The Impact of Goodwill and Software Assets on Firm Market Value: Evidence from Listed Manufacturing Firms in Nigeria

[1]Affiong Ukana Otung,[2] Nkanikpo Ibok Ibok ,[3] Adebimpe Umoren
Department of Accounting, Akwa Ibom State University, Obio Akpa Campus

Abstract: *The relationship between intangible assets, specifically goodwill and software, and a firm's market value remains underexplored, especially in emerging economies like Nigeria. This study aims to investigate the impact of goodwill and software assets on the market value of listed manufacturing firms in Nigeria, using both quantitative and theoretical approaches. The sample includes firms listed on the Nigerian Stock Exchange between 2010 and 2023, with market capitalization as the dependent variable. Independent variables include goodwill and software assets, while control variables such as firm size is also considered. The study employs the Least Squares Dummy Variable (LSDV) regression model to estimate the relationships. The findings reveal that while software investments have a significant positive impact on market value, goodwill assets do not show a statistically significant relationship with market capitalization in the Nigerian context. These results challenge conventional wisdom in developed markets, where goodwill is often seen as a key driver of firm valuation. The study suggests that in Nigeria, the market may not fully recognize or value goodwill as a major determinant of firm value, likely due to differences in investor perceptions, regulatory frameworks, and financial reporting practices. Given the growing importance of technology, the study recommends that firms should prioritize software investments to enhance their market value. Policymakers and regulators should also consider improving the transparency of intangible asset reporting to support better market efficiency.*

Keywords: goodwill, software assets, firm market value, listed manufacturing firms, Nigeria

INTRODUCTION

The importance of intangible assets in influencing firm value has gained significant attention in recent years, with particular focus on goodwill and software assets. Goodwill, representing a firm's

non-tangible assets such as brand reputation, customer loyalty, and intellectual property, has been linked to market value in numerous studies (D'Alauro, 2013; Heiens et al., 2012). However, the relevance of goodwill as a determinant of firm value is highly contested, especially in emerging markets like Nigeria, where market perceptions and financial reporting standards differ from developed economies (Zhou et al., 2014). On the other hand, the importance of software assets, driven by their capacity to foster innovation and enhance operational efficiency, has been increasingly recognized in today's technology-driven market (Filip et al., 2015). These intangible assets are seen not only as drivers of competitive advantage but also as key indicators of future profitability and growth potential (Park, 2017). However, despite growing interest, the specific effects of goodwill and software assets on market capitalization in Nigerian manufacturing firms remain underexplored, particularly given the unique challenges posed by the Nigerian market, such as financial market inefficiencies and a relatively underdeveloped reporting framework for intangible assets.

The study is motivated by the need to fill this gap in the literature by exploring the relationship between goodwill, software assets, and market value within the Nigerian context. Nigeria presents a unique setting due to its emerging market status, where accounting practices, financial transparency, and investor perceptions may differ significantly from developed economies. This is crucial, as studies from other emerging markets (Mue &Suleiman, 2020; Omarjee et al., 2019) suggest that the relationship between intangible assets and firm value can be significantly different depending on the local market dynamics. In developed markets, intangible assets like goodwill and software are often recognized as key drivers of market value (Demerjian et al., 2012), yet in Nigeria, the extent to which these assets are valued by investors remains uncertain. As Nigerian firms continue to embrace digital transformation and leverage technology for business growth, understanding the role of software as a strategic asset becomes critical (Filip et al., 2020). This study, therefore, seeks to address the gaps in the literature by focusing specifically on the effects of goodwill and software assets on market capitalization in Nigeria, with a particular emphasis on manufacturing firms, which play a pivotal role in the economy.

The primary objectives of this study are to examine the relationship between goodwill and market value, and the relationship between software assets and market value, in Nigerian manufacturing firms. Prior research in other regions (Mue & Suleiman, 2020; Park, 2017) has indicated that intangible assets such as software and goodwill can drive firm value, but this effect is often contingent on the firm's size and sector. This highlights the necessity to assess these relationships in the Nigerian context, where firm size may play a more substantial role in influencing market value, given the country's economic and industrial structure. Additionally, this study will contribute to a better understanding of how the value of goodwill and software assets is perceived by investors in emerging economies, offering insights into the nuanced ways in which intangible assets influence market value in such settings (Elkemali, 2024; Gamayuni, 2023). This will not only enhance academic understanding but also provide practical insights for managers and

investors who need to account for the value of intangible assets in their investment and managerial decisions.

An opportunity for the study lies in the differences in the Nigerian setting compared to the more developed markets where previous studies have been conducted. Unlike in developed economies, Nigerian manufacturing firms operate in a relatively volatile market, marked by economic instability, regulatory challenges, and a lack of sophisticated financial reporting mechanisms for intangible assets. Therefore, the effects of goodwill and software assets on market value may be less straightforward or may vary in significance. In addition, Nigeria's market is characterized by a greater reliance on tangible assets such as oil and gas, which might overshadow the recognition and importance of intangible assets. This study provides an opportunity to investigate whether these differences lead to divergent effects of goodwill and software assets on market capitalization when compared to the findings in developed economies like the U.S. and Europe, where these assets are typically more acknowledged in valuation models (Demerjian et al., 2012; Kabir & Rahman, 2016). Moreover, this study will help bridge the gap in literature by exploring a contextual analysis of intangible assets in Nigeria, adding depth to the ongoing debates on the role of these assets in emerging market economies.

The theoretical framework for this study is grounded in signaling theory and the resource-based view (RBV) of the firm. Signaling theory posits that firms with valuable intangible assets, such as goodwill and software, signal their market potential to investors, which can affect their market valuation (Spence, 1973). In the case of goodwill, firms with strong brand reputation or customer loyalty may be perceived by investors as more stable, signaling long-term profitability. However, poor impairment decisions or lack of goodwill transparency may signal poor management or future earnings decline, negatively impacting market value (Ji, 2013). On the other hand, RBV suggests that software assets, being unique to a firm, can provide sustained competitive advantage, which enhances firm value over time (Barney, 1991). Software, as a valuable intangible asset, signifies the firm's ability to innovate and improve efficiency, which can positively influence its market value, especially in technology-driven industries. Both theories support the premise that the strategic management of intangible assets can significantly affect market capitalization, depending on how these assets are perceived by the market.

The contribution of this study is multifaceted, starting with its context-specific focus on Nigerian manufacturing firms. While much of the existing literature focuses on developed markets, this study highlights the unique challenges and opportunities presented by emerging economies like Nigeria, making it a valuable addition to the literature on intangible assets. Methodologically, the use of panel least squares dummy variable regression is a robust approach that allows for the analysis of both time-series and cross-sectional data, providing more reliable insights into the relationships between goodwill, software, and market value. Additionally, the study's emphasis on the role of firm size as a control variable addresses an important aspect often overlooked in prior

research. By contributing new empirical evidence from an underexplored market, this study expands the understanding of intangible asset valuation in emerging economies, enriching the existing theoretical frameworks and offering practical implications for managers and investors. The structure of the paper follows a systematic analysis, starting with a comprehensive review of literature, followed by model specification, empirical analysis, and concluding with discussions on the implications of the findings for theory and practice.

LITERATURE AND HYPOTHESES DEVELOPMENT

Goodwill Asset and Market Value

The concept of goodwill refers to the intangible value that a firm possesses due to its reputation, customer relationships, brand strength, and other non-physical assets (Majid, 2019). Goodwill arises during business combinations when the purchase price exceeds the fair value of identifiable net assets. Several studies have focused on the measurement and implications of goodwill, with some arguing that it plays a significant role in enhancing a firm's market value (D'Alauro, 2013; Heiens et al., 2012). Goodwill is often considered an asset that provides a future economic benefit, although its exact value can be difficult to quantify due to its intangible nature. A major issue in goodwill accounting is its impairment, where a firm must assess whether the carrying value of goodwill exceeds its recoverable amount, leading to write-downs (Zhou et al., 2014). These write-downs can affect the market value of a company, as investors may interpret them as signals of poor performance or diminished future earnings potential (Bepari et al., 2014). The impairment process and related disclosures under IFRS have been found to influence stockholder perceptions and, consequently, market valuation (Rahman & Nguyen, 2015). Recent studies emphasize the importance of timely impairment tests and transparent disclosures to avoid misleading stakeholders about a company's financial health (Gunn et al., 2017; Kabir & Rahman, 2016).

The theoretical underpinnings of the relationship between goodwill and market value can be linked to the signaling theory, which suggests that companies use the information on goodwill impairments as a signal to the market about their future prospects. A significant impairment loss might signal poor management or inefficient resource allocation, which can adversely affect a company's market value. In contrast, the absence of impairment or the correct timing of goodwill impairment can signal financial stability and effective management. The agency theory also provides insights into the potential for managerial discretion in goodwill impairments, where managers might delay impairments to smooth earnings and maintain stock prices (Ji, 2013; Demerjian et al., 2012).

Few studies exist on the specific relationship between goodwill assets and market value in emerging markets, particularly in Nigeria. However, studies such as those by Mue and Suleiman (2020), who investigated the value relevance of intangible assets in Nigerian manufacturing firms, offer useful insights. They found that goodwill assets, along with other intangible assets, significantly influence the market value of firms listed on the Nigerian Stock Exchange (NSE).

Similarly, in the context of South Africa, Omarjee et al. (2019) examined the value relevance of aged goodwill, concluding that goodwill impairment has a significant impact on the stock market reaction. Additionally, research by Kabir and Rahman (2016) in Australia suggests that managerial discretion over goodwill impairments can influence stockholder perceptions and, thus, market value. On the other hand, Zhou et al. (2014) found that impairment losses negatively affected market value in Chinese firms. This contrast highlights the varying market perceptions across different regions and firm contexts. Moreover, studies like those of Abughazaleh et al. (2011) suggest that the effects of goodwill impairment can be mitigated by strong corporate governance, which further influences market reactions. Based on the reviewed literature, the following hypothesis is proposed:

H01: There is no significant relationship between goodwill assets and market value in listed manufacturing firms in Nigeria.

Software Asset and Market Value

Software assets refer to intangible assets that represent the value of software owned or developed by a company, often classified as capitalized expenditures for development costs. These assets are essential in today's technology-driven markets and can significantly contribute to a firm's competitive advantage (Filip et al., 2015). Software assets, unlike physical assets, provide long-term benefits such as process automation, efficiency improvements, and enhanced product offerings. The measurement of software assets involves determining their fair value or cost, and they are often amortized over their useful life (Omarjee et al., 2019). The value relevance of software as an asset in financial reporting has been the subject of several studies, particularly focusing on whether these assets influence stockholder perceptions and overall market value (Mue and Suleiman, 2020). Software assets are considered by many to be key drivers of innovation and long-term firm value, with investors often perceiving them as valuable intangible assets (Park, 2017). The market value of a firm may, therefore, be affected by the level of software capital it holds, especially if these assets are associated with unique, proprietary technology that gives the firm a competitive edge.

The relationship between software assets and market value is best explained through the resource-based view (RBV) theory, which posits that intangible assets like software can provide firms with unique capabilities that enable sustained competitive advantage and, therefore, higher market valuation. Additionally, signaling theory supports the idea that firms with advanced software systems send positive signals to the market, indicating efficiency, innovation, and growth potential. These intangible assets can increase the perceived future cash flows of the firm, thereby boosting market value (Filip et al., 2020). However, the value of software assets can be affected by factors such as the firm's ability to maintain and update these assets, as well as market perceptions of their sustainability and relevance.

In terms of empirical studies, several authors have examined the impact of software assets on firm value. For instance, Mue and Suleiman (2020) found a positive relationship between software assets and market value in Nigerian manufacturing firms, suggesting that firms investing in software development experience a higher market valuation. In Europe, Park (2017) investigated the role of intangible assets, including software, in the book-to-market effect, concluding that software assets positively influence market value. Similarly, in the U.S., a study by Demerjian et al. (2012) demonstrated that software assets enhance firm performance, indirectly increasing market value. On the other hand, a study by Kimbro and Xu (2016) in the Australian market showed that while software assets are valued by the market, their influence on overall firm value may be contingent on the firm's industry and market conditions. Akpan (2021) evaluated the effect of intangible asset on market value added of listed ICT firms in Nigeria from 2011 to 2019. The results revealed that market related and technology-based intangible assets have positive significant effects on market value added, while human efficiency has insignificant effect on market value added of ICT firms in Nigeria.
 These findings suggest that the relationship between software assets and market value is complex and context-dependent. Based on the above findings, the following hypothesis is proposed:

H02: There is no significant relationship between software assets and market value in listed manufacturing firms in Nigeria.

DATA AND METHOD

The research employs an ex post facto design, which is suitable for studying the effects of variables that have already occurred and are not subject to manipulation by the researcher. This design is effective for analyzing secondary data where the researcher examines past events and their outcomes. The study focuses on a population of 59 manufacturing firms listed on the Nigerian Exchange Group (NGX), with a sample size of 46 manufacturing firms selected using a simple filtering sampling technique. The period under consideration spans from 2010 to 2023, ensuring a comprehensive evaluation of the variables over a decade. The source of the data is secondary, obtained from the annual reports of the selected firms, financial statements, and other publicly available financial records from the Nigerian Exchange Group (NGX). The method of data analysis employed in this study is Least Squares Dummy Variable Regression (LDVR), which is appropriate for analyzing panel data that includes both cross-sectional and time series elements. Panel data allows for a more robust analysis by considering both the variation across firms and the variation over time. The dependent variable in this study is market capitalization (MCAP), which serves as a proxy for firm value. Market capitalization is widely used in financial literature as an indicator of a firm's total value in the market, representing the aggregated value of all the firm's outstanding shares. The relationship between market capitalization (MCAP) and the independent variables (goodwill assets, software assets, and firm size) is captured by the following regression model:

$$MCAP_{it} = \beta_0 + \beta_1 GDW_{it} + \beta_2 SFT_{it} + \beta_3 FIMZ_{it} + \varepsilon_{it}$$

The primary independent variables under consideration are goodwill assets (GDW) and software assets (SFT). Goodwill assets represent intangible assets arising from acquisitions, while software assets represent the value derived from owned or developed software. The study also includes firm size (FIMZ) as a control variable, which is expected to influence both the dependent and independent variables. Firm size is typically measured by the total assets of a company and has been shown to affect market value, goodwill, and software asset utilization (Mue & Suleiman, 2020). This model will allow us to assess the individual effects of goodwill and software assets on market capitalization while controlling for the potential influence of firm size. The data will be analyzed using a panel regression approach, with the dummy variable method used to account for any fixed or random effects across individual firms over time. The use of panel data analysis ensures that both individual and time-specific effects are controlled, leading to more accurate estimates of the relationships between the variables. The analysis will be carried out using appropriate statistical software, with the significance levels set at 5%, allowing for robust conclusions about the effects of goodwill and software assets on market value within the context of Nigerian manufacturing firms.

RESULTS AND DISCUSSION

Descriptive Statistics Analysis
The study examines the descriptive statistics for both the explanatory and dependent variables of interest. Basically, each variable is examined in terms of the mean, standard deviation, maximum and minimum. Table 1 displays the descriptive statistics for the study.

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
mcap	506	6.918	1.127	4.270	9.690
gdw	506	9.058	15.654	0.000	88.400
sft	506	0.444	0.777	0.000	5.070

Source: Authors computation (2024)

The descriptive statistics provide valuable insights into the characteristics and distribution of the variables in this study, which explores the effect of goodwill and software assets on the market value of listed manufacturing firms in Nigeria. Market capitalization (MCAP) has a mean of 6.918 and a standard deviation of 1.127, indicating a moderate level of variability across the firms in the sample. The minimum and maximum values, 4.270 and 9.690 respectively, show a wide range in firm sizes, from smaller to larger firms. Goodwill cost (GDW) shows a mean of 9.058 and a large standard deviation of 15.654, with values ranging from 0 to 88.400. This indicates significant variability in the amount of goodwill reported by firms. Some firms have substantial goodwill, likely due to acquisitions or mergers, while others report no goodwill at all. This wide dispersion

suggests that goodwill is not uniformly distributed across the firms in the sample, with varying levels of intangible benefits. Software cost (SFT) has a mean of 0.444 and a standard deviation of 0.777, with values ranging from 0 to 5.070. The relatively low mean indicates that software costs are generally minimal for most firms, with few firms having significant investments in software. The narrow range suggests that software costs may not be a major intangible asset for the majority of firms in the sample.

Correlation Analysis Result

Table 4.2: Spearman's Rank Correlation

Variables	(1)	(2)	(3)	(7)
(1) mcap	1.000			
(2) gdw	0.856	1.000		
(3) sft	0.749	0.772	1.000	
(7) fimz	0.890	0.869	0.763	1.000

Source: Authors computation (2024)

The results from the Spearman Rank Correlation analysis in Table 4.3 show several positive associations between the variables under study. First, there exists a strong positive association between goodwill (GDW) (0.856) and market capitalization (MCAP), indicating that firms with higher levels of goodwill tend to have higher market capitalization during the period under study. Similarly, software (SFT) also shows a positive association with market capitalization (0.749), suggesting that higher investments in software are linked with higher market value for firms. The control variable, firm size (FIMZ), has the strongest positive association with market capitalization (0.890), implying that larger firms tend to have higher market value.

Regression Analyses
Specifically, to examine the cause-effect relationships between the dependent variables and independent variables as well as to test the formulated hypotheses, the study used a panel regression since the result reveal the presence of heteroscedasticity.

Table 4.3: Regression Results - Baseline

Variables	(1) OLS	(2) FE	(3) RE	(4) LSDV
gdw	0.006***	0.001	0.002	0.001
	(0.001)	(0.354)	(0.078)	(0.354)
sft	0.157***	0.066**	0.089***	0.066**
	(0.000)	(0.043)	(0.007)	(0.043)
fimz	0.732***	0.350***	0.576***	0.350***
	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	1.371***	4.385***	2.693***	4.032***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	506.000	506.000	506.000	506.000
R²	0.819	0.165		0.954
Adj R²	0.817	0.071		0.948
F-stat	375.738	14.903		183.204
Year Dummy	No	No	No	Yes
Hettest	10.48{0.000}			
FE/RE		18.24{0.000}	548.84{0.000}	
VIF	2.17			
Hausman		72.34{0.000}		

*Notes: p-values are in parentheses. *** p<.01, ** p<.05*
Source: Authors computation (2024)

Table 4.3 represents the results obtained from the estimation of the models using the OLS regression method. The results indicate that the dependent variable, as captured by the regression model, has an R-Square value of 0.819. This suggests that the independent and control variables in the study account for approximately 81.9% of the systematic variation in the dependent variable during the period under study. The remaining 18.1% of the variation is explained by other factors not included in the model, as indicated by the error term. The significance of the OLS model is further supported by the highly significant F-statistic value of 375.738, indicating that the model is statistically significant at the 1% level (p<0.000). This reinforces the model's relevance in explaining the variation in the dependent variable. However, to further validate the estimates of the pool OLS results, this study also tests for multicollinearity and heteroscedasticity.

The test for multicollinearity using the Variance Inflation Factor (VIF) yields a mean VIF of 2.17, which is well below the threshold of 10, aligning with Gujurati's (2004) guideline. This suggests that multicollinearity is not a concern in this model, and none of the independent variables need to be excluded due to multicollinearity issues. The Breusch-Pagan test for heteroscedasticity reveals a chi-square statistic of 10.48 with a p-value of 0.000, indicating that the assumption of homoscedasticity has been violated. Due to the presence of heteroscedasticity, the study needs to adjust the model to produce reliable standard errors and valid statistical inferences. This necessitates employing panel fixed and random effect regression techniques to control for the violation of homoscedasticity, as recommended by Wooldridge (2010).

The Hausman specification test shows a chi-square statistic of 72.34 with a p-value of 0.000, which is significant at the 1% level. This result suggests that the fixed effects (FE) model is preferred over the random effects (RE) model for this study. The Hausman test confirms that the fixed effects model is more appropriate due to the presence of unobserved heterogeneity that correlates with the explanatory variables. The results from the panel fixed effect regression, as presented in Table 4.4, show an F-statistic value of 14.903, with a probability value of 0.000, indicating that the fixed effect regression model is statistically significant at the 1% level, and is suitable for statistical inference. Additionally, the fixed effect regression has an R-squared value of 0.165, implying that the independent variables of the study explain approximately 16.5% of the systematic changes in the dependent variable of market capitalization (MCAP) during the period under review. Given the findings from the Hausman test, the study employs the Least Square Dummy Variable (LSDV) regression to account for unobserved variations across time. The LSDV model shows a high R-squared value of 0.954, indicating that approximately 95.4% of the systematic variation in the dependent variable is explained by the independent variables when considering time effects. The adjusted R-squared value of 0.948 supports the robustness of the LSDV model in capturing the variations in market capitalization (MCAP), further validating the choice of this model for policy recommendations and interpretation.

The significance of the LSDV model is further supported by the highly significant F-statistic value of 183.204, indicating that the overall model is statistically significant at the 1% level (p<0.000). This underscores the effectiveness of the LSDV model in explaining the dependent variable of MCAP over time, after controlling for unobserved heterogeneity. The use of year dummies in the model also accounts for time-specific effects, allowing for a more precise estimation of the relationships between the variables under study. The LSDV regression results reinforce the validity of the model, suggesting that the independent variables, including intangible assets and firm size (FIMZ), explain a significant portion of the variation in market capitalization (MCAP). The high R-squared and adjusted R-squared values indicate that the LSDV model provides a better fit than the other models in the study, making it the preferred approach for drawing conclusions about the relationships between intangible assets and market value.

DISCUSSION OF FINDINGS

Goodwill and Market Value
The results obtained from the Least Square Dummy Variable (LSDV) regression model reveal that goodwill does not have a statistically significant effect on the market capitalization of listed manufacturing firms in Nigeria during the period under study. This finding, with an insignificant p-value of 0.354, suggests that goodwill may not be a major driver of market value for these firms. This could imply that the market does not fully recognize or assign value to goodwill, which often reflects past acquisitions or brand recognition, as a critical factor in determining firm market capitalization in the Nigerian manufacturing context. This result challenges the expectation that

intangible assets, particularly goodwill, inherently boost a firm's market value, especially in economies like Nigeria's where financial reporting and market perceptions of intangible assets may differ from more developed economies. When compared to the findings of other studies, this result aligns with the work of Adeniji (2022), who found that goodwill had an insignificant impact on the financial performance of firms in developing countries, suggesting that the contribution of intangible assets like goodwill to firm value may be context specific. Similarly, Bayelign (2022) noted that in markets with weaker financial systems, goodwill is often undervalued or even ignored by investors, which might explain why it fails to have a significant effect on market capitalization in Nigeria.

However, the findings contradict several studies that emphasize the positive role of goodwill in enhancing firm value. For example, Elkemali (2024) and Husni et al. (2023) demonstrated that goodwill is often a critical intangible asset that positively correlates with market value in more developed economies, where investors may place more trust in the strategic benefits associated with acquisitions and brand equity. This highlights a divergence in how goodwill is perceived and valued across different market environments. In more developed economies or industries with higher levels of transparency and governance, goodwill is often seen as a vital asset that reflects the company's past investments in acquisitions and brand-building activities, as noted by Michael et al. (2024). The lack of significance in the Nigerian context could be attributed to differences in market maturity, investor behavior, and the transparency of reporting practices. Mehnaz et al. (2024) also found a positive relationship between goodwill and market capitalization in their study of Asian manufacturing firms, suggesting that goodwill tends to play a stronger role in markets where intangible assets are more rigorously assessed and integrated into firm valuation processes. Similarly, Dragomir (2024) highlighted the importance of goodwill in European firms, arguing that it represents a valuable measure of a firm's brand strength and acquisition-driven growth. The contrast between these findings and the result for Nigerian firms might indicate that in less developed markets, investors might focus more on tangible assets or immediate financial performance rather than intangible, long-term growth indicators such as goodwill.

On the other hand, the results are in partial agreement with the findings of Pattaraporn (2023), who noted that in certain emerging markets, the significance of goodwill is diluted by the presence of other more dominant factors like firm size or profitability, which are more closely monitored by investors. In Nigeria, this might suggest that market participants pay less attention to goodwill when assessing firm value, instead focusing on more immediate and measurable indicators such as earnings or asset base. Contradicting these perspectives, Gamayuni (2023) demonstrated that goodwill is highly valued in Indonesia's manufacturing sector, where firms that invest in acquisitions and brand-building enjoy a higher market valuation. The discrepancy with the Nigerian context might be attributed to differences in the transparency of financial reporting, investor confidence, or even the overall economic stability, which affects how intangible assets are perceived and valued. In contrast, Peng et al. (2023) noted that in certain less developed

markets, like parts of Southeast Asia, investors are more skeptical of goodwill due to inconsistent accounting standards and the potential for overstatement of assets, leading to an undervaluation of this intangible asset. This aligns more closely with the findings of the current study, suggesting that the perceived value of goodwill in Nigerian manufacturing firms may be limited due to similar concerns.

The study's finding also echoes the work of Imeokparia and Okere (2023), who identified that the influence of intangible assets, such as goodwill, is often overshadowed by other factors like firm size and profitability in the Nigerian context. This might suggest that Nigerian investors prioritize more concrete measures of firm performance over intangible metrics. Similarly, Panern and Suwansin (2024) found that in some developing markets, goodwill has a more muted effect on firm valuation, possibly due to weaker regulatory environments and less sophisticated financial markets, where investors tend to discount intangible assets more heavily. The results from this study stand in contrast to the findings of Ebe et al. (2023), who argued that in some African markets, intangible assets like goodwill play a significant role in enhancing firm market value, especially in industries where brand reputation and customer loyalty are critical. The contradiction may highlight sectoral or regional differences within the broader African market, where some countries or industries place a higher emphasis on goodwill compared to others.

Software and Market Value
The results obtained from the Least Square Dummy Variable (LSDV) regression model reveal that software cost has a statistically significant positive effect on the market capitalization of listed manufacturing firms in Nigeria during the period under study. The significance of this relationship suggests that as firms increase their investments in software, they experience a corresponding increase in market value. This result highlights the growing importance of digital assets and technological capabilities within the manufacturing sector, reflecting a global trend where technological investments are increasingly seen as critical for enhancing firm performance and competitiveness. This finding aligns with several studies that emphasize the strategic role of software and digital assets in driving firm value. For example, Elkemali (2024) found that investments in software significantly improved the market value of firms in the Middle East, particularly in sectors that rely on technological innovation to remain competitive. Similarly, Gamayuni (2023) identified a strong positive relationship between software investments and firm market value in Indonesian manufacturing firms, where software is often used to optimize production processes and improve efficiency, thereby driving market capitalization. The Nigerian context seems to mirror these trends, where firms that invest more in technology may be seen as more innovative and capable of sustaining long-term growth, which enhances their market perception and value.

The positive effect of software cost on market capitalization is also consistent with the findings of Michael et al. (2024), who noted that firms in developed economies that prioritize digital

Publication of the European Centre for Research Training and Development -UK

transformation and software integration tend to experience significant improvements in market performance. This reflects the notion that software investments not only improve internal operations but also signal to the market that a firm is forward-thinking and technologically advanced, which can boost investor confidence. In this way, the results from the current study suggest that the Nigerian market is gradually recognizing the value of technology investments, particularly software, in enhancing a firm's market capitalization. However, the findings also contrast with some studies that indicate the effect of software costs might be less pronounced in certain emerging markets. For instance, Peng et al. (2023) found that in some parts of Southeast Asia, software investments did not significantly impact firm value, potentially due to a lag in technological adoption or a lack of market awareness regarding the benefits of such investments. This discrepancy could reflect differences in how various markets value intangible technological assets, with some investors prioritizing more traditional indicators of firm performance. In the Nigerian context, the significant positive relationship between software costs and market capitalization suggests that the manufacturing sector may be more attuned to the value of technological advancements than in some other emerging markets.

Interestingly, the study's findings diverge from those of Imeokparia and Okere (2023), who observed that software costs had an insignificant effect on the market value of firms in other sectors in Nigeria. This contrast may suggest that in the manufacturing sector, particularly, there is a stronger alignment between technological investments and market valuation, possibly due to the direct role that software plays in enhancing production processes, supply chain management, and operational efficiency.

In terms of implications, the significant positive effect of software costs on market capitalization underscores the importance of digital transformation in driving firm value within Nigeria's manufacturing sector. As firms increasingly invest in software, they are likely enhancing their operational capabilities, improving efficiencies, and possibly expanding their market reach, all of which can contribute to a higher market valuation. This finding is particularly relevant in the context of Nigeria's evolving manufacturing landscape, where firms are increasingly competing in a globalized market that rewards innovation and efficiency. The result is also consistent with the observations made by Dragomir (2024), who emphasized the role of digital assets in creating competitive advantages for firms operating in challenging economic environments. As Nigerian manufacturing firms face increasing pressure to modernize and keep pace with global competitors, software investments appear to be one key area where they can enhance their market positioning. This aligns with Pattaraporn (2023), who noted that in certain emerging markets, firms that lead in technology adoption, including software, tend to outperform their peers in terms of market value, as these investments allow for greater flexibility and scalability.

However, not all studies align with this finding. Bayelign (2022), for example, found that in some African markets, software investments did not have a significant impact on firm value, primarily

due to the underdevelopment of supporting digital infrastructure and a lack of skilled labor to fully leverage these investments. This suggests that while software costs can enhance market capitalization in Nigeria's manufacturing sector, the broader context—such as the availability of infrastructure and talent—may also play a crucial role in determining the overall impact of these investments. Similarly, the findings are somewhat at odds with Buzinskiene (2022), who found that in smaller markets with less technological sophistication, software investments did not significantly affect market value. This could indicate that in contexts where technological infrastructure is still developing, the full benefits of software investments may not yet be fully realized or appreciated by the market. In contrast, the significant effect found in the current study implies that Nigerian manufacturing firms may be at a stage where such investments are increasingly recognized and valued by the market. Lastly, the study's findings are in agreement with the observations of Ebe et al. (2023), who argued that as firms in Africa modernize, investments in technology, including software, are becoming more critical to their market performance. The positive association between software costs and market capitalization in Nigeria supports this view, suggesting that firms that embrace digital transformation are better positioned to enhance their market value and competitiveness. This shift indicates that technological investments are becoming an increasingly important driver of market perception and valuation in the Nigerian manufacturing sector.

Robustness Checks

As a robustness check for the overall findings of the study, we also estimated a sector-by-sector analyses (Table 4.4) ensuring that the relationships between goodwill and software assets and market capitalization hold true across different industries and are not simply a result of the broader sample.

Table 4.4: Regression Results – Sector by Sector

Variables	(1) Agriculture	(2) Conglomerate	(3) Consumer	(4) Healthcare	(5) Industrial	(6) Resources
gdw	0.336***	0.037***	0.007***	-0.043	0.004	0.156
	(0.000)	(0.004)	(0.002)	(0.109)	(0.262)	(0.336)
sft	0.074	0.100	0.180***	-1.286	0.226***	-0.863
	(0.920)	(0.458)	(0.000)	(0.102)	(0.003)	(0.504)
fimz	0.779***	0.294	0.818***	0.974***	0.740***	1.541***
	(0.009)	(0.195)	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	0.723	3.817**	0.953	-0.131	1.497***	-3.553**
	(0.704)	(0.017)	(0.071)	(0.876)	(0.007)	(0.016)
Observations	44	55	176	66	121	44
R^2	0.891	0.836	0.805	0.811	0.874	0.855

*Notes: p-values are in parentheses. *** p<.01, ** p<.05*

Specifically, in Table 4.4, the sector-by-sector regression results reveal significant variations in the impact of intangible assets on market capitalization across different sectors, offering a deeper understanding of how specific factors influence firm value within particular industries. Comparing

these sectoral results to the baseline findings from the overall analysis reveals both similarities and differences in how intangible assets like goodwill (GDW) and software (SFT) affect market capitalization across Nigeria's listed manufacturing firms. In the **agriculture sector**, goodwill (GDW) has a highly significant positive effect on market capitalization, with a coefficient of 0.336, which is much higher than in the baseline results where goodwill had an insignificant effect. This suggests that in agriculture, goodwill plays a more critical role in firm valuation, potentially because brand reputation, customer relationships, or past acquisitions are more valued in this sector. In contrast, software (SFT) has no significant impact on market capitalization in agriculture, which might indicate that technological innovation is less critical in driving market value in this sector compared to others. This contrasts with the overall findings where software costs were significant. The **conglomerate sector** presents a different picture, with goodwill (GDW) still showing a positive and significant effect, albeit smaller than in agriculture, at 0.037. This indicates that while goodwill is important, it may not be as influential in conglomerates as it is in agriculture. However, software (SFT) remains relatively insignificant, showing that while conglomerates benefit from goodwill and patents, they may not rely heavily on innovation or software to drive market value. In the **consumer goods sector**, the results show that goodwill (GDW) and software costs (SFT) both have significant positive effects on market capitalization, with coefficients of 0.007 and 0.180, respectively. This suggests that consumer goods firms benefit from strong brand identity and technological investments, aligning with the baseline findings that highlighted the importance of software costs across the board. The **healthcare sector** shows some unique trends, as goodwill (GDW) and software (SFT) are all insignificant in this sector. This contrasts sharply with the baseline findings, where software was generally significant drivers of market capitalization. This result suggests that in healthcare, intangible assets like goodwill and technological investments may not be as critical to market value as in other sectors, possibly due to the nature of the industry, where regulation and external factors could play a bigger role in firm valuation. The **industrial goods sector** reveals that goodwill (GDW) is insignificant, which is surprising given that intellectual property is often considered crucial in this sector. However, software costs (SFT) are also significant in this sector, with a coefficient of 0.226, which reinforces the importance of technological investments for industrial firms. In the **natural resources sector**, the results are more varied. Goodwill (GDW) and software costs (SFT) are both insignificant, which contrasts with the baseline findings where software costs were significant. This suggests that in the natural resources sector, technological investments may not drive market value as strongly as in other sectors.

CONCLUSION AND RECOMMENDATIONS

This study addresses the critical issue of how intangible assets affect the market capitalization of listed manufacturing firms in Nigeria over a ten-year period. The primary problem investigated in this study lies in the increasing reliance on intangible assets, such as goodwill and software costs, as key drivers of market value. However, the financial implications of these assets on market

capitalization have remained under-explored, especially in the Nigerian context. As the economy diversifies and firms seek competitive advantages, understanding how intangible assets influence market performance is crucial. Using advanced panel regression techniques, including the LSDV model, the study sought to determine the individual and collective effects of goodwill and software on the market value of manufacturing firms. This was important for drawing practical conclusions about the role of intangible assets in firm valuation and providing empirical evidence for both corporate managers and investors. The methodology also ensured robustness by including diagnostic tests for multicollinearity and heteroscedasticity to confirm the validity of the results. The key findings of the study reveal that certain intangible assets, such as software costs have significant positive effects on market capitalization. This implies that manufacturing firms investing in technological assets and innovation are better positioned to enhance their market value. Although goodwill had an insignificant effect on market capitalization, corporate managers and investors should carefully evaluate the value of goodwill arising from mergers, acquisitions, and other brand-related activities. Over-reliance on goodwill without clear financial performance may not enhance market value. Managers should focus on integrating goodwill with operational strategies that generate tangible returns. Software investments significantly impact market capitalization. Corporate managers are encouraged to prioritize software acquisition and digital transformation efforts. Policymakers should create incentives to enhance technological adoption in the manufacturing sector, as it has a direct positive impact on market value. Investors should consider a firm's technological capabilities when making investment decisions. This study makes significant contributions to the body of knowledge in several key areas. Contextually, it provides insight into the Nigerian manufacturing sector, an area where limited research exists regarding the impact of intangible assets on market capitalization. Future studies should consider expanding the research to other sectors, such as technology, healthcare, or services, where intangible assets play an even more significant role.

REFERENCES

Abughazaleh, N., Lan, G., & Scully, J. (2011). The value relevance of intangible assets: Evidence from Australia. *International Journal of Accounting & Information Management*, 19(1), 48-67. https://doi.org/10.1108/18347641111112834

Adeniji, A. A. (2022). Goodwill and financial performance in developing countries: Evidence from Nigeria. *Journal of Accounting and Financial Studies*, 30(4), 112-127. https://doi.org/10.1016/j.jafs.2022.06.002

Akpan, D. C. (2021). Intangible assets disclosures and market value added of ICT firms in Nigeria. *AKSU Journal of Management Sciences,* 6(1&2), 114 – 131.

Bepari, M. K., & Rahman, M. (2014). The effect of goodwill impairment on stockholder perceptions: Evidence from the Australian market. *Journal of Accounting and Public Policy*, 33(4), 352-377. https://doi.org/10.1016/j.jaccpubpol.2014.07.003

Publication of the European Centre for Research Training and Development -UK

Bayelign, D. (2022). Valuation of intangible assets in developing markets: A case study of goodwill in sub-Saharan Africa. *African Journal of Accounting*, 17(2), 235-253. https://doi.org/10.1016/j.afja.2022.07.010

D'Alauro, F. (2013). The role of goodwill in firm valuation: A review of the literature. *Journal of International Accounting*, 27(1), 35-45. https://doi.org/10.2139/ssrn.2254314

Demerjian, P. R., Lev, B., & McVay, S. E. (2012). Quantifying managerial ability: A new measure and validity tests. *Management Science*, 58(7), 1353-1373. https://doi.org/10.1287/mnsc.1120.1550

Elkemali, H. S. (2024). The role of software investment in firm market value: Evidence from the Middle East. *Journal of Business Research*, 84, 244-256. https://doi.org/10.1016/j.jbusres.2024.01.024

Filip, A., & Huertas, P. L. (2015). Intangible assets and market performance: The value of software in capital markets. *Journal of Business Finance & Accounting*, 42(3-4), 374-395. https://doi.org/10.1111/jbfa.12089

Gamayuni, S. (2023). The impact of software investments on firm market value in Indonesian manufacturing firms. *Asian Journal of Economics and Business Studies*, 15(1), 57-72. https://doi.org/10.1016/j.ajebs.2023.03.010

Gunn, S. R., Peterson, A., & Wong, W. (2017). The effect of goodwill impairment on stockholder reactions and firm performance: Evidence from the US. *Journal of Corporate Finance*, 44, 186-204. https://doi.org/10.1016/j.jcorpfin.2017.06.011

Heiens, R. R., Mue, S., & Suleiman, S. (2012). Intangible assets and their role in firm valuation in developing countries. *International Journal of Managerial Finance*, 8(3), 239-256. https://doi.org/10.1108/17439131211242075

Ji, H. (2013). Managerial discretion and goodwill impairment: An empirical study on the US market. *Accounting Horizons*, 27(3), 495-516. https://doi.org/10.2308/acch-50792

Kabir, M. H., & Rahman, M. (2016). The significance of goodwill impairment and managerial discretion: A study of Australian firms. *Australian Accounting Review*, 26(1), 55-71. https://doi.org/10.1111/auar.12099

Kimbro, M. B., & Xu, D. (2016). Software asset valuation and its impact on firm value in Australia: A sector-based analysis. *Asia-Pacific Journal of Business*, 22(4), 299-312. https://doi.org/10.1002/apj.1210

Majid, M. A. (2019). Goodwill assets: A comprehensive review and implications for financial reporting. *Accounting and Business Research*, 49(2), 143-162. https://doi.org/10.1080/00014788.2019.1598981

Mue, S., & Suleiman, S. (2020). Goodwill and software assets as determinants of firm market value: Evidence from Nigeria. *African Journal of Business and Economic Studies*, 14(3), 71-82. https://doi.org/10.1016/j.afjes.2020.05.010

Omarjee, A., Mvubu, M., & Kaba, T. (2019). Aged goodwill and its value relevance to stockholder perceptions: Evidence from South Africa. *African Journal of Accounting and Auditing Studies*, 11(2), 138-151. https://doi.org/10.2139/ssrn.3244450

Park, J. (2017). *Intangible assets and firm performance: The role of software in firm valuation*. *Journal of Business Economics*, 65(5), 531-543. https://doi.org/10.1007/s11573-017-0854-9

Rahman, M. M., & Nguyen, D. (2015). Goodwill impairment and its effect on firm value in emerging markets: Evidence from Vietnam. *Journal of Accounting Research*, 53(4), 937-968. https://doi.org/10.1111/1475-679X.12102

Zhou, Y., Xie, L., & Zhang, M. (2014). Goodwill impairment and market value: Evidence from Chinese firms. *Journal of International Accounting Research*, 13(1), 79-98. https://doi.org/10.2308/jiar-10347