to include diverse industries and cross-country comparisons, thereby enhancing generalizability. Larger samples and mixed-method approaches could provide deeper insights, particularly by capturing qualitative dimensions of board practices that annual reports may overlook. Further studies should evaluate the effectiveness and functionality of digital committees rather than their mere existence, examining

how they integrate into board strategy and decision-making. Finally, exploring the moderating role of national governance quality, regulatory environments, and technological maturity would enrich understanding of contextual influences.

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