

RESEARCH ARTICLE

Business Intelligence, Corporate Governance and Economic Performance: Evidence from Transcorp Conglomerate for the period 2012 - 2021

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Abstract

Investment in business intelligence keeps soaring as businesses strive to achieve timely data-driven decisions. This empirical study desired to quantitatively establish if the huge investment in business intelligence translates to increased profitability; and if its interaction with corporate governance variables like board emoluments and meetings lead to significant increase in profitability. Anchoring on economic theory with secondary data from Transcorp Conglomerate from 2012 – 2021, the research established that: excessive investment in business intelligence leads to significant decrease in profitability; high board emoluments and increased number of meetings have significant negative effects on profitability; bank size have significant positive effect on profitability; the interactions of business intelligence and board emoluments as well as the interactions of business intelligence and board meetings have significant positive effects on profitability; and the interaction of business intelligence, board emoluments and board meetings has significant negative effect on profitability. The study established the relevance of economic theory on business intelligence and governance study; and recommends that firms in general should optimise their business intelligence investment by linking it to profitability (which is the overall measure of economic performance).

Keywords: Business intelligence; corporate governance; economic performance; hardware and software investments; profitability

Introduction

Businesses invest in business intelligence for numerous reasons which include speedy delivery of services, enhance efficiency, and optimization of profitability. In order to sustain these objectives in the long run, increased market share and customer retention, increased revenue and decreased cost, businesses must be able to derive added value which is more than the cost of deploying and sustaining business intelligence for its operations. (Fink, Yogev & Even, 2016; Popovič, Turk & Jaklič, 2015; Lyke-Ho-Gland, 2017; Rama, Zhangb & Koroniosc, 2016). The demand by Lautenbach, Johnston and Adeniran-Ogundipe

(2017) for the quantification of the cost-benefit analysis of investment in business intelligence spurred academic debate as earlier studies viewed the concept of business intelligence (BI) from the lens of promoting business processes with the core objective of promoting business analytics and data driven decision-making (Livingston (2017). Business intelligence can promote organizational sustainability and can also mar it depending on the match between its economics: the nexus between the cost and returns on BI investment has led to underpinning BI studies with economic theory by finance and business experts (Lebied, 2017; Phocas Software, 2018). Businesses must be able to make positive returns from investments on BI

deployment if their business processes must be sustainable. Again, the need to anchor BI deployment and sustenance on cost-returns matrix is to keep businesses innovative in their objective to respond to the ever-changing market dynamics more swiftly, focused, and objectivity (Roth, 2017).

Governance of businesses has gone scientific as decisions are mostly taken on available data. So, modern corporate governance key stakeholders like members of the boards and top management work mostly work with data. There is need for an empirical study of the interaction between corporate governance and business intelligence investment. The effect of such interaction on the overall efficiency (profitability) of businesses is a forgotten aspect of BI studies. This is the crux of this study. Recent studies on BI investment failed to integrate corporate governance (see: Ahlijah, 2022; Wahua and Ahlijah, 2020). Governance is very critical for both small and large businesses. A conglomerate like Transcorp Group of business makes a good case study for this study: it has seven large subsidiaries (Transcorp Hilton Abuja, Transcorp Hotels Calabar, Aura by Transcorp Hotels, Transcorp Power Delta State, Transafam Power Limited Rivers State, Transcorp OPL 281 Nigeria Limited, and Transcorp Energy Limited); it is listed in the Nigerian Stock Exchange; and it is a home grown Nigerian conglomerate; and its governance structure and investment in business intelligence technology is top-notch (based on reviewed literature).

The objective of this study is to establish the moderating role of business intelligence on the relationship between corporate governance and economic performance of Transcorp Conglomerate using audited secondary data from 2012 to 2021. Specifically, the study aims at

establishing if: (i) Business intelligence significantly affects the profitability of Transcorp conglomerate; (ii) Board emoluments significantly affect the profitability of Transcorp conglomerate; (iii) Board meetings significantly affect the profitability of Transcorp conglomerate; (iv) The size of Transcorp Conglomerate significantly affects its profitability; (v) Business intelligence significantly moderates the relationship between board emoluments and profitability of Transcorp Conglomerate when the impact of size is controlled; (vi) Business intelligence significantly moderates the relationship between board meetings and profitability of Transcorp Conglomerate when the impact of size is controlled; and (vii) Business intelligence significantly moderates the relationship between board meetings, board emoluments, and profitability of Transcorp Conglomerate when the impact of size is controlled.

Literature

Theoretical Framework – Economic Theory

Gibson, Arnott and Jagielska (2004) as cited by Wahua and Ahlijah (2020) wondered why recent studies have failed to quantitatively connect the ever-increasing BI cost to firm productivity (the technically called it profitability paradox). BI deployment and sustenance is capital intensive; and the need for all rational investor to carry out cost-benefit analysis of decisions to deploy and sustain BI from time to time in order to empirically establish if it is worth the high cost outlay (Mbawuni & Nimako, 2015). This is the canon of economic theory of BI investment. Wahua and Ahliah (2020) adopted this theory.

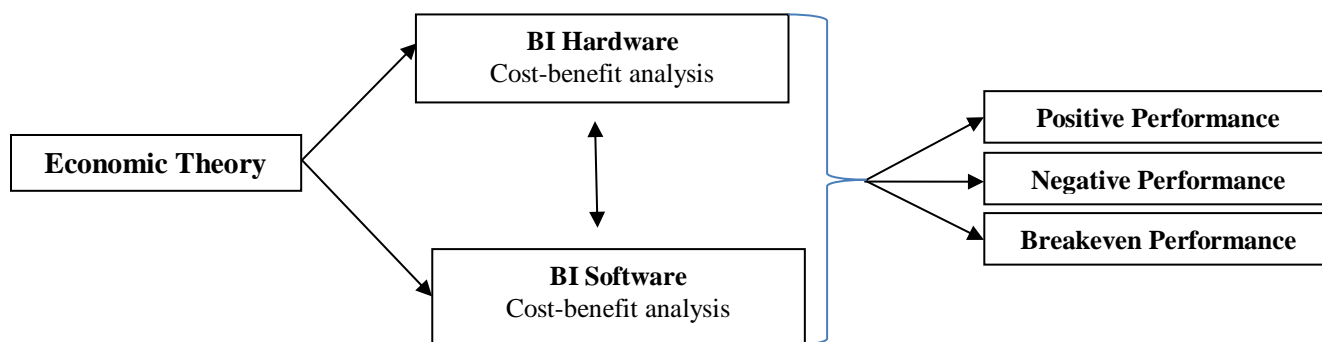


Figure 1: BI-Economic theoretical framework diagram. Source: Authors (2023)

Figure 1 captures the economic theoretical framework of business intelligence investment. The critical elements of BI investment are hardware and software. Technically, investment in BI is the summation of hardware and software costs. According to Wahua and Ahlijah (2020), the economic theory of BI holds that its cost-benefit analysis could result to positive performance (when investment is lesser than returns), negative performance (when investment is higher than returns), and it could be breakeven (when investment is equal to returns). The cost-benefit model of BI is quantitative in nature and predicts and predicts how a unit change in BI investment affects the performance of the firm using variables like profitability, value added, revenue, productivity, etcetera (Lyke-Ho-Gland, 2017; Wahua & Ahlijah, 2020).

Conceptual Framework

The conceptual framework diagram (Figure 2) captures four categories of variables: corporate governance (measured by board emoluments and board meetings) as the independent variable; business intelligence (measured by hardware and software investments) as the moderating variable; company size (measured by total assets) as the control variable; and profitability (measured by total comprehensive income) as the dependent variable.

Board Emoluments and Meetings

Nahar-Abdullah (2006) which observed that board remuneration has significant negative effect on profitability of Malaysian firms. One possible explanation for this is that the emoluments of board members are economically on the high side.

It has also been established that Board meetings negatively affected banks performance (Adhiambo & Lisiolo, 2018).

This is because Board meeting frequency exerts a negative effect on the financial performance of firms. Also, other authorities have also established that high board meeting frequency equates to low returns on asset, equity and sales (Hanh, Ting, Kweh & Hoanh, 2018). Therefore, there seems to be a consensus to suggest that too much Board meetings is counter-productive to the overall performance of firms.

Business Intelligence

Computer hardware and software are the two integral elements of business intelligence technology; and business intelligence is the combination of the two elements for faster business processes for data-driven business decisions (Fink, Yogev & Even, 2016). According to Chen, Chiang and Storey (2012), the three cardinal aspects of business intelligence infrastructure (when measured from the physical segment of business intelligence assets) are data processing, data delivering, and data storage. The bottom-line of business intelligence investment goes beyond enhanced service delivery to overall efficiency of firms as measured by profitability for sustainable business growth and expansion (Wahua and Ahlijah, 2020).

Company Size

The capacity to deploy BI infrastructure or technology revolves around big firms with fund to invest in it. This is because BI investment is capital intensive. This is a common position by Idowu and Osofisan (2012), Jain and Pandey (2013), Oracle White Paper (2011), and Awa, Ukoha and Emecheta (2012). Therefore, it is right to add that BI investment is directly related to the size of firms. Firm size has significant positive association with profitability (Ahlijah, 2022).

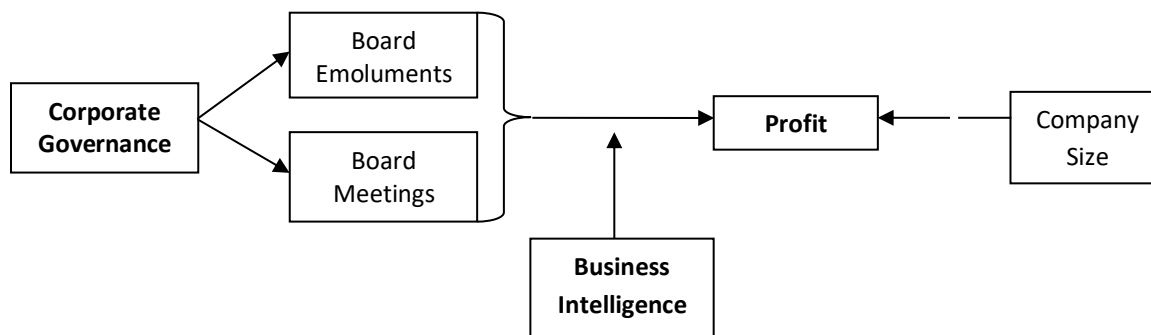


Figure 2: Conceptual framework diagram. Source: Author (2023)

Profitability

Profitability is the end-point of all business processes as well as the overall measure of efficiency of firms. A profitless organisation is non-sustainable; and is tantamount to close shop. The relationship between business intelligence deployment (investment) and profitability has mixed findings when viewed aggregately or specifically from the perspective of BI hardware and BI software (see: Wahua & Ahlija, 2020; Ahlijah, 2022).

Empirical Review

The quantification of the relationship between BI and profitability is receiving attention gradually. This is because of the need to justify the huge investment therein in recent times. Ahlijah (2022) in an original article entitled “Business intelligence and performance of the standard bank of South Africa limited” established that: (i) computer software investment had significant positive association with profitability while computer hardware investment had significant negative association with profitability. This does not agree with Wahua and Ahlijah (2020) which established that computer software cost has significant negative effect on profitability. One possible explanation here is that while Ahlijah (2022) used Pearson correlation, Wahua and Ahlijah (2020) used OLS regression analysis. Wahua and Ahlijah (2020) established that BI hardware cost did not have significant effect on the profitability of top ECOWAS banks within 2012 – 2016. Conversely, the same study established that computer software cost had significant negative effect on the profitability of same banks within the same period. Finally, the work also found out that business intelligence cost (summation of hardware and software) had significant negative effect on profitability of the sampled banks within the period covered in the study. In summary, Wahua and Ahlijah (2020) stated that BI investment decreased profitability of studied banks by circa 40%. One possible explanation for this is over investment in BI infrastructure.

In Ghana, the deployment of business intelligence by banks have not led to better performance in terms of profitability; but, has made Ghanaian banks to witness improved growth; enhanced learning by staff, and better internal processes with improved service delivery to customers (Owusu, 2017). This goes to buttress that BI is not all about profit maximization; but, that its benefits is holistic to firms’ entire well-being.

In an attempt to bridge the gap between business intelligence and value creation, Fink, Yogev and Even (2016) sampled three firms in Israel and established that business intelligence adds values to firms in Israel. The proxies used for business intelligence are computer hardware and computer software (otherwise called business intelligence assets). This quantitative study which anchored on resourced based theory. It collected primary data via questionnaire and interview. It is the recommendation of the study that further works should identify a specific firm and integrate other firm factors. This particular research integrates corporate governance with business intelligence and profitability of Transcorp Conglomerates (a Group of Companies worth more than 416,000,000,000 as at 31 December 2021). This particular study is based on economic theory which is also connected with resources based theory.

It is the position of Lyke-Ho-Gland (2017), Sclater, Webb, and Danson (2017), Roth (2017) and Phocas Software (2018) agree that business intelligence improves the key performance indicators of firms, managerial and organizational efficiency, and value for me. Specifically, Cornerstone Information System (2017) stated that the deployment of BI infrastructure helps firms to maximize profit, cut operating costs, promote project management, and enables firms to inculcate the culture of savings and better implementation of budgets. Firms do also deploy BI technology to outsmart their competitors with ease and smoothened operations using cutting edge technological advancement. This position is shared by Roth (2017) and Phocas Software (2018) who equally agree that BI helps firms to enhance effective, efficient, and economical optimization of firm resources in order to boost profit, reduce operating cost without undermining quality, and promote business sustainability.

Majority of reviewed works established a significant positive relationship between business intelligence deployment and corporate performance (profitability inclusive). Hartl, Jacob, Mbep, Budree and Fourie (2016) measured BI from non-cost point of view using data quality, data mining, data integration, collaborative analytical functions; and they measure corporate performance to include business process and organizational effectiveness and efficiency. It is apt to add that the overall measure of efficiency is profitability. Again, BI implementation has been adjudged to significantly increase business performance (Kakhki & Palvia, 2016; Richards, Yeoh, Chong & Popovič, 2014). Regrettably, this did not also factor in cost of business

intelligence. This particular study measures business intelligence with investment in BI infrastructure; hence, it attempts the bridge the gap observed in literature.

In Malaysia, Teoh, Rajendran and Lim (2014) established that BI investment and related costs statistically decreased BI implementation by manufacturers; and that BI implementation statistically increased the performance of manufacturers in the country. The imports of these findings are: (i) the high cost of deploying and sustaining BI infrastructure discourages firms from investing on it; and (ii) firms that actually deployed BI infrastructure in their operations witnessed improved performance in terms of operations and financials. This position still holds true in the USA where Brynjolfsson (2011) noted that firms that deployed BI technology outperformed their peers by circa 5 – 6% in productivity and output. Also in Slovenia, Popovič, Turk and Jaklič (2010) established that BI investment significantly increased firms' performance (profitability inclusive) by adding values to their operations.

Development of Research Hypotheses

The economics of BI-driven decision-making should be objective in establishing the significance of incremental business values (such as business growth, profitability, value added, productivity, turnover, etcetera) while appraising BI cost-returns nexus (Lyke-Ho-Gland, 2017). The Cornerstone Information System (2017) established that BI does not only improve decision-making; but that it increases the overall profitability of businesses. This is supported by Phocas Software (2018) who also established that BI investment promotes overall effectiveness of entire business processes as well as they overall performances. Such performance indicators include customer retention, profitability, value added, reduced cost, increased revenue, productivity, business size, and business value which included goodwill (Lyke-Ho-Gland, 2017; Rama, Zhangb & Koroniosc, 2016). Also, Adhiambo and Lisiolo (2018), and Hsinh, Ting, Kweh and Hoanh (2018) established that board meetings decreases business profitability. Nahar-Abdullah (2006) also observed that board remuneration has significant negative effect on profitability of Malaysian firms. One possible explanation for this is that the emoluments of board members are economically on the high side. Finally, the capacity to deploy BI infrastructure or technology revolves around big firms with fund to invest in it. This is because BI investment is capital intensive. This is a common position by Idowu and Osofisan (2012),

Jain and Pandey (2013), Oracle White Paper (2011), and Awa, Ukoha and Emecheta (2012). Therefore, it is right to add that BI investment is directly related to the size of firms. Firm has significant positive association with profitability (Ahlijah, 2022).

H0₁: Business intelligence does not significantly affect the profitability of Transcorp conglomerate

H0₂: Board emoluments do not significantly affect the profitability of Transcorp conglomerate

H0₃: Board meetings do not significantly affect the profitability of Transcorp conglomerate

H0₄: The size of Transcorp Conglomerate does not significantly affect its profitability

Business intelligence technology aims at quantifying the value added by businesses due to their adoption of BI (Popovič, Turk & Jaklič, 2015). Attempts to establish the contribution of BI investment to firms' bottom-line performance are yet to fully integrate the moderating effect of BI technology (Grover, Teng, Segars & Fiedler, 1998). Hypotheses 5 – 7 attempt to establish the moderating effects of BI in the relationship between corporate governance and profitability of Transcorp Group of Conglomerates.

H0₅: Business intelligence does not significantly moderate the relationship between board emoluments and profitability of Transcorp Conglomerate when the impact of size is controlled.

H0₆: Business intelligence does not significantly moderate the relationship between board meetings and profitability of Transcorp Conglomerate when the impact of size is controlled.

H0₇: Business intelligence does not significantly moderate the relationship between board meetings, board emoluments, and profitability of Transcorp Conglomerate when the impact of size is controlled.

Methods

Research Design, Method and Model

Descriptive research design underpinned this study using quantitative-parametric research method. Quantitative paradigm promotes positivism and leads to the formulation of hypotheses for the purpose of developing empirical knowledge using cause-and-effect approach (Kefas, 2014; USCLibraries, 2018; Wahua et al. 2023; Babbie, 2010). Wahua and Ezeilo (2021) and Wahua (2020) adopted this approach. The model used in this study is:

$$\Pi = C + BI + Emo + Meet + (BI * Emo) + (BI * Meet) + (BI * Emo * Meet) + Size$$

Where:

- Π = Profitability
- C = Constant
- BI = Business intelligence
- Emo = Board emoluments
- Meet = Board meetings
- BI * Emo = Interaction of business intelligence and board emoluments
- BI * Meet = Interaction of business intelligence and board meetings
- BI * Emo * Meet = Interaction of business intelligence board emoluments and board meetings

Population and Sampling Procedures

The population of this study covers all the member companies of Transcorp Group: Transcorp Hilton Abuja,

Transcorp Hotels Calabar, Aura by Transcorp Hotels, Transcorp Power Delta State, Transafam Power Limited Rivers State, Transcorp OPL 281 Nigeria Limited, and Transcorp Energy Limited. The sample size includes all the population of study. Therefore, the census sampling technique was adopted. Ankomah (2020), and Wahua, Mkombo, Okai and Acquah-Yalley (2022) adopted this approach.

Data Collection Process, Description and Analysis Technique

Data were collected from the audited published annual accounts of Transcorp Group of companies from 2012 – 2021. Some other works that adopted this method are Roozitalab and Sayadi (2018), Wahua (2020), Wahua and Ahlijah (2020), Wahua, Tsekpo and Anyamele (2018). Descriptive and inferential statistics were carried out with statistical package for Social Sciences (SPSS). The hypotheses were tested with Univariate General Linear Model (which is an advanced form of OLS multiple regression analysis). Wahua (2015) applied this method too.

Research Variables Operationalization

Table 1 (Operationalization of research variables) captures the variables covered in this study and their individual measurements. Board emoluments and meetings are proxies of corporate governance; summation of yearly net book values of hardware and software measured business intelligence; yearly total assets of the company measured bank size; and yearly total comprehensive income measured profitability.

Table 1: Operationalization of research variables

Variable	Proxies	Measurement	Sources
Independent	Board Emoluments	Yearly board members total emoluments	Nahar-Abdullah (2006)
	Board Meetings	Yearly % of No. of meetings attended by board members	Adhiambo and Lisiolo (2018)
Moderating	Business Intelligence	Yearly NBV of hardware and software	Wehner (2020)
Control	Bank Size	Yearly total assets of the company	Ahlijah (2022)
Dependent	Profitability	Yearly total comprehensive income	Wahua and Ahlijah (2020)

Source: compiled by the Author

Test of Normality Assumption

Table 2: Test of normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Business Intelligence	0.620	10	0.492
Board Emoluments	0.975	10	0.931
Board Meetings	0.857	10	0.471
Company Size	0.988	10	0.993
Profitability	0.845	10	0.451

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Authors (2023)

This is a parametric study; and it is necessary for the data (mostly the dependent variable) to be drawn from a normal distribution (Wahua, 2020). The Shapiro-Wilk test of normality fits this study as the sample size is below 2000 (Garson, 2012). A variable passes normality assumption if its p-value is greater than 0.05 (see: Wahua, Mkombo, Okai, & Acquah-Yalley, 2022; Wahua, Tsekpo & Anyamele, 2018). In line with this position, the data used in this study are normally distributed. Table 2 indicates that all the variables are drawn from normal distributions.

Results and Discussions

Descriptive Statistics

Risk-returns analysis (Table 3) was carried out descriptively to basically ascertain the performance of the

company using the following monetary variables: business intelligence investment, hardware investment, software investment, board emoluments, company size, and profitability. The mean serves as the returns while standard deviation serves as the risk. When the standard deviation is greater than the mean, it implies that the variable is too risky (Wahua, 2015; 2018).

The standard deviation of business intelligence is greater than its mean; and this is traced to over investment in computer hardware (which has a standard deviation that is higher than the mean). This also resulted to a profit figure whose standard deviation is higher than the mean (signaling that the profit might not be much sustainable in the long-run). Therefore, the need for the company to critically watch its investment in hardware in particular cannot be ignored.

Table 3: Risk-returns analysis

	N	Maximum	Minimum	Range	Mean	Std. Deviation
Business Intelligence (Naira '000)	10	14,477,438	97,744	14,379,694	4,169,094	6,517,416
Hardware (Naira '000)	10	14,350,458	7,057	14,343,401	4,062,259	6,499,420
Software (Naira '000)	10	168,065	56,355	111,710	106,836	39,616
Board Emoluments (Naira '000)	10	737,235	308,164	429,071	545,244	119,635
Board Meetings (Number)	10	100	77	23	93	7
Company Size (Naira '000)	10	416,000,017	75,604,202	340,395,815	248,085,855	101,163,592
Profitability (Naira '000)	10	23,543,810	- 579,519	24,123,329	7,811,550	8,167,917

Source: Authors (2023)

Test of Hypotheses

- H0₁:** Business intelligence does not significantly affect the profitability of Transcorp conglomerate
- H0₂:** Board emoluments do not significantly affect the profitability of Transcorp conglomerate
- H0₃:** Board meetings do not significantly affect the profitability of Transcorp conglomerate
- H0₄:** The size of Transcorp Conglomerate does not significantly affect its profitability
- H0₅:** Business intelligence does not significantly moderate the relationship between board emoluments and profitability of Transcorp Conglomerate when the impact of size is controlled.
- H0₆:** Business intelligence does not significantly moderate the relationship between board meetings and profitability of Transcorp Conglomerate when the impact of size is controlled.
- H0₇:** Business intelligence does not significantly moderate the relationship between board meetings, board emoluments, and profitability of Transcorp Conglomerate when the impact of size is controlled.

Table 4 (Results of hypotheses 1 – 7: Parameter estimates) indicates that the model used in the research is a good fit for testing the hypotheses as it significantly accounted for 99.9% of the changes that occurred in the dependent variable, profitability (F = 192.71; Sig = 0.005). One salient finding of this research is that when the independent, moderating and control variables are held

constant, Transcorp Group’s profit increased significantly by 99.3% (that is, N441,336,718) within the period under study. The major findings of the study are:

- i. Business intelligence had 98.8% significant negative effect on the profitability of Transcorp conglomerate within the period studied;
- ii. Board emoluments had 98.9% significant negative effect on the profitability of Transcorp conglomerate within the period studied;
- iii. Board meetings had 99.4% significant negative effect on the profitability of Transcorp conglomerate within the period studied;
- iv. The size of Transcorp Conglomerate had 99.6% significant positive effect on its profitability within the studied period;
- v. Business intelligence had 98.8% significant positive moderating effect on the relationship between board emoluments and profitability of Transcorp Conglomerate when the impact of size is controlled; and
- vi. Business intelligence had 98.8% significant positive moderating effect on the relationship between board meetings and profitability of Transcorp Conglomerate when the impact of size is controlled;
- vii. Business intelligence had 98.8% significant negative moderating effect on the relationship between board meetings, board emoluments, and profitability of Transcorp Conglomerate when the impact of size is controlled.

All the hypotheses (1 – 7) are therefore rejected for stating otherwise.

Table 4: Results of hypotheses 1 – 7: Parameter estimates

Variable	B	t	Sig.	Partial Eta Squared
Intercept	441,336,718	17.383	0.003	0.993
BI	-2247	-12.998	0.006	0.988
Board Emoluments	-90	-13.630	0.005	0.989
Board Meetings	-5,178,874	-18.110	0.003	0.994
BI * Board Emoluments	0	12.838	0.006	0.988
BI * Board Meetings	23	12.977	0.006	0.988
BI * Board Emoluments * Board Meetings	0	-12.828	0.006	0.988
Company Size	0	22.334	0.002	0.996
Corrected Model: F = 192.707 (0.005)			0.005	0.999

Dependent Variable = Profitability

Source: Authors (2023)

Discussions of the Hypothetical Findings of the Study

Business intelligence has significant negative effect on the profitability of Transcorp Conglomerate within the period covered in this study. This is in sync with Wahua and Ahlijah (2020) which equally established that business intelligence cost has significant negative effect on profitability of top ECOWAS banks with 2012 – 2016. While Ahlijah (2022) did not measure the aggregate effect of BI on profitability of Standard Chartered Bank, it established mixed findings: hardware investment had significant negative association with profitability while software investment had significant negative association with profitability. Therefore, more works are needed to establish the impact of BI investment on profitability of firms.

This study established that firm size has significant positive effect on profitability; and this is collaborated by Ahlijah (2022). It is therefore apt to tentatively state that the size of a firm has significant positive effect on its profitability. Larger firms make more profit than smaller ones.

Board characteristics (as measured by emoluments and number of meetings attended) witnessed significant negative effects on the profitability of Transcorp Conglomerate. This is supported by Nahar-Abdullah (2006) which observed that board remuneration has significant negative effect on profitability of Malaysian firms. One possible explanation for this is that the emoluments of board members are economically on the high side.

This study also established that Board meetings have significant negative effect on the profitability of Transcorp Conglomerate; and this seems to suggest that the number of meetings attended by board members is somewhat counter-productive (the number of meetings is on the high side). It has also been established that Board meetings negatively affected banks performance (Adhiambo & Lisiolo, 2018). This is because Board meeting frequency exerts a negative effect on the financial performance of firms. Also, other authorities have also established that high board meeting frequency equates to low returns on asset, equity and sales (Hanh, Ting, Kweh & Hoanh, 2018). Therefore, there seems to be a consensus to suggest that too much Board meetings is counter-productive to the overall performance of firms.

Conclusion

Summary of the Findings of the Research

The salient findings of this study are:

- i. The risk elements in BI, hardware, and profitability are higher than their returns;
- ii. When all the variables are held constant (equal to zero), the company's profit increased positively by circa 99.3%;
- iii. The interaction of BI and board emoluments had significant positive effect on the profitability of the company;
- iv. The interaction of BI and board meetings had significant positive effect on the profitability of the company;
- v. The size of the company had significant positive effect on the profitability of the company; and
- vi. The other elements of variables had significant negative effects on the company's profitability.

New Knowledge added by the Research

This study has empirically proved that excessive investment in business intelligence has significant negative effect on the profitability of a conglomerate like Transcorp Group. This extends to both hardware and software investments. Therefore, there is need for large conglomerate to optimise their economy of size over excessive investment in technological advancement.

Again, while the two proxies of corporate governance had significant negative effects on profitability, their interactions with BI had significant positive relationship on profitability. This extends to the fact that business intelligence investment has significant positive moderating effect on the relationship between corporate governance and profitability. This is a key addition to knowledge by this study. One breakthrough in this study is that business intelligence significantly moderated the relationship between corporate governance and profitability positively: (i) the interaction between BI and board emoluments had positive significant effect on profitability; and (ii) the interaction of BI and number of meetings attended by board numbers had significant positive effect on profitability too.

Significance of the Research Findings

Theoretical Significance

The relevance of economic theory is empirically clear in this study: excessive investment in business intelligence translates to decreased profitability. As such, firms should

simulate BI investment level that optimizes their profitability.

Practical Significance

Board emoluments and meetings had significant negative effects on the profitability of the company within the studied period. These calls to order the number of hours spent on meetings. Meetings attendance of 77 – 100% indicates that it is a dis-service to the profitability of the company as so much time/hours is spent on meetings. Therefore, the company should simulate its number of meetings to arrive at optimum profitability.

Policy Significance

The need for top-bottom corporate policy on investment on business intelligence, board emoluments, and board meetings cannot be ignored as this study has shown that these variables have significant negative effects on the profitability of the company.

Recommendations

Based on the empirical results established in this study, the following recommendations are made:

- i. Investment in hardware should be scaled down based on empirical simulation aimed at maximizing profitability;
- ii. Board's number of meetings as well as emoluments should also be properly simulated in order to arrive at levels that optimizes profitability of the company; and
- iii. The company should continue to expand its size (total assets) as it has shown to be one single variable that shape and reshape the profitability of the company positively.

Conclusions

Investment in business intelligence keeps soaring as businesses strive to achieve timely data-driven (quality) decisions. This empirical study desired to quantitatively establish if the huge investment in business intelligence translates to increased profitability in one hand; and if its interaction with corporate governance variables like board emoluments and meetings lead to significant increase in profitability. Resting on economic theory with secondary data from 2012 – 2021 (10 years), established the following: (1) excessive investment in business

intelligence leads to significant decrease in profitability of conglomerates; (ii) board emoluments and number of meetings have significant negative effects on the profitability of conglomerates; (iii) bank size have significant positive effect on the profitability of conglomerates; (iv) the interactions of BI and board emoluments, and BI and board meetings have significant positive effects on the profitability of conglomerates; and finally (v) the interaction of BI, board emoluments, and board meetings has significant negative effect on the profitability of conglomerates. The study established the relevance of economic theory on BI-Governance study; and recommends that firms in general should optimise their BI intelligence by linking it to profitability (which is the overall measure of economic performance).

Further Research

Further study should cover other conglomerates that are having at least ten years annual reports (both within and outside Nigeria). Such study could also adopt comparative approach. In terms of analytical approach, the hierarchical regression method could also be applied in similar studies.

Conflict of Interests and Ethical Considerations

This study is devoid of any conflict of interest as it is completely carried out and funded by the Authors. It also complied with best ethical research norms as no data or results manipulation was carried out. The findings are true reflections of the actual analyses carried out with the real research data.

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