



**College of Law and Management Studies**

**School of Accounting, Economics & Finance**

**The relevance and reliability of intangible asset values for JSE listed companies: An  
empirical analysis**

**By**

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**(206 500 203)**

**A thesis submitted in fulfillment of the requirements for the degree of Doctor of Philosophy  
(Ph.D) at the University of KwaZulu-Natal**

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**2024**

## DECLARATION

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## **DEDICATION**

This study is dedicated to my loving mother, Desray Gurr and father, Neil Gurr. My parents have been a constant source of joy and motivation to continue my studies and achieve my full potential. The dedication of my parents to ensure my ability to excel is inspiring and a testament to the phenomenal individuals they are. They sacrificed on a daily basis to give me every possible opportunity to be successful. Through my dad's career at Toyota, he instilled the concept of Kaizen in my upbringing. My parents both had a strong sense of good discipline, morals and ethics which were entrenched in their transfer of knowledge and principles to me. I hope that I have made them proud. Everything they have done for me throughout my life has contributed and been vital to my achievements to date. Thank you for your unwavering love and continued support throughout my life. I would also like to dedicate this study to my sisters, Shelley and Michelle. Thank you both for being a source of happiness and allowing me to vent my triumphs and frustrations during this journey.

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## ABSTRACT

Difficulties in measuring intangible assets and applying them within commerce have persisted due to their unique nature. This complexity challenges companies' ability to fairly value and present intangible assets in annual financial statements. International Financial Reporting Standards (IFRS) emphasise the importance of presenting information that is both relevant and reliable; without these qualities, users' decision-making may be adversely affected. Concerns have been raised over whether intangible asset values reported in financial statements meet these criteria.

This study investigates the relevance and reliability of intangible asset values presented by JSE-listed companies in South Africa. Using a quantitative, empirical approach, the research analysed secondary data drawn from the annual financial statements of the top 40 JSE-listed companies (by market capitalisation) from 2015 to 2019. Data was analysed through ratio and descriptive statistical analysis (via Excel), and inferential statistics using the Ohlson model (via SPSS and AMOS).

Four key objectives guided the study: (1) to determine how intangible assets are measured and valued; (2) to assess whether current valuation techniques (cost or revaluation model per IAS 38) produce relevant and reliable values; (3) to evaluate the significance of intangible assets relative to total assets; and (4) to explore industry-specific differences in intangible asset values.

Findings reveal that most JSE-listed companies report intangible assets. The cost model with finite useful lives dominates for other intangible assets, while goodwill is measured applying an indefinite useful life, as required by IFRS. Intangible assets were found to be a significant component of total assets, especially in sectors like tobacco and pharmaceuticals. A statistically significant positive correlation ( $p = 0.0166$ ) was found between book equity value and market value, highlighting the material role of intangible assets.

The study acknowledges limitations, including reliance on JSE data, simplified Ohlson model assumptions, and limited generalisability. Recommendations include revisions to IAS 38 for more relevant valuation methods, the use of industry-specific guidance, and the involvement of valuation experts. Establishing an intangible asset exchange platform is proposed to aid consistent valuation. The study contributes valuable insight for standard setters to enhance intangible asset reporting.

**Keywords:** Intangible assets; relevance; reliability; Ohlson model; financial statements

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## LIST OF ABBREVIATIONS

AFS	-	Annual Financial Statements
AMOS	-	Analysis of Moment Structures
AT	-	Asset Turnover
BV	-	Book Value
CMAR	-	Capital Market-based Accounting Research
COVID-19	-	Coronavirus disease of 2019
DI	-	Degrees of Intangibility
EPS	-	Earnings Per Share
FASB	-	Financial Accounting Standards Board
GAAP	-	Generally Accepted Accounting Practice
GDP	-	Gross Domestic Product
IA	-	Intangible Assets
IAS	-	International Accounting Standard
ICT	-	Information Communication Technology
IFAC	-	International Federation of Accountants
IFRS	-	International Financial Reporting Standards
IPSAS	-	International Public Sector Accounting Standard
IPSASB	-	International Public Sector Accounting Standard Board
JSE	-	Johannesburg Stock Exchange
M&A	-	Mergers and Acquisitions
MB	-	Market to Book Ratio
NM	-	Net Margin
OEPS	-	Overall Earnings Per Share
RBV	-	Resource-Based View
RG	-	Revenue Growth
ROA	-	Return on Assets
ROE	-	Return on Equity

SCA	-	Sustainable Competitive Advantage
SIC	-	Standard Interpretations Committee
SOFP	-	Statement of Financial Position
SPSS	-	Statistical Package for the Social Sciences
TFG	-	The Foschini Group
TSR	-	Total Share Return
VA	-	Value Added
ZAR	-	South African Rand

## **CHAPTER ONE: OVERVIEW OF THE STUDY**

### **1.1 Introduction to the study**

The conceptual framework, which is the basis for all International Financial Reporting Standards (IFRS), mandates that all information disclosed in the annual financial statements must be relevant and reliable. The valuation of intangible assets heavily relies on the principles of relevance and reliability, which form the cornerstone of the conceptual framework for IFRS for intangible assets. These qualities depend on the ability of the company to determine an appropriate fair value. Relevance ensures that the information presented in the financial statements has the capacity to influence the decisions of users by reflecting current economic realities (Barth, Li, & McClure, 2023; Du & Wang, 2022). Conversely, reliability emphasises the accuracy, verifiability, and neutrality of the information disclosed (Jianu & Jianu, 2021). The tension between these two qualitative characteristics is apparent in the valuation of intangible assets, where the challenges of estimation, recognition, and measurement introduce complexities that directly affect the quality of financial reporting.

By their nature, intangible assets lack physical substance, making their measurement and valuation inherently difficult. Applying a cost model approach to the valuation of intangible assets is assumed to result in reliable information but lacks relevance as it reflects a historical value as opposed to current market conditions. Conversely, the revaluation model is assumed to result in more relevant information through the application of a fair value; however, there is concern regarding how reliable a fair value is. This conundrum between the use of the cost model (an assumed more reliable value that is often not considered relevant) or the revaluation model (an assumed more relevant value that has questionable reliability) brings to the fore the issues surrounding the relevance and reliability of intangible asset values. Similarly, this dichotomy highlights the challenges in choosing between these two models for valuing intangible assets. The inherent subjectivity in estimating fair values, especially in the absence of observable inputs, raises concerns about the reliability of these valuations.

The challenges in achieving relevance and reliability in intangible asset valuation are further compounded by the lack of active markets for many intangible assets, such as internally developed intellectual property, customer relationships, or proprietary technologies. Fair values provide insight into financial market trends, considering the expected changes in terms of the financial effects given the economic volatility in companies' investments (Philander, 2016). Implementing the fair value concept is commensurate with measuring the financial and operational performance of the company. The introduction of the comprehensive income section within the statement of profit or loss and other comprehensive income explains the gaps in valuation, which tend to relate to expected future earnings (Ibidunni & Okere, 2019). Implementing the comprehensive income section provides an opportunity to reduce the gap between the accounting value and the company's market value. The concept of measuring assets and liabilities at their fair value goes a long way in addressing the gap between book values as recorded through the application of accounting standards and market values as evidenced through the share prices and perceived value placed on the company (Pandya, van Zijl, & Maroun, 2021).

The changing commercial world gives rise to new challenges in terms of recording various accounting transactions. As technology and other areas advance, it is found that intangible items represent a significant amount of value within the company, as described through research conducted by Tambe, Hitt, Rock, and Brynjolfsson (2019). Barth and Landsman (1995) posited that implementing fair value accounting (as required under the revaluation model for intangible assets) can be complicated and reliant on critical estimations, which can naturally give rise to errors. The resulting subjectivity within fair value estimates has led to ongoing projects by the Financial Accounting Standards Board (FASB) to provide additional guidance in deriving fair value. The latest development attempt to provide a framework for fair value accounting arises in the International Financial Reporting Standard (IFRS) 13. The objective of IFRS 13, as per paragraph 2, is "to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions" (IFRS, 2023c, p. A670).

International Accounting Standard (IAS) 38 (Intangible Assets) uses IFRS 13 to apply valuation principles to intangible assets. International Public Sector Accounting Standard (IPSAS) 31 is prepared by the International Public Sector Accounting Standards Board (IPSASB), which is an independent body within the International Federation of Accountants (IFAC). IPSAS 31 is prepared based on the principles set out in IAS 38 and Standard Interpretations Committee (SIC) 32 (Intangible Assets: Web Site Costs) (IFAC, 2018).

There is a suggestion that intangible assets and their valuation are becoming more material and important value drivers in the commercial sector. It is further suggested that the limitations placed upon intangible asset recognition and measurement through the restrictions imposed by IFRS undervalue the contributions of intangible assets to a business, thereby negatively impacting their usefulness (Jenkins & Upton, 2001). The relevance and reliability of reported values are qualitative elements that require a form of balancing between one another, especially in terms of intangible assets, as there are instances where the reliability of an estimate could be difficult to ascertain due to a lack of market (Barth, Beaver, & Landsman, 2001a; Gu & Lev, 2011; Holthausen & Watts, 2001).

The issues surrounding the valuation of intangible assets extend beyond theoretical debates; they have tangible implications for corporate governance, investor confidence, and financial sustainability. This study is justified by the need to address these ongoing challenges in the valuation of intangible assets, focusing on the interplay between relevance and reliability. Similarly, it is critical to understand the current measurement bases (which will be further explained in section 1.2 for the benefit of readers who may not have an integral knowledge of the relevant accounting standards) for intangible assets under the current IAS 38 accounting standard through the application of either the cost model or the revaluation model. The issues and inefficiencies under the current accounting standard become evident upon understanding the current measurement bases. The cost model is considered to be unable to result in relevant information due to the use of a historical cost rather than an updated fair value, which is assumed to be more relevant and reflective of the market value for intangible assets, particularly given that intangible assets are considered to be increasing in value and possibly a significant portion of the

total assets held by a company. While the fair value, as required by the revaluation model, is more reflective of the market value of the intangible assets, it is riddled with issues in terms of being a reliable estimate.

## **1.2 Financial Accounting Environment**

IAS 38, paragraph 8, defines an intangible asset as "an identifiable non-monetary asset without physical substance" (IFRS, 2023b, p. A671). The recognition criteria are detailed within the conceptual framework (which provides a core set of ideas and systems underlying the accounting standards) for financial reporting. The conceptual framework states that "An asset or liability is recognised only if recognition of that asset or liability and any resulting income, expenses or changes in equity provides users of financial statements with useful information, i.e., with relevant information about the asset or liability and any resulting income, expenses, or changes in equity and a faithful representation of the asset or liability and about any resulting income, expenses or changes in equity" (IFRS, 2023a, p. A49).

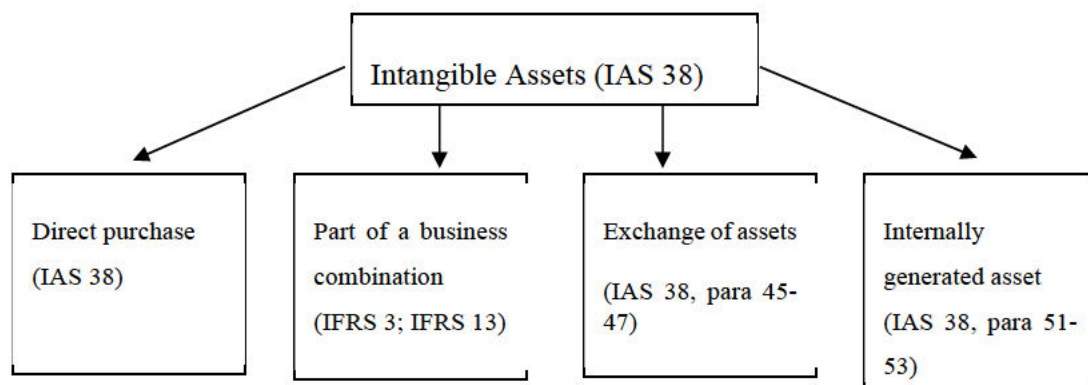
The above paragraph shows that the intention of IAS 38 is to comply with the conceptual framework, thereby ensuring that information presented in relation to intangible assets is both relevant and a faithful representation (reliable). The author notes a potential trade-off between relevance and reliability with the applicability of the two models, with one assumed to be more reliable (cost model) and the other more relevant (revaluation model).

Furthermore, IAS 38 paragraph 18 stipulates that an intangible asset can only be recognised when the definition and the old recognition criteria are met. The old recognition criteria are defined in IAS 38 paragraph 21 as follows:

- The cost of the assets must be reliably measurable and
- The flow of expected future economic benefits to the entity that is associated with the asset must be probable.

The old recognition criteria are still maintained in the individual accounting standards, and the new recognition criteria are detailed in the updated conceptual framework. Paragraphs 51 to 67 of IAS 38 detail the measurement of internally generated intangible assets. The conceptual framework alludes to a trade-off between relevance and reliability. However, it is noted that an element of both is required for information to be useful to the users of the financial statements, which underpins the objectives of their creation (Johnson, 2005). Accounting information is considered to be reliable and faithfully represented if it can be measured objectively. In contrast, information is considered relevant if it is consonant with the intended purpose for valuing a corporate entity as a going concern (Fukui & Saito, 2020).

Various methods may give rise to an intangible asset within the records of a company, namely through a direct purchase of the intangible asset, as part of a business combination, an exchange of assets, or in the form of an internally generated asset, as per Figure 1 below (Cohen, 2011).



**Figure 1: Methods giving rise to intangible assets**

Source: Self-generated

Intangible assets purchased directly seem to be more accessible in terms of valuation as the intangible asset's initial recognition would be at the price paid to acquire the asset. IAS 38 paragraph 27 notes that the cost would include the purchase price and any import duties, non-refundable taxes, and any costs directly attributable to the cost of preparing the asset for its intended use, excluding any rebates or discounts (IFRS, 2023b). Generally, these intangible assets also meet the recognition criteria. They are deemed to be a faithful representation of the value

regarding the purchase price paid for the asset (no measurement uncertainty). These intangible assets are also deemed relevant as they exist (no existence uncertainty), evidenced by the purchase thereof. There is also a high probability that there will be a benefit in the form of an inflow of economic benefits to the company (no outcome uncertainty); otherwise, the company would not have purchased the intangible asset (Eckstein, 2004).

IAS 38 paragraph 33 directs the measurement of intangible assets obtained as part of a business combination, which can be difficult to value since the entity may not have previously recognised them in the acquiree's records. These intangible assets are expected to be valued at fair value at the date of acquisition (IFRS, 2023b). IAS 38, paragraph 35, notes that if the intangible asset acquired through a business combination is separable or results from contractual/legal rights, there is sufficient information to measure the asset's fair value reliably. Estimates would have to be made when calculating the intangible asset's fair value, and the entire range of potential outcomes and uncertainties should be factored into the calculation for consideration (IFRS, 2023b).

IAS 38, paragraph 45, describes the cost measurement for intangible assets derived through an asset exchange transaction. The cost of such items should be considered as being the fair value unless the transaction lacks commercial substance or the fair value of neither the asset received nor the asset given up is deemed reliably measurable. The persistence to expect a fair value for either the intangible asset received or given up reflects a preference and superiority associated with the measurement at fair value instead of the cost or the carrying amount. If the intangible asset cannot be measured at its fair value, the cost would be allocated at the asset's carrying amount given up (IFRS, 2023b). IAS 38 paragraph 47 goes further to clarify when the fair value of an intangible asset is deemed to be reliably measurable, whereby either of the following two conditions should be met:

- i. “The variability in the range of fair value measurements is not significant for the asset or
- ii. the probabilities of the various estimates within the range can be reasonably assessed and used when measuring fair value” (IFRS, 2023b, p. A1350).

In terms of internally generated intangible assets, IAS 38 paragraph 48 explicitly prohibits the recognition of internally generated goodwill (IFRS, 2023b). Furthermore, IAS 38 paragraph 63 also has a detailed list of items prohibited from being recognised as an intangible asset, namely brands, mastheads, publishing titles, customer lists, and other similar items (IFRS, 2023b). IAS 38, paragraphs 49, 50, and 64 describe the reasoning behind the prohibition in paragraph 48 by detailing the lack of identifiability and separability for the internally generated goodwill. Essentially, a value attributed to internally generated goodwill cannot be separated from the value attributed to a company's day-to-day operations (IFRS, 2023b).

Internally generated intangible assets (other than goodwill) pose challenges in terms of recognition. These challenges arise due to difficulties in determining whether an identifiable intangible asset exists that will generate future economic benefits and determining the cost of the intangible asset reliably (Leimalm & Carlberg, 2002). In light of these difficulties, IAS 38, paragraphs 52 to 67 provide guidance to recognise and initially measure the internally generated intangible assets (IFRS, 2023b). An assessment needs to be made in terms of the life-stage of the internally generated intangible asset and a decision made about whether it is within the realms of the research phase or the development phase of the intangible asset, as defined in IAS 38 (Ballester, Garcia-Ayuso, & Livnat, 2003). Where a company cannot adequately determine the internally generated intangible asset phase, IAS 38 paragraph 53 stipulates that it would be treated as within the research phase (IFRS, 2023b).

The research phase is defined in IAS 38 paragraph 8 as "original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding" (IFRS, 2023b, p. A1343). All costs incurred during the research phase are not permitted to be recognised as part of an internally generated intangible asset. At this point in development, these costs cannot be part of the asset because there is no certainty regarding the intangible asset's ability to generate future economic benefits. Therefore, all costs incurred during this phase are expensed per IAS 38 paragraph 54 (IFRS, 2023b).

The development phase is defined in IAS 38 paragraph 8 as "the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems or services before the start of commercial production or use" (IFRS, 2023b, p. A1343). Further to the application of the definition when determining the life-stage of the internally generated intangible asset, the company must satisfy all of the following criteria to recognise and capitalise costs to the asset:

- I. "The technical feasibility of completing the intangible asset so that it will be available for use or sale.
- II. It intends to complete the intangible asset and use or sell it.
- III. Its ability to use or sell the intangible asset.
- IV. How the intangible asset will generate probable future economic benefits. There should be a market for the output of the intangible asset or the intangible asset itself, or it must be useful if used within the company's internal processes.
- V. Availability of adequate technical, financial, and other resources to complete the development, use, or sell the intangible assets. The company should corroborate its assessment with a business plan or a funding commitment from a lender, etc.
- VI. Its ability to measure the reliability of the expenditure attributable to the intangible asset during its development." IFRS (2023b, p. A1352)

Dahmash, Durand, and Watson (2009) clearly outlined three main issues that standard setters are faced with in terms of intangible assets, namely:

- Should intangible assets be recognised on the face of the statement of financial position (capitalised), or should they be expensed? Should purchased intangible assets be treated differently from internally generated intangible assets?
- Should all intangible assets be amortised, or should there be a distinction between finite and indefinite useful lives with indefinite classifications being subjected to annual impairment testing?

- Should companies be permitted to upwardly re-value intangible assets in an effort to accurately reflect the fair value, and if so, under what circumstances?

Given the significance of intangible assets and their ability to generate future economic benefits, it appears that the capitalisation of intangible assets is considered to be appropriate. The application of fair values to value intangible assets is considered to be superior to the cost model in terms of offering a relevant value; however, there are concerns surrounding its reliability. There appears to be a mismatch in the differentiation in recognising internally generated intangible assets and those that are specifically acquired (Powell, 2003). Despite the current treatments for purchased and internally generated brands, it is difficult to support differing measurement applications simply due to the origin of the intangible asset. As with property, plant, and equipment, there should be differing life spans and resultant amortisation based on the expected useful life of the intangible asset. As entities move towards the future and the fourth industrial revolution, the role of intangible assets becomes more important, and thus, the accurate recognition and measurement thereof are vital (Jiang, 2019). Accounting standard setters should scrutinise each element of intangible asset recognition and measurement principles to ensure that a structure is developed that will generate an output of relevant and reliable information.

Ultimately, various stakeholders and users of financial statements depend on the reliability of the values pertained therein (Mukhametzyanov & Nugaev, 2016). However, inaccurate values reported in the financial statements can adversely affect stakeholders and result in incorrect decisions and economic loss (Banham, 2019). There is an inherent assumption by the users of financial statements that the information provided therein is both relevant and reliable (Ekwe, 2013).

### **1.3 Background**

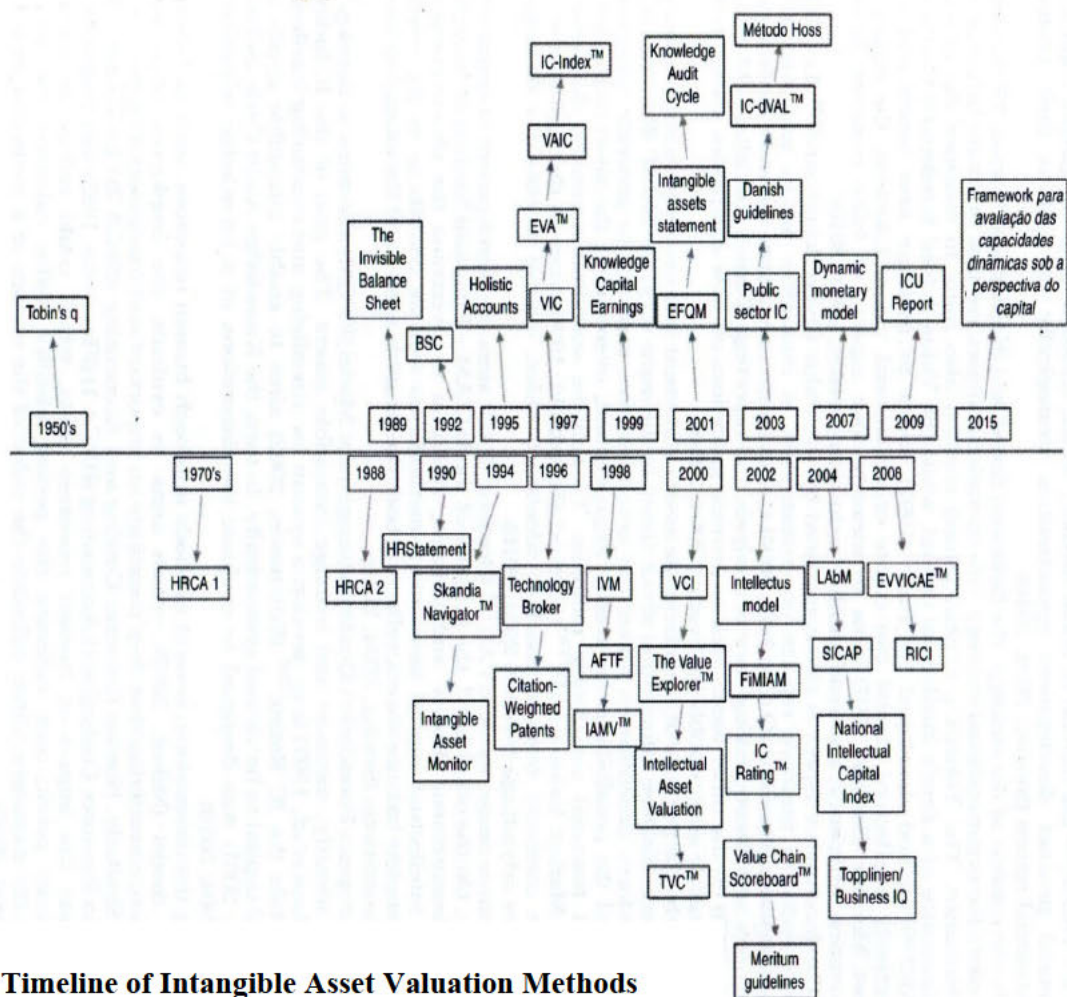
The inefficient valuation of intangible assets can have various impacts on businesses, investors, and the relevant economy, including the incorrect allocation of resources. In the event that certain intangible assets are undervalued, this may result in inadequate resources being allocated to the

intangible assets' development or maintenance, thereby not taking full advantage of potential growth opportunities. The undervaluation of intangible assets in the statement of financial position can lead to a distortion of investor perceptions, thereby leading to the company's stock being undervalued in the market due to investor decisions based on the financial statements. An inaccurate valuation of intangible assets can cause inaccurate financial ratios, making it difficult for stakeholders to correctly determine the company's economic performance. Undervaluing intangible assets can result in an erroneous assessment of the risks that impact the company due to the extent to which the competitive advantage derived from the intangible asset is overlooked. When companies do not recognise the value associated with their intangible assets, there may be instances where opportunities are missed. Inaccurate valuations may potentially erode investor confidence as they may feel skeptical about the accuracy and reliability of the information contained in the financial statements, thus impacting the investor's willingness to invest/lend to the company. Where particular intangible assets are undervalued, a company may not secure the relevant funding to ensure the development and maintenance of the intangible asset, thereby missing potential opportunities. Inefficient intangible asset valuations may result in an overpayment by the acquiring company due to an inaccurate assessment of the target company's intangible assets. Intellectual property in the context of company intangible assets includes copyrights, trademarks, and patents. Opportunities such as monetisation and licensing can be missed should there be ineffective intellectual property management and protection due to inaccurate intangible asset valuations. Ensuring accurate estimations relating to intangible assets is vital for both regulatory and tax compliance (García-Ayuso, 2003).

The above impacts due to an inefficient valuation of intangible assets detail various negative consequences that ultimately have varying effects on the company's financial performance, investor relationships, strategic decisions, and competitive advantages. The effect of an inefficient valuation of intangible assets highlights the importance of developing more robust valuation practices. Various factors explain the inefficient valuation of intangible assets, including a lack of information because, by nature, intangible assets are difficult to value, which is further compounded by the fact that financial statements do not specify the information on a firm's value drivers, which stems from the conservative valuation methods applied by the accounting standards

(Amir & Lev, 1996; Ittner & Larcker, 1998). There are no established markets for the trade of intangible assets, making it challenging to derive a meaningful and objective value (García-Ayuso, 2003). Analysts rely on using all the information available to develop a forecast and predict an entity's future earnings. Not all analysts will have access to the same information, and each individual will have unique biases that will factor into the valuation (García-Ayuso, 2003). Ethical dilemmas may arise whereby the manipulation of a value is desired to create a particular impression. An over-valuation of assets is considered a risk, and where one needs to estimate a value, such as for intangible assets, there may be room for misstatement (Lee, Myers, & Swaminathan, 1999).

Figure 2 below reveals how the valuation of intangible assets has changed and adapted over the years, with more refined and detailed information being employed to ascertain what is deemed to be an accurate and reliable measure of such assets. Over time, the adaption regarding intangible asset valuation shows that this area has revealed inefficiencies in the past. There have been attempts to rectify these through the ever-changing valuation techniques adopted to strive towards a more reliable estimate. Tobin's Q was the initial basis for measurement in the 1950s, with a simplistic basis of valuation utilising the market value divided by the replacement cost of an asset. From the rudimentary valuation basis of Tobin's Q, valuation was refined over time in a constant effort to try and ascertain more relevant and more reliable values for intangible assets to the current position with the implementation of IFRS. Despite the previous realisation relating to the inefficiencies of the various valuation methods, there has been stagnation since 2015 in terms of further refining the valuation of intangible assets to arrive at a relevant and reliable figure. There is a need to continue the refinement process until many of the valuation issues relating to relevance and reliability are adequately addressed.



**Figure 2: Timeline of Intangible Asset Valuation Methods**

Source: Osinski, Selig, Matos, and Roman (2017, p. 476)

Given the background knowledge of the requirements of IAS 38 in terms of the valuation of intangible assets, it appears to give rise to the complexity of valuing intangible assets in a manner that results in both relevant and reliable information as envisaged by the conceptual framework. This issue is further articulated through various studies (Aboody, Barth, & Kasznik, 1999; Barth & Clinch, 1998; Easton, Eddey, & Harris, 1993; Mazzi, Slack, Tsalavoutas, & Tsoligkas, 2022), noting the problems concerning the choice between the cost model, which is assumed to provide reliable information but is considered irrelevant given the exclusion of the updated market value attributable to the intangible assets. The revaluation model is often assumed to be more relevant

than the cost model through the application of attributing a fair value to the intangible asset. Still, there are questions about the reliability of this value due to the unique nature of intangible assets and the difficulties in obtaining a true fair value for each individual intangible asset. It is essential to note that limited studies have been conducted to test the assumptions relating to the cost and revaluation model, noting that such were not conducted on JSE-listed companies and those that have been conducted to a limited extent have been performed on international samples and/or data prior to 2015 thereby not reflecting the latest version of IAS 38 as illustrated in Figure 2. The importance of ensuring a relevant and reliable intangible asset value is strengthened by the fact that they are often a key driver in the success of businesses as well as the fast-paced (and resultant change in market values) commercial world and reliance on key intangible assets as a competitive advantage.

Lev, Petrovits, and Radhakrishnan (2010) has recommended sorting intangibles into various classifications, including those derived from discoveries (for instance, patents), those associated with customers (like brand equity), and organisational assets (such as internal processes). Such methodical classifications have the potential to enhance transparency and harmonise valuation methodologies across organisations. Scholars including Barth (2018), further endorse fair value methodologies for appraising intangibles, although apprehensions regarding subjectivity and reliability persist as substantial impediments. This study aims to understand choices made by entities, given that it seems a trade-off needs to be considered between offering more reliable information (cost model) and relevant information (revaluation model). Objective one expects to determine how intangible assets are measured and valued by JSE-listed companies in South Africa through the use of ratios and descriptive statistics, which is enhanced by objective two to assess the values that have been disclosed for intangible assets in relation to the market capitalisation value.

Corrado, Haskel, Jona-Lasinio, and Iommi (2022) assert the critical role of research and development investments, which are frequently treated as expenses rather than capital expenditures, in enhancing national productivity and fostering GDP growth. This perspective diminishes their significance at both the firm-specific and macroeconomic dimensions. The

research elucidates the tendency of contemporary economies to undervalue the extensive contributions of intangible assets, including design and human capital, when assessed through conventional accounting frameworks. There is a significant concern that intangible assets are undervalued with the application of the International Financial Reporting Standards in their current form. This study aims to address this through the second objective to determine whether standard valuation techniques (application of the cost or revaluation model) reflect a relevant and reliable estimate of the intangible asset value for JSE-listed companies in South Africa through the application of the Ohlson model and inferential statistics to identify whether intangible assets are, in fact, undervalued in relation to the market value of the entities.

The assessment of intangible assets presents considerable difficulties owing to their intrinsic complexity, subjectivity, and absence of tangible form; nevertheless, they represent a significant segment of a corporation's asset portfolio, frequently exceeding the importance of tangible assets. Items such as patents, trademarks, goodwill, and proprietary technologies that aren't tangible are essential for gaining competitive leverage, encouraging innovation, and creating worth. Lev (2004) highlighted that firms operating in areas like technology, pharmaceuticals, and retail see intangible assets often exceeding 50% of their market capitalisation. However, conventional financial reporting methodologies tend to inadequately reflect their economic worth, creating a disparity between book values and market valuations. Barth (2018) contended that inconsistent accounting practices, exemplified by recognising certain intangibles (e.g., goodwill) exclusively during acquisition events while disregarding internally generated assets such as research and development, further intensify valuation challenges. This misalignment significantly influences the statement of financial position, where intangible assets are either undervalued or wholly omitted, thereby constraining stakeholders' capacity to make well-informed decisions. Remedying this dilemma necessitates reassessing accounting standards and implementing sophisticated valuation methodologies to more effectively reconcile financial reporting with contemporary enterprises' economic realities. This study, through the third objective, seeks to assess the significance of intangible assets on the total assets of South African JSE-listed companies to establish whether there is a large disparity between the investment of tangible and intangible assets.

Technology, pharmaceuticals, and retail sectors exhibit a pronounced dependence on intangible assets, including intellectual property, customer databases, and proprietary technologies. Lev (2004) determined that intangible assets make up nearly half of the S&P 500's market capitalisation. The issue regarding the undervaluation of intangible assets, particularly for technological-intensive companies, is further echoed by Qureshi and Siddiqui (2021). Nonetheless, these contributions frequently remain obscured due to prevailing accounting frameworks that inadequately reflect non-physical resources, thereby hindering stakeholders' ability to accurately evaluate the genuine value of enterprises within these industries. The identified issue relating to specific sectors internationally holding particular disparities in terms of intangible asset valuations aims to be addressed by objective four, namely, to examine whether differing industries hold a diverse value disparity in terms of intangible asset values in order to ascertain whether such issues are also faced by South African companies listed on the JSE.

The assessment of intangible assets represents one of the most contentious topics in modern accounting and financial reporting. Although the importance of intangible assets in fostering value and growth is broadly recognised, prevailing research indicates ongoing difficulties and discrepancies in their assessment. The critique provided by Lev (2003) regarding conventional financial reporting frameworks centers on their inadequacy in effectively depicting the economic value of intangible assets, primarily those that are developed internally, including research and development and brand equity. This oversight has resulted in a "reporting gap" between the book value and market value of enterprises, particularly in knowledge-intensive sectors such as technology and pharmaceuticals.

Contemporary research, including that conducted by Barth et al. (2001a), illustrates that the prevailing accounting standards, such as International Financial Reporting Standards (IFRS), allow for the acknowledgment of intangibles like goodwill solely in the context of acquisitions. In contrast, internally developed assets remain unrecognised unless they satisfy stringent criteria. This paradox leads to underestimating intellectual capital and innovation, frequently the principal contributors to firm value in contemporary economies. Furthermore, investigations such as those by Penman (2009) contend that the inherently subjective nature of intangible asset valuation raises

concerns regarding reliability, as valuations are often swayed by assumptions and projections that are challenging to authenticate.

The trade-off between relevance and reliability in financial reporting further intensifies the discourse. Detractors of the current measurement paradigms, including Hunter, Webster, and Wyatt (2005), assert that historical cost accounting does not adequately capture the prospective economic advantages of intangible assets, while fair value measurement introduces fluctuations and necessitates subjective judgment. Moreover, as posited by Laux and Leuz (2009), reliance on market-based metrics for assessing intangibles may not consistently yield accurate or dependable outcomes, particularly in less liquid markets or during times of economic volatility.

Certain scholars advocate for a fundamental transformation in accounting standards to propel the discourse forward. Lev and Gu (2016) suggest adopting a more forward-looking framework that incorporates non-financial indicators, such as innovation outputs or customer satisfaction, to encapsulate the value of intangibles more effectively. Comparably, Abhayawansa, Guthrie, and Bernardi (2019) propose leveraging narrative disclosures and integrated reporting to augment standard financial metrics, thereby granting a more holistic understanding of intangible asset value.

In essence, while earlier investigations have markedly advanced the understanding of the difficulties surrounding the assessment of intangible assets, it accentuates the critical call for reforms in accounting standards to better the relevance, reliability, and comparability of intangible asset reporting. The ongoing discourse continues to wrestle with the challenge of harmonising theoretical rigor with practical applicability and addressing stakeholders' diverse needs in an increasingly dynamic economic environment. This study aims to contribute to the debate surrounding the valuation of intangible assets with the expectation of adding new recommendations (from a South African perspective) to the pot to shape meaningful changes in the future, resulting in more relevant and reliable values of intangible assets.

#### **1.4 Research Problem**

The valuation of intangible assets faces a conundrum for valuation under the International Financial Reporting Standards, as it involves balancing between two prevalent models: the cost model and the revaluation model. The cost model is considered to be more reliable as it reflects the historical acquisition cost of the particular intangible asset. However, its relevance is often questioned due to its reliance on outdated information, which renders disclosure less reflective of the current value of the asset. In contrast, the revaluation model is considered to provide relevant and up-to-date information through the application of the fair value of the intangible asset. However, there are questions surrounding the reliability of such a value, especially due to the unique nature of many intangible assets, often due to fast-moving technology (software, programs) as well as valuable knowledge (including intangible asset items such as patents, inventions, pharmaceutical recipes, etc.).

The importance of the accurate/reliable valuation of intangible assets is further elevated because, previously, tangible assets had been the primary driver of company values. The value of intangible assets in companies' financial positions has grown from 20% to now representing 80% of the value in companies (Scroupa, 2017). Companies such as Coca-Cola, Microsoft, Pfizer, and Apple demonstrate that a significant portion of value resides in intangible assets, such as brand equity and intellectual property, which are often not captured under traditional accounting frameworks (Damodaran, 2016). The lack of clear guidelines for deriving fair value, particularly for internally generated intangible assets, leaves room for subjectivity.

Assessing intangible assets within the South African context encounters distinct obstacles shaped by the nation's regulatory landscape, industrial structure, and socio-economic environment. South Africa conforms to the International Financial Reporting Standards (IFRS), which impose rigorous recognition and measurement stipulations for intangible assets. Although existing literature remains limited compared to global studies, it underscores significant concerns surrounding the prevailing frameworks and the overarching discourse on the valuation of intangible assets. A notable critique within the South African landscape arises from the absence of dedicated research focusing on the valuation of intangible assets within the predominant industries of the

Johannesburg Stock Exchange (JSE), including mining, financial services, and telecommunications. Pereiro (2002) noted that the technology and pharmaceuticals sector encounter substantial obstacles owing to the underreporting of internally generated intangible assets, which are omitted from statements of financial positions under IFRS. The absence of adequate expertise and resources further exacerbates these valuation challenges (Eloff & de Villiers, 2015).

As highlighted, the valuation challenges in intangible assets pose a significant practical problem for investors, creditors, and other stakeholders who rely on financial information to make informed decisions. The potential for misvaluation can lead to misallocation of capital, inaccurate assessments of firm performance, and increased information asymmetry. Moreover, local research (Coetzee, 2023; Eloff et al., 2015; Omarjee, Yasseen, & Mohamed, 2019) elucidates the challenges associated with the application of IFRS in South Africa's multifaceted economic landscape. Moreover, the reliance on externally generated expertise to value complex intangible assets often results in increased costs and subjectivity, undermining the accuracy and relevance of financial reporting (Coetzee, 2023). Ames (2013); Coetzee (2023); Lev et al. (2016), have also highlighted concerns over the rigid distinction between internally generated intangible assets and goodwill under IFRS, which undermines the role of research and development and innovation in long-term value creation.

While prior research has examined various aspects of intangible asset valuation (Dancaková, Sopko, Glova, & Andrejovská, 2022; Grzybek, 2023; Ma & Zhang, 2023; Namazi & Shakeri, 2021; Turovets, 2021), there remains a significant gap in understanding the specific challenges and practices within the South African context. In the South African context, Eloff et al. (2015) examined the value relevance of goodwill under IFRS 3, while Zahra and Garnett (2017) focused on intangible assets within specific industries. This study extends their work by applying a broader lens, incorporating both purchased and internally generated intangible assets, and using the Ohlson model to address sectoral disparities. Evidently, there is limited empirical evidence on the relevance and reliability of intangible asset values reported by JSE-listed companies. This study addresses this gap by examining the measurement of intangible asset values for companies listed

on the Johannesburg Stock Market to determine the extent to which these valuations are both relevant and reliable. The research contributes to the existing literature by providing empirical evidence on the relevance and reliability of intangible asset values in a specific emerging market context and offers insights for policymakers, standard setters, and practitioners.

The research gap is evident in the limited exploration of how IAS 38 impacts the valuation of intangible assets in South Africa, particularly among JSE-listed companies. Practical challenges, such as reliance on subjective estimates and inconsistent application across industries, underline the need for empirical analysis. This study contributes by articulating these gaps and proposing solutions informed by both global and local contexts. The justification for undertaking this study is rooted in the increasing significance of intangible assets in modern financial reporting. As JSE-listed companies represent a pivotal component of South Africa's economic framework, understanding the valuation of intangible assets is critical for ensuring the relevance and reliability of financial statements. This study addresses the challenges posed by IAS 38, focusing on how it affects reporting accuracy and investor decision-making.

At the heart of this study lies a pressing challenge in financial accounting: the persistent difficulty in accurately valuing intangible assets. While the Ohlson Model has been widely used in previous studies, its application to emerging markets, particularly South Africa, remains underexplored. This thesis makes a significant theoretical contribution by extending the Ohlson Model to account for the specific economic and institutional conditions that shape the valuation of intangible assets in South Africa. Unlike in developed economies, where market efficiency allows for more accurate valuation estimates, South African firms face unique challenges such as regulatory inconsistencies, lack of market transparency, and sector-specific valuation disparities. By integrating institutional theory into the analysis, this study offers a refined theoretical framework that better captures the nuances of intangible asset valuation in an emerging market context. By bridging theoretical gaps and addressing practical inefficiencies, this research provides actionable insights for standard setters, policymakers, and practitioners.

## **1.5 Research Aim and Objectives**

The overarching research aim and the relevant objectives are outlined below. The research aim is designed to focus the study, with the research objectives supporting the research aim. The research aim for this study was determined after an extensive review of the relevant literature and given the information developed through investigating the background and research problem associated with the topic. The research aim is a focused and defined statement pertinent to the chosen topic.

### **1.5.1 Research aim**

This research aims to examine the measurement of intangible asset values for listed companies in South Africa's Stock Market (JSE) to assess the extent to which the values are relevant and reliable.

### **1.5.2 Research objectives**

The following specific objectives are formulated to guide the study.

- SO1: To determine how intangible assets are measured and valued by JSE-listed companies in South Africa;
- SO2: To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies;
- SO3: To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies and
- SO4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies.

## **1.6 Research Questions**

The research questions are functional and designed to ensure that the research aim and objectives are thoroughly investigated in an effort to generate robust findings and conclusions. The research questions that were developed in order to satisfy the objectives are as follows:

- RQ1: How do the selected JSE-listed companies in South Africa measure and value their intangible assets?

- RQ2: To what extent are intangible asset valuations derived using the cost and revaluation models, relevant and reliable for JSE-listed companies?
- RQ3: Do intangible assets represent a significant portion of the total assets for the selected JSE-listed companies in South Africa?
- RQ4: What are the differences in intangible asset intensity across different industry sectors of JSE-listed companies?

### **1.7 Significance and Contributions of the Study**

The South African studies that used the Ohlson model differ from this proposed study, as detailed below. Eloff et al. (2015) interrogated the value relevance of goodwill reported under IFRS 3 compared to IAS 22. Eloff et al. (2015) conducted research aimed to look at all recognised intangible assets and not solely at goodwill for mergers and acquisitions, focusing on IFRS 3 in relation to IAS 22 (which focuses on intangible assets acquired as part of a business combination) compared to the market capitalisation. This study differs from that conducted by Eloff et al. (2015), which engaged in a comparison of the valuation under the old IAS 22 (intangible assets acquired as part of a business combination) and IFRS 3 (the new standard for intangible assets acquired as part of a business combination). This study aims to investigate the relevance and reliability of generally acquired assets and internally generated intangible assets, as well as the relevance and reliability of the values from these assets through the lens of significance in the company in relation to total assets, the methods used to value said intangible assets, the relevance, and reliability of the values in relation to market capitalisation for these intangible assets as well as a further stratification of results by industry to ascertain any specific nuances to particular industries listed on the JSE in South Africa. Another study conducted in South Africa using the Ohlson model by Zahra et al. (2017) focused on the value relevance of goodwill only, while this study aims to cover all recognised intangible assets as per IAS 38. The researcher further intends to provide greater insight by stratification of the results of different industries to ascertain which industries yield a higher value disparity in South Africa.

The significance of this study is that the results will contribute to the existing knowledge surrounding the valuation of intangible assets. There is a lack of research conducted within South

Africa regarding the valuation of intangible assets and the practical applications of the International Financial Reporting Standards. As evidenced in the background of this study, the valuation of intangible assets has been a long-debated topic. The contributions from this study will aid in better understanding the valuation of intangible assets within South Africa and the significance of intangible assets in the Statement of Financial Position. The information derived from this study should aid in refining the International Financial Reporting Standards to provide clarity in the valuation of intangible assets in line with IFRS 13 by providing insight into the valuation methods selected by JSE-listed companies as well as whether IAS 38 results in relevant and reliable intangible asset values; the significance of the intangible asset value included in the financial statements, and which industry is more impacted by the intangible asset valuation disparity.

Barth et al. (2001a, p. 8) profoundly stated that: “Value relevance research is designed to provide evidence to accounting standard setters that can update their prior beliefs about how accounting amounts are reflected in share prices and, thus, can be informative to their deliberations on accounting standards.” The International Financial Reporting Standards could be updated to provide more guidance in measuring and valuing intangible assets. A more accurate and reliable value for intangible assets will ensure that the users of the financial statements who rely on this data will make better decisions.

This study concentrates on the relevance and reliability of intangible assets within the South African context and is of considerable importance. It offers multiple contributions across the realms of academia, professional practice, and policy formulation. The economic landscape of South Africa encompasses a heterogeneous array of sectors, such as mining, technology, retail, and financial services, each characterised by distinct attributes that impact the recognition and valuation of intangible assets. The study in this domain could yield customised insights into the pragmatic challenges encountered by South African enterprises in the implementation of IFRS, particularly in light of the stringent criteria governing the recognition of intangible assets. For instance, internally developed assets, including research and development (R&D) and brand equity, continue to be inadequately reported, which may lead to a misrepresentation of the financial

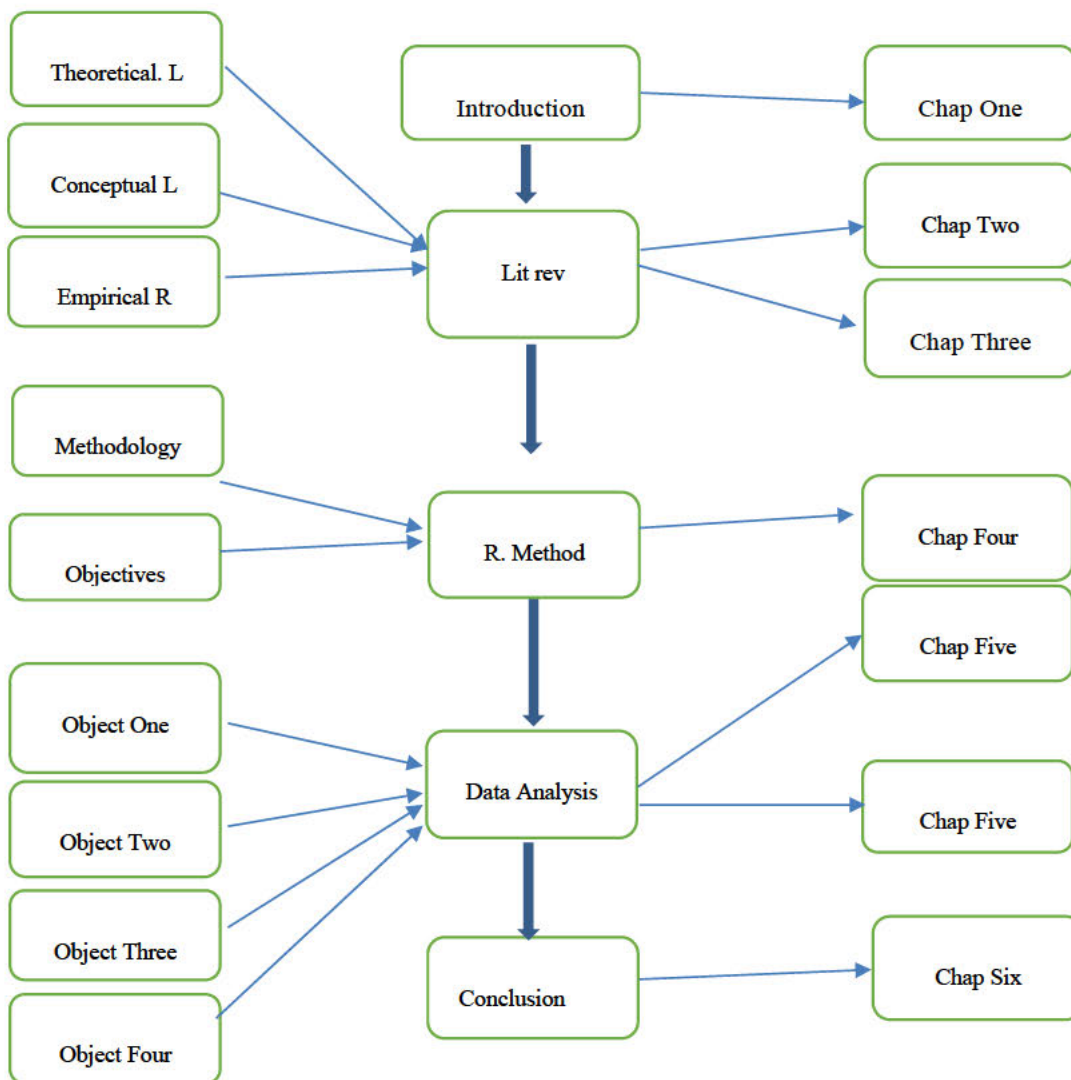
standing of firms (Coetzee, 2023). The accurate valuation and disclosure of intangible assets are imperative for augmenting the relevance and transparency of financial statements. By scrutinising the relevance and reliability of intangible asset values, such a study could facilitate the reconciliation of the financial performance reported by firms with their actual economic worth, especially in sectors where intangible assets predominate, such as technology and pharmaceuticals. Intangible assets, including intellectual property and goodwill, are integral to fostering innovation and generating value. A deeper comprehension of how South African firms report these assets could bolster investor confidence in the financial disclosures of entities listed on the JSE, thereby attracting foreign direct investment and promoting economic development. South Africa has emerged as a frontrunner in advocating for integrated reporting through the King IV Code of Corporate Governance, which underscores the importance of incorporating non-financial and intangible components. Investigating the relevance and reliability of intangible assets could furnish policymakers and standard-setting organisations with insights, advocating for modifications to IFRS or adopting alternative frameworks that are attuned to local economic conditions (King IV Report, 2016).

The research could enrich academic discourse by offering a South African viewpoint on the ongoing global discussion regarding the limitations of IFRS in the accounting for intangible assets, extending the critiques posited by Lev et al. (2016), who contend that current standards inadequately encapsulate the economic value of intangibles. The study could elucidate industry-specific best practices and challenges by examining the composition and valuation of intangible assets within industries characterised by a high dependency on such assets (e.g., technology and pharmaceuticals); the study could also provide actionable insights for relevant stakeholders. The reliable reporting of intangible assets enhances the decision-making capabilities of stakeholders, including investors, auditors, and regulatory bodies. The research could heighten awareness of how intangible assets influence firm valuation, competitiveness, and risk assessment, particularly within an emerging market context like South Africa. The study could yield practical recommendations for South African firms, suggesting the adoption of sophisticated valuation methodologies, training specialists to assess intangible assets, and utilising alternative reporting frameworks to improve the precision and dependability of financial statements.

In an economic environment increasingly influenced by intangible value generators, such as intellectual property and innovation, this study could act as a stimulus for enhancing accounting practices in South Africa. It would lay a crucial groundwork for aligning financial reporting with the shifting economic realities, thereby supporting sustainable business practices and augmenting global competitiveness.

### 1.8 Structure of the Thesis

The structure of the thesis is detailed below to provide an outline and framework within which the study is conducted and presented. The thesis comprises six chapters, which are structured and designed to present the information developed in a meaningful way. The structure of the thesis is represented in Figure 3 below:



**Figure 3: Structure of the thesis**

Source: Self-generated

As shown in Figure 3, the thesis will be arranged as follows:

#### **CHAPTER ONE: INTRODUCTION**

Chapter One introduces the study, identifies the research problem, and details the research aims, objectives, and questions. The introduction contains the aim, objectives, rationale and motivation, and the significance of the study's contributions.

#### **CHAPTER TWO: LITERATURE REVIEW**

This chapter addresses empirical literature reviews on the relevance and reliability of intangible asset values for JSE-listed companies. In order to identify the research gaps, an outline of the body of research and literature that already exists on the relevance and reliability of intangible asset values are examined and documented. As part of the research, a conceptual model describing its link among variables to every target was created.

#### **CHAPTER THREE: THEORETICAL AND CONCEPTUAL LITERATURE REVIEW**

Chapter Three offers an overview of the research's relevant theoretical and conceptual literature. The existing models and theories act as a framework and grounding for the study. In addition, this chapter covers the following theories: the relevance and reliability of intangible asset values theories, namely, Positive accounting theory, Resource-based view (RBV), stakeholder theory, accounting conceptual framework, signaling theory, dynamic capabilities theory, and institutional theory.

#### **CHAPTER FOUR: RESEARCH METHODOLOGY**

Chapter Four considers the methodology and research approach. The research design and paradigm are illustrated, as well as the determination of the population and sampling. Data collection sources and procedures are detailed in this chapter. The data analysis and presentation of results are encapsulated along with data tools. The validity and reliability of the data are interrogated, and ethical considerations are sufficiently outlined.

#### **CHAPTER FIVE: DATA ANALYSIS, RESULTS AND FINDINGS**

This chapter provides a presentation and analysis of data collected during the study. The study's findings will be presented and discussed according to the study objectives. Additionally, the results of the tests that align with the aim and objectives will be presented in this chapter. The researcher will consider and discuss the findings in terms of the existing literature and theories. The format for presenting the research findings is conducted in relation to the research objectives that have been identified.

## **CHAPTER SIX: SUMMARY AND CONCLUSION**

Chapter Six summarises the outcomes of the study, limitations relevant to the study, and areas for further research, ultimately drawing a conclusion from the research undertaken in conjunction with the relevant literature to establish recommendations resulting from the study.

### **1.9 Chapter Summary**

The chapter began by detailing the background and introducing the identified research issue. This chapter aimed to illustrate the research gap and highlight the rationale for the engagement in the research topic. The relevance and reliability of intangible asset values presented in financial statements are justified as an area of interest due to the perpetuated difficulties in applying the current accounting standards and the lack of dedicated research for intangible assets within the context of South Africa. The conundrum between the cost and revaluation models was illustrated, noting a trade-off between relevance and reliability in applying each model, highlighting the inefficiencies in practical application. The objectives that are sought to address the issues described in the chapter include determining how intangible assets are measured and valued by JSE-listed companies in South Africa, determining whether standard valuation techniques (cost or revaluation model as per IAS 38) reflect relevant and reliable values of intangible assets, assessing the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies and finally to examine whether differing industries hold a different value disparity in terms of intangible assets values for JSE-listed companies in South Africa. This study concentrates on the relevance and reliability of intangible assets within the South African context, which possesses considerable importance and offers multiple contributions across the realms of academia, professional practice, and policy formulation. The information derived in this thesis has

the potential to add to the continuing academic discussion and body of knowledge surrounding the relevance and reliability of intangible asset values, particularly from a South African perspective, as well as to drive changes in the accounting standards, which are applicable worldwide and have the advantage of assisting in developing models for intangible asset valuation that are more relevant and reliable in relation to the share price and market capitalisation values for companies. The structure of the thesis was described in detail to ensure that the information is presented in a logical and meaningful manner.

The literature review is a critical component of any research, as it establishes the foundation for addressing the identified research gap. Synthesising existing studies allows researchers to contextualise their work within the broader academic and industry discourse, identifying gaps, limitations, and unexplored areas that require further investigation (Boote & Beile, 2005). This process not only ensures that the research is informed by prior knowledge but also highlights areas where current methodologies, theories, or frameworks fall short in explaining the phenomenon under study. Specifically, in the context of intangible assets, the literature review is essential for understanding the evolution of valuation practices, challenges, and industry-specific dynamics, thereby justifying the need for localised or sectoral investigations (Lev et al., 2016). Ultimately, the literature review bridges between what is known and what remains to be explored, ensuring that the research contributes meaningfully to advancing knowledge and practice. The researcher performed an empirical literature review, commonly called a systemic literature review, to examine past empirical studies that have been conducted relevant to the research topic. This review is presented in the next chapter.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter engages with the existing literature in an effort to learn more about the particular field of interest, further explore the pertinent issues, and gain a thorough understanding of the information that underpins the topic. This chapter of the thesis will provide the underlying foundation that will aid the analysis, interpretation, and ability to determine generalisations relating to the results. The literature review is structured by first introducing the concept of intangible assets, and thereafter, the literature is discussed for each of the research objectives. The following section will provide more information on the concept of intangible assets as a whole.

### **2.2 The Concept of Intangible Assets**

The literature in terms of intangible assets fits into two main categories, namely intangible assets that are recognised by companies in line with the accounting standards and those intangible assets that companies do not recognise, for example, human capital (knowledge), structural capital (policies, procedures, and systems) and relational capital (customers and suppliers) as these are prohibited from being recognised in terms of the accounting standards (Sonnier, Carson, & Carson, 2007). This study's focus is the recognition of those intangible assets that are permitted as per the accounting standards. Diverse methods are available for the definition of intangible assets as several authors analyse the fundamental methods utilised in the definition thereof (Van Criekingen, Bloch, & Eklund, 2022). After examining the methods used to describe the concept, the researcher will then proceed to analyse the value of intangible assets as well as their significance and a stratification of the results by industry to understand whether any industry-related disparities exist.

Lim, Macias, and Moeller (2020) define intangible assets as future advantages produced through inventiveness, unique organisational concepts, or methods of human resources that produce invisible sources of value. According to Barker, Lennard, Penman, and Teixeira (2022), intangible assets are non-material sources that contribute to creating value for an organisation. These assets consist of the skills of the business's staff, resources, operational approach, and relationships with investors.

Buonomo, Benevene, Barbieri, and Cortini (2020) state that the Financial Accounting Standards Board (FASB) provides the following description of Intangible Assets: assets lacking material form that arise from (i) past occurrences that produce a (ii) tangible effect and (iii) provide a future advantage. An analogous description is provided by Tefera and Hunsaker (2020), with respect to intangibles, namely that they are assets that have emerged due to previous occurrences and show the following three primary characteristics: they are non-physical in nature, they have the potential to generate future economic net benefits, and they are legally or de facto protected. The study posits that limiting the definition of intangible assets exclusively to the assets recognised in accounting is unwarranted (Ievdokymov, Ostapchuk, Lehenchuk, Grytsyshen, & Marchuk, 2020). This viewpoint arises from conflating two distinct issues, as discussed below.

The first is the definition of an asset, and the second is an explanation of which assets are eligible for accounting recognition and which are not (Lopes & Carvalho, 2021). Given that the term "asset" essentially refers to any prospective economic advantage acquired and managed by a company due to previous transactions and occurrences, then all tangible and intangible components falling within the previous description appear to be the assets of the organisation (Nemţeanu, Dabija, & Stanca, 2021). Whether or not these elements satisfy the criteria for identification in bookkeeping and accounting is an entirely different matter (Nemţeanu & Dabija, 2023).

The specified criteria for the acknowledgment of assets by accounting and bookkeeping as intangible are supplemented by a variety of conditions in the International Financial Accounting Standards (Widnyana, Wiksuana, Artini, & Sedana, 2021). Therefore, when considering the criteria for identifying intangible assets, it can be stated that any non-financial, non-physical assets that are distinguishable from the organisation's additional property and typically have a useful life of over 12 months are eligible to be classified as intangible assets (Uddin, Hasan, & Abadi, 2022). Hence, the stance of this study can be succinctly outlined as follows: An intangible asset refers to any property or control held by a company that lacks a tangible or, in the case of financial investments, monetary form yet possesses the ability to generate future economic benefits (Qureshi et al., 2021). The combination of an organisation's intangible assets could also be referred to as

intellectual capital or intangibles. In addition, Castilla-Polo and Sánchez-Hernández (2020) focused on providing an overview of the subject. Austin (2007) noted a lack of relation between the cost of intangible assets and the specific future revenues expected to be derived from the intangible asset.

Mehta and Madhani (2008) looked at existing approaches to valuing intangible assets, namely cost, market, and income. Ultimately, intangible assets are vital to gain a competitive advantage, particularly in the knowledge economy. This sentiment was echoed by Powell (2003), noting that intangible assets were one of the least developed areas of accounting theory, with a significant mismatch in the recognition of acquired and internally generated intangible assets. Yallwe and Buscemi (2014) also argue that accounting valuation techniques do not reflect but hinder intangible assets' contribution to financial statements.

The empirical literature review will be further performed for each of the research objectives derived for the purposes of this study. The sections to follow include the relevant methodologies and studies conducted relating to each research objective, as well as a critical evaluation of the methodologies employed both internationally and locally (South Africa) to clearly articulate the gap to be addressed by this study.

### **2.3 SO1: Measurement and valuation of intangible assets**

The literature presented for the first research objective aims to understand the studies that have been performed in relation to how intangible assets are measured and valued from an international perspective as well as a South African/emerging markets perspective. This section provides a critical analysis of research that has been previously conducted and critically evaluates the methodologies employed in previous studies and articulates the gap to be addressed by this study. The various factors and inputs that drive the valuation of intangible assets include estimations such as the anticipated useful life of the intangible asset, any estimated residual value at the end of the intangible asset's useful life, or the IAS 38 measurement model adopted by the company (IFRS, 2023b; Nieuwoudt & Hall, 2022). IAS 38 describes the useful life of an intangible asset as either finite or indefinite. A finite useful life is determined to be for an intangible asset with an anticipated

end date for the usefulness of the intangible asset to the company (Modiba, 2022). On the contrary, an indefinite useful life is a scenario where the company does not see an end to the expected useful life of the intangible asset, with the anticipated benefits extending to the company in perpetuity (Ncanywa, 2019). The accounting standard IAS 38, paragraph 90, details the factors that should be considered by the preparer of the annual financial statements when assessing the useful life of an intangible asset as follows:

- “the expected usage of the asset by the entity and whether the asset could be managed efficiently by another management team;
- typical product life cycles for the asset and public information on estimates of useful lives of similar assets that are used similarly;
- technical, technological, commercial, or other types of obsolescence;
- the stability of the industry in which the asset operates and changes in the market demand for the products or services output from the asset;
- expected actions by competitors or potential competitors;
- the level of maintenance expenditure required to obtain the expected future economic benefits from the asset and the entity’s ability and intention to reach such a level;
- the period of control over the asset and legal or similar limits on the use of the asset, such as the expiry dates of related leases and
- whether the useful life of the asset is dependent on the useful life of other assets of the entity” (IFRS, 2023b).

The useful life of an intangible asset can also be encumbered by legal terms and conditions associated with the intangible asset (Tshuma, 2021). When an intangible asset is subject to a legal life, the intangible asset will be measured using the shorter of the legal life and the expected useful life (Steenkamp, 2022). Should the legal life be extendable at an insignificant cost to the company, this extension in legal life can be taken into account when assessing the applicable useful life of the intangible asset. The next factor that is considered when valuing intangible assets is whether a residual value is anticipated at the end of the useful life (Grosse, Wocke, & Mthombeni, 2023). Given that the residual value is considered for the end of the useful life of the intangible asset, it

is thereby implied that the residual value is only considered in the case where an intangible asset has been determined to have a finite useful life (Mans-Kemp & Van der Lugt, 2020). IAS 38 stipulates that the residual value must be zero unless one of the two following scenarios exists:

- “there is a commitment by a third party to purchase the asset at the end of its useful life; or
- there is an active market (as defined in IFRS 13) for the asset; and
  - residual value can be determined by reference to that market; and
  - it is probable that such a market will exist at the end of the asset’s useful life” (IFRS, 2023b, p. A1524).

Intangible assets with a finite useful life may possess a residual value, but it is mandatory that they are amortised over their expected useful life. Amortisation is calculated on an annual basis by deducting the residual value of the intangible asset from the cost to derive a depreciable amount, which is then divided by the useful life of the intangible asset (IFRS, 2023b; Mans-Kemp et al., 2020). Two models provided in IAS 38 are permitted to be applied in the measurement of intangible assets, namely the cost model or the revaluation model. The cost model is considered to provide less relevant information as opposed to the revaluation model, which relies on updated fair values to reflect a more accurate presentation of the intangible asset value as provided in the annual financial statements (Tshitadi, 2020).

This school of thought is persistent and pervasive throughout the annual financial statements, with the expectation that revaluing and measuring financial items in terms of their fair value would present more relevant and reliable information that is useful to the stakeholders, as described by Ma et al. (2023). This sentiment is corroborated in research by Razak and Stainbank (2018), who investigated the choices typically made by companies when presenting property, plant, and equipment in their annual financial statements, finding that a large majority of companies opted to use the revaluation model to measure their property, plant and equipment at fair value, due to the perceived higher relevance to the associated valuation and measurement. A similar study was conducted in Serbia by Karapavlović, Obradović, and Bogićević (2020), who cited controversial results finding that their sample of companies had preferred the cost model over the revaluation model due to a variety of factors, including the cost to obtain the fair value with the assistance of

an expert; the time taken to apply the revaluation model over the less-time intensive option of the cost model; and the overall unwillingness of those in management.

The objective is to determine how intangible assets are measured and valued by JSE-listed companies in South Africa which will be further assessed through the analysis of the relevant theoretical, conceptual, and empirical literature to guide the applicable research methodology to be employed and thereafter drive the data analysis and key findings to reach appropriate conclusions with reference to the existing body of knowledge. Through a meticulous review and analysis of the literature surrounding the relevance and reliability of intangible asset valuation, this chapter will provide insights into the factors influencing the recognition, measurement, and disclosure of intangible assets within the ambit of JSE-listed companies. The primary purpose of this literature review is to articulate and evaluate the existing body of knowledge associated with the relevance and reliability of intangible asset values within the context of JSE-listed companies.

### **2.3.1 Accounting regulations and standards**

While IFRS is the most widely adopted form of accounting standards, there are certain countries that choose to adopt their own form of GAAP, which can give rise to differences in terms of intangible asset recognition, measurement, and disclosure in financial statements (Tribuzi, 2018). The adoption of differing accounting regulations and standards can impact the relevance and reliability of intangible asset disclosure (Chalmers, Clinch, & Godfrey, 2008). The International Accounting Standards Board (IASB) provides guidelines (IAS 38) regarding the accounting treatment of intangible assets in financial statements (Dancaková et al., 2022). Generally, internally created legal intangibles are not acknowledged, whereas legal intangibles acquired from third parties are recognised, as stated in IAS 38 (Van Crieking et al., 2022).

An intangible item shall be recognised as an expense at the time of its occurrence, even though the following conditions are met: (i) It is obtained as part of the cost of an intangible asset that satisfies the accounting standards; or (ii) It is obtained as a result of a merger of companies and therefore cannot be recognised as an intangible asset. Should this be the situation, this expense (which is incorporated into the cost of the corporation) shall be recognised as a component of the value

assigned to goodwill on the date of purchase (refer to IFRS 3 Business Combinations). According to Zammit (2022), the influence of claimed intangible assets on company valuation is greater than that of tangible assets.

In order to be in a position to answer Research Question One, one needs to understand what types of measurement components can be chosen by the company, as well as the potential influences that may cause a company to choose one measurement option over another. The components regarding the measurement of intangible assets have been identified as the useful life (finite or indefinite), and the measurement model (cost or revaluation). Therefore, the choices that are prevalent to a company with regard to the measurement of intangible assets include the useful life and the measurement model, which will hence be the focus area to satisfy Objective One.

### **2.3.2 Measurement Models of Intangible Assets**

The methods imposed by the accounting standards to record and measure intangible assets remain a key focus of academic research, reflecting the complexities of valuing these assets in financial reporting (Ma et al., 2023). Measurement models have the purpose of creating a theoretical foundation to value and present intangible assets in financial statements (Danielsson & Lindblad, 2021). Measurement models aim to address issues such as measurement uncertainty, estimate reliability, and comparability across companies, and include the cost model and the revaluation model (Cañibano, García-Ayuso, Sánchez, & Olea, 1999b). These models are prescribed by IAS 38, with the cost model being more prevalent due to its simplicity and reduced subjectivity. The revaluation model, while theoretically enhancing relevance by reflecting fair value, faces practical challenges such as limited market benchmarks and high subjectivity in fair value determination. This section critically evaluates existing studies, highlighting their methodologies, sample populations, results, and shortcomings, and demonstrates how the current study addresses these gaps.

A pivotal contribution to the field comes from Wyatt (2005), who performed a meta-analysis of international empirical research on the accounting for intangible assets. The author compared the application of the cost and revaluation models globally, examining how market dynamics,

regulatory environments, and firm characteristics influence their adoption. The meta-analysis included studies from developed economies such as the United States, Australia, and the European Union, focusing on intangible asset disclosures under different accounting frameworks. The study highlighted a global preference for the cost model, driven by its simplicity and lower compliance costs. It emphasised that the revaluation model, while theoretically superior in enhancing relevance, faces practical limitations, such as the absence of reliable fair value benchmarks and concerns about subjectivity and market efficiency. The study did not include emerging markets, such as South Africa, where contextual factors like regulatory maturity, market inefficiencies, and limited active markets significantly impact model adoption. Moreover, the study by Wyatt (2005) was limited to a qualitative discussion and lacked empirical testing of the reliability and relevance of these models. This study contributes to the limited body of research on intangible asset measurement in emerging markets by focusing on South Africa's JSE-listed companies. It empirically tests the impact of the cost and revaluation models on the relevance and reliability of intangible asset values, providing evidence specific to the South African context as well as industry/sector insights. This study further provides insight regarding whether a finite or indefinite useful life is more prevalent in the measurement choices made by JSE-listed companies.

Adding to the discourse, van Zijl and Hewlett (2022) utilised content analysis of annual financial statements of JSE-listed companies to investigate the prevalence of the measurement models (cost model or revaluation model). van Zijl et al. (2022) employed descriptive statistics to assess the proportion of companies adopting each model and analysed trends in intangible asset reporting. The sample consisted of JSE-listed companies across various industries for a single financial year (2017). The study found that the cost model is overwhelmingly adopted by JSE-listed companies, primarily due to its simplicity and lower costs of implementation. The revaluation model, while permitted under IAS 38, was rarely applied due to challenges such as the absence of active markets for intangible assets, making it difficult to obtain reliable fair value estimates. The study was limited to a single financial year, which does not allow for an analysis of longitudinal trends. Furthermore, it did not explore the impact of measurement models on the relevance and reliability of financial information. The study also lacked insights into how industry-specific factors influence model selection. This study expands on that performed by van Zijl et al. (2022) by

adopting a longitudinal approach (2015–2019) to analyse trends in measurement model adoption over time. Additionally, it investigates how these models impact the relevance and reliability of intangible asset values through the application of the Ohlson model and includes industry-specific stratifications to provide more granular insights. This study further provides deeper insight into measurement choices regarding the finite or indefinite useful life for JSE-listed companies.

A sector-focused perspective was introduced by Matsane, Nakpodia, and Areneke (2022), who assessed the measurement and disclosure practices of intangible assets in South Africa by analysing annual financial statements of JSE-listed companies. The researchers focused on disclosures related to goodwill and other intangible assets, emphasising the accounting policies adopted for measurement. They used comparative ratio analysis to examine the impact of measurement models on financial statements. The study focused on JSE-listed companies in specific sectors, including banking, financial services, insurance, and real estate. The study found that the cost model dominates the measurement of intangible assets in South Africa for the specific sectors analysed. Goodwill was often a significant component of reported intangibles, while other intangible assets were less frequently disclosed. The study noted that the revaluation model was seldom applied, citing the lack of active markets and the inherent subjectivity in fair value assessments. Despite its contribution, the study excluded some major intangible-asset industries, including technology, tobacco, pharmaceutical, and retail, as well as lacking a focus on regulatory and contextual factors specific to South Africa's emerging market. This study builds on Matsane et al. (2022) by including a comprehensive evaluation of both goodwill and other intangible assets for a wide array of industry sectors included on the JSE, as well as an investigation into whether the finite useful life or indefinite useful life is more prevalent. Furthermore, this study employs the Ohlson model to evaluate the relevance and reliability of intangible asset values under the cost and revaluation models, bridging the gap between accounting policy adoption and its impact on financial decision-making as driven by market capitalisation values.

The discussion around measurement models in relation to intangible assets is ongoing, reflecting the evolving complexities of financial reporting in this domain. Although the existing literature on this topic of discussion provides insights into the conceptualisation, measurement, and disclosure

of intangible assets, gaps remain, particularly in the context of emerging markets. This study seeks to fill these gaps by providing empirical evidence and contextual analysis, contributing to the understanding and application of measurement models in South Africa's unique regulatory and market environment.

### **2.3.2.1 Potential Influences for Selecting Measurement Components**

A variety of influences may impact the choices made by a company when determining the selection of components in measuring items disclosed in the annual financial statements, as allowed by the accounting standards. Intangible assets allow a choice between either the cost model or the revaluation model, as well as requiring an assessment of the useful life as either finite or indefinite.

When the accounting standards allow for a range of options, the comparability of values presented amongst different companies may be hindered due to the choices made regarding subsequent measurement methods. One possible approach to address this issue is by implementing measures to reduce the impact on comparability between companies that have opted for varying subsequent measurement models. For example, corporations that have selected the revaluation model (for assets like property, plant and equipment, or intangible assets) or the fair value model (for investment property) could potentially face extra disclosure obligations. These requirements could involve including information on what the carrying amounts would have been if the cost model had been utilised. This approach aims to enhance comparability amongst companies that have adopted different measurement methods by providing a basis for comparison.

When determining the value and measurement method to be applied to various items housed within the company's annual financial statements, the management involved in this process may need to consider the following factors. Due to the selected sample of companies being JSE listed, they will be required to comply with the prevailing accounting standards. The requirements, as outlined in the accounting standards, provide choices in terms of applicable measurement models. However, they are limited to those that are considered to provide an output that is congruent to the principles as provided in the conceptual framework (Barth, Landsman, & Lang, 2008). Overall, management needs to exercise professional judgment when it comes to selecting measurement methods.

However, any form of human judgement is, to a degree, impacted by inherent biases, which may influence their ultimate decision (Nelson, Elliott, & Tarpley, 2002). A component of the decision on which measurement model to apply will be influenced to a degree by the selections that have been made by peer companies operating within the same industry, which is often referred to as a form of benchmark (Daske, Hail, Leuz, & Verdi, 2013). The decision made by management in terms of the measurement model to be applied may be based on the needs and expectations of the users of the financial statements, in particular with reference to enhancing the transparency and accountability of the information being presented (Barth et al., 2008). The macroeconomic environment within which the company finds itself in relation to fluctuating interest rates, inflation rates, and changes in currency may impact the decision on which measurement model may be deemed appropriate in an effort to reflect the substance and reality of the transactions being disclosed (Ball, 2006). In an effort to manage the tax affairs of the company in the most cost-effective and efficient manner possible, management may consider the tax implications of each measurement method (Nelson et al., 2002). Management shall consider the needs of the users of the financial statements with reference to the potential information that may be provided for each measurement model and the related alignment with the needs of the users of the financial statements (Daske et al., 2013).

All the above considerations are not unique to any one single accounting standard measurement decision that may be required of management and would thus extend to the measurement decisions made regarding intangible assets as well.

#### **2.4 SO2: The relevance and reliability of intangible asset valuation using standard valuation techniques**

While the cost model is widely adopted due to its simplicity and objectivity, the revaluation model is theoretically favored for its potential to provide more relevant financial information by incorporating fair value. However, the reliability of these valuations remains contested due to inherent challenges such as the absence of active markets and subjectivity in valuation inputs. The Ohlson model, a valuation framework that links accounting data to firm value, provides a tool to empirically assess whether these valuation methods yield relevant and reliable financial

information. Against this backdrop, empirical studies have sought to explore these issues, examining their methodologies, sample populations, and results, while identifying gaps that this study seeks to address. This section evaluates empirical studies that analyse intangible asset valuation through the lens of standard valuation techniques and critically assesses their methodologies, sample populations, results, shortcomings, and how the current study addresses the identified gaps.

#### **2.4.1 Value relevance**

The market's perception of goodwill has sparked considerable academic inquiry, as demonstrated by Najib and Cahyaningdyah (2020) and Fullana, González, and Toscano (2021). These researchers ascertained the market's perception of benevolence. The studies in question can be classified into two distinct lines of research: those that aim to determine whether market players consider goodwill as value relevant when determining the equity value of an organisation; and those that examine whether users of financial statements obtain more value-relevant information through the systematic amortisation of the goodwill balance or by noting the value of goodwill in the event of an impairment. In addition, prior value-relevance research has established that market players consider goodwill an asset (Salim & Ismudjoko, 2021). Extending this discourse, Ewens, Peters, and Wang (2024) contend that for the value-relevance of goodwill to be considered an asset in the statement of financial position, it must be recognised as such and offer market participants value-relevant information that is utilised in the valuation of the entity. While these studies focused primarily on goodwill, this study broadens the lens to understand intangible assets holistically, including goodwill and other intangible assets from the perspective of the measurement models employed and the relevance and reliability of the values in relation to market capitalisation. The study also covers the significance of the investment in intangible assets over fixed assets and a stratification of the results by industry to gain additional understanding and insights.

The interplay between goodwill and market valuation has been further explored by Elviani, Simbolon, Riana, Khairani, Dewi, and Fauzi (2020), who investigated the correlation between the market value of the firm's equity and the value attributed to goodwill. Elviani et al. (2020) stated that the value-relevance of goodwill is adequately reflected in the statement of financial position

in one of the earliest forms of research on the subject. Sharma and Bodla (2022) echoed these findings noting and affirming a correlation between the disclosed value-relevance of goodwill values and the market value of equity for the company. Similarly, Seto (2022) supported the notion that the value-relevance of goodwill is considered an asset by the market and is factored into firm valuations. The positive correlation between the claimed value-relevance of goodwill and the market value of an entity is further validated in research conducted by Lutfiyyah and Bhilawa (2021). The results of this study indicate that market players place value on acknowledged benevolence.

The implementation of IFRS 3, which mandates a yearly impairment assessment for the value-relevance of goodwill rather than amortising the balance over its limited life, has furnished scholars with an additional framework to examine whether the accounting approach to the measurement of value-relevance of goodwill conveys value-relevant knowledge to consumers of financial statements. Lisin, Kushnir, Koryakov, Fomenko, and Shchukina (2022) examined whether the firm's loss of goodwill write-offs accurately represents its core possibilities for investment in the latest research utilising this fundamental shift in handling goodwill. The authors contend that an impairment in goodwill signifies a reduction in the company's investment opportunities due to a decline in economic goodwill. Consequently, the impairment system permits companies to decrease their disclosed goodwill amounts if they demonstrate diminished investment prospects or economic goodwill (Pratama & Mulyana, 2020).

These findings indicate that impairment deductions are substantially inversely related to the investment possibilities of companies, indicating that the write-down regime mirrors the economic conditions of firms. Adil (2021) examined the comparative merits of an impairment regime and a systematic amortisations regime in research that was very similar to the present inquiry regarding the economic value of relevance and reliability. By examining whether there is a correlation between relevance and reliability, accounting penalties and income, or companies' financial investment opportunities under both an impairment and amortisations regime, Utami, Musa, and Anwar (2022) conducted a direct comparison of the two regimes.

A significantly larger correlation was observed between relevance and reliability impairment expenses and companies' possibilities for investment, as opposed to a weaker connection between relevance and reliability amortisation or write-offs and firms' investment opportunities (Darmayanti, Asrori, Damayanti, Rikah, & Kuntardina, 2023). In light of these findings, Darmayanti et al. (2023) determined that an impairment regime more accurately reflects the economic value of relevance and reliability at its core.

Together, these studies underscore the nuanced dynamics of intangible asset valuation, particularly the critical role of goodwill in shaping market perceptions and firm valuation. By expanding the scope to address the broader spectrum of intangible assets, this study aims to contribute new insights into the efficacy of standard valuation techniques, offering a more comprehensive understanding of their impact on financial reporting and investment decisions.

#### **2.4.2 Market value and intangible assets**

The association between market value and intangible assets investigates the market's reaction to the recognition and presentation of intangible assets in the financial statements (Choi, Kwon, & Lobo, 2000). The assessment between the market value and intangible assets is established through an analysis of the share price and the book values (Cañibano, Covarsí, & Sánchez, 1999a).

Lev and Zarowin (1999) critically examined the declining relevance of financial reporting in the face of increasing investments in intangible assets, such as R&D, intellectual property, and brand value. Their study demonstrated that traditional accounting practices fail to fully reflect the economic contribution of intangible assets, resulting in a widening gap between book value and market value. They argued that financial statements should evolve to better capture intangible-driven firm value, although they did not prescribe specific valuation models.

While their work remains foundational in understanding the limitations of financial reporting, its continued relevance lies in the persistence of these issues today. Recent studies (Barth et al., 2023; Coetzee, 2023; Grzybek, 2023) confirm that intangible assets remain underreported, and the gap between accounting and market values persists, particularly in knowledge-intensive industries.

This study builds on Lev et al. (1999) insights by employing the Ohlson model, which provides a structured, empirical approach to measuring intangible asset value, rather than relying on market capitalisation alone. Additionally, by focusing on JSE-listed companies, this study addresses an emerging market context not explored by Lev et al. (1999), while also incorporating industry-specific stratification to examine disparities in intangible asset valuation across sectors.

By extending their findings with a quantitative model and regional focus, this study not only reinforces the continued significance of intangible assets in financial reporting but also offers more actionable insights on their measurement and valuation in a contemporary, industry-specific setting.

Oberholster, Zulu, and De Klerk (2017) examined the value relevance of financial metrics in South Africa, finding that book value (BV) is a significant predictor of share prices, while profits provide limited explanatory power. Their study, using JSE-listed companies, applied regression analysis to assess the relationship between accounting measures (e.g., EPS and BVPS) and stock prices. They compared the value relevance of interim financial statements (IFS) and annual financial statements (AFS), concluding that AFS, due to their audited nature and comprehensive disclosures, were more reliable for investor decision-making. Interim reports, while providing incremental value, were less comprehensive and more affected by market fluctuations and financial events such as mergers or impairments.

Despite its contributions, their study had limitations, including its focus on general financial metrics rather than intangible assets, a lack of industry-specific differentiation, and the assumption of market efficiency. In contrast, this study builds upon their findings by applying the Ohlson model to examine intangible asset valuation, an often-overlooked component of financial reporting. Additionally, this research includes a sector-based analysis, addressing a gap in Oberholster et al. (2017) by exploring how intangible asset values vary across industries. While both studies analyse JSE-listed firms, this study provides a more granular and targeted assessment of intangible asset relevance and reliability in financial reporting.

Levdokymov, Ostapchuk, Lehenchuk, Grytsyshen, and Marchuk (2020) examined the impact of intangible assets on market value, employing regression analysis on publicly listed firms across various industries. Their study found that intellectual property, goodwill, and brand value had a significant positive correlation with market capitalisation, reinforcing the notion that traditional financial statements often understate the value of intangible assets. The research highlighted a discrepancy between book value and market value, suggesting that investors price intangible assets more highly than accounting frameworks typically recognise.

However, the study had several limitations. It focused primarily on a narrow set of intangible assets (e.g., intellectual property and brand value), omitting other key drivers such as software. The study did not account for variations across countries or industries, and its reliance on OLS regression assumed a linear relationship, potentially oversimplifying the complexity of intangible asset valuation. Furthermore, it did not consider market sentiment or macroeconomic influences that may impact the perception and valuation of intangibles.

This study builds upon and extends the work of Levdokymov et al. (2020) by focusing on JSE-listed firms in South Africa, providing insights into intangible asset valuation in an emerging market context. Unlike their broad industry approach, this research stratifies firms by sector, allowing for a more nuanced understanding of how intangible assets are valued across industries. Additionally, this study applies the Ohlson model, a more advanced valuation framework that integrates accounting metrics with market data, offering a robust alternative to the basic regression approach used in Levdokymov et al. (2020). By incorporating both accounting ratios and statistical techniques, this study presents a comprehensive assessment of intangible asset valuation within an emerging economy.

Schøler (2020) applied multivariate regression analysis to examine the impact of intangible assets on market value across multiple countries and industries. The study found a significant positive correlation between intangible assets—particularly goodwill and brand value—and market capitalisation, with stronger effects in developed markets where disclosure practices are more

standardised. Knowledge-intensive sectors, such as technology and pharmaceuticals, exhibited higher value relevance for intangible assets compared to traditional industries.

Despite its global scope, Schøler (2020) did not account for local variations in accounting practices or regulatory frameworks, which differ significantly between IFRS and GAAP jurisdictions. The study also relied on publicly available financial data, potentially underreporting intangible assets that are not formally disclosed, such as intellectual capital. Furthermore, the assumption of market efficiency may not hold in emerging markets, where information asymmetry could distort the valuation of intangibles.

This study builds on Schøler (2020) by shifting the focus to JSE-listed companies in South Africa, offering a more in-depth analysis of a single emerging market. Unlike Schøler (2020), which adopts a broad global approach, this study examines industry-specific variations, providing a granular assessment of intangible asset valuation across sectors. Additionally, this research applies the Ohlson model, a structured valuation framework that links earnings and book value to equity value, incorporating growth rates and discount factors for a more nuanced evaluation of intangibles.

By focusing on South Africa's regulatory and economic environment, this study provides valuable insights into how intangible assets are reported and measured within an emerging market, addressing challenges such as market inefficiencies and inconsistent disclosure practices—factors that Schøler (2020) does not fully capture in a global analysis.

Ngcobo and Sibanda (2021) employed a quantitative research methodology to examine the effects of integrated reporting (IR) on the cost of capital and the accuracy of analysts' forecast errors for mining firms listed on the JSE. The study used secondary data from financial statements, integrated reports, and analysts' forecasts from JSE-listed mining firms spanning several years. Ngcobo et al. (2021) utilised regression analysis to assess the relationship between the adoption of IR and its impact on both the cost of capital and forecast errors. The study employed firm-specific control variables such as firm size, profitability, and leverage to strengthen the robustness of the findings.

The study found that firms that adopted integrated reporting practices experienced a significant reduction in the cost of capital. This was attributed to increased transparency and a more comprehensive approach to reporting non-financial and financial performance, which helped reduce investor uncertainty. It was found that integrated reporting contributed to improved accuracy in analysts' earnings forecasts. The availability of more detailed and holistic information enabled analysts to make more precise predictions about firms' future performance. The results showed that the mining sector particularly benefited from IR due to the sector's reliance on sustainability and social responsibility disclosures, which are key components of integrated reporting. The study exclusively focused on the mining sector, which limits the generalisability of the findings to other industries. Mining firms have unique characteristics, such as higher environmental and social responsibility reporting requirements, which may not apply to other sectors. While the study established a correlation between IR adoption and its outcomes, it did not conclusively prove causation. Other external factors, such as macroeconomic conditions or regulatory changes, might have influenced the results. This study focuses on the Ohlson model to assess intangible asset relevance and reliability. In contrast, Ngcobo et al. (2021) focused on IR and its implications for the cost of capital and forecast accuracy. While the study by Ngcobo et al. (2021) is limited to the mining sector, this study encompasses a broader range of industries on the JSE, allowing for a more comprehensive analysis of intangible asset valuation.

Dancaková et al. (2022) conducted an empirical study examining the impact of intangible assets on market value across multiple sectors, focusing on publicly listed European companies. The study applied multiple regression analysis using market capitalisation as the dependent variable and various intangible assets—such as goodwill, patents, intellectual property, and brand value—as independent variables. Control variables, including firm size, industry sector, and financial metrics, were incorporated to isolate the effect of intangible assets.

The findings confirmed a statistically significant positive relationship between intangible assets and market value, with stronger effects in technology, pharmaceuticals, and consumer goods—sectors where intellectual property, branding, and innovation play a critical role. Conversely, traditional manufacturing industries exhibited a weaker correlation. The study also highlighted that

different types of intangible assets impact market value to varying degrees; for instance, patent portfolios and strong brands were more strongly associated with higher market capitalisation than goodwill.

While providing valuable insights, the study has several limitations. Its cross-sector approach may oversimplify sector-specific nuances, particularly in industries with vastly different dependencies on intangible assets. Additionally, reliance on publicly available financial data may lead to underreporting of intangibles, given variations in disclosure practices. The study focused on developed European markets, limiting its applicability to emerging economies, where regulatory environments, market conditions, and investor behaviour differ. Moreover, the OLS regression model assumes a linear relationship between intangible assets and market value, which may not fully capture the complexity of intangible asset valuation, especially given potential endogeneity issues such as reverse causality or omitted variable bias.

Unlike Dancaková et al. (2022), which adopts a broad cross-sectoral European perspective, this study focuses on JSE-listed companies in South Africa, providing a more contextually relevant analysis of an emerging market. The use of the Ohlson model offers a more advanced valuation framework than basic regression analysis, as it integrates profitability, book value, and growth projections, yielding a more robust measure of the value relevance of intangible assets.

Furthermore, this study stratifies companies by industry, allowing for a granular assessment of intangible asset valuation across key South African sectors such as mining, financial services, and technology—industries with distinct economic and regulatory characteristics. By combining financial ratios, market data, and advanced valuation techniques, this study provides a more comprehensive and reliable evaluation of intangible assets compared to the simplified regression approach used by Dancaková et al. (2022).

While Dancaková et al. (2022) contributed to the literature on intangible asset valuation, their study does not fully address the challenges of emerging markets or sector-specific differences in intangible asset recognition. This research bridges those gaps by incorporating South Africa's

regulatory and economic context, applying a more sophisticated valuation model, and conducting industry-specific analysis, ensuring a more nuanced and reliable understanding of the valuation of intangible assets in relation to firm valuation.

In their research, Tunyi, Ehalaiye, Gyapong, and Ntim (2020) examined the correlation between the effectiveness of value added (VA) and three conventional measures for company effectiveness: market valuation, efficiency, and profitability. The effectiveness of VA was assessed by analysing the main elements of the business's base resources, namely physical capital, human capital, and structural capital. Seventy-five publicly traded enterprises in South Africa, representing four industries with high intellectual capital demands—banking, electronics, computer technology, and utilities—constituted the research sample (Lopes et al., 2021). The lack of a correlation between the efficacy of value added (VA), which represents the main foundation of resources, and company profit in the empirical findings suggests that physical capital continues to be the most important fundamental factor influencing company profitability in South Africa. A further study concerning intangible assets was based on a sample of 65 JSE-listed companies, whereby an empirical analysis revealed that the performance of the selected entity's intellectual capital had an effect on profitability and productivity but had no relation to market valuation (Firer & Stainbank, 2003). The empirical analysis was conducted using correlation and multiple regression analysis, with the statistical significance being assessed at a level of  $\rho = 0.05$ .

The studies listed above generally highlight the importance of intangible assets in determining market capitalisation but do not necessarily use systematic, comprehensive valuation models like the Ohlson model. By integrating the Ohlson model, which incorporates accounting and market data, this study provides a more robust and reliable measure of intangible asset value, addressing the gaps left by these previous studies in quantifying the true value of intangible assets. Additionally, while previous studies tend to focus more on specific types of intangible assets or particular regions, this study will offer a broader analysis across industries, potentially providing a more holistic understanding of the relationship between intangible assets and market capitalisation.

### **2.4.3 Ohlson Model**

The relevance and reliability of annual financial statements can be ascertained by scrutinising the relationship between the market value of an entity and its accounting numbers (Dahmash et al., 2009). Examining the relationship between equity values and accounting numbers can indicate the relevance and reliability of the information reported in the annual financial statements. Therefore, it is imperative that a model comprising three features be engaged to embark on such an examination. The first component is that the model must provide a methodologically rigorous analysis of firm value. The second component is that the model must use accounting information (which is the focus of this paper). The third component is that the model must assess both the relevance and reliability of the information reported in the annual financial statements. Feltham and Ohlson (1995) developed a model that satisfies each of the three components required and is a well-established tool used to analyse such data.

The Ohlson Model provides a framework for valuing companies by incorporating both accounting data and market data, making it an influential model in the field of financial valuation. The Ohlson Model combines fundamental accounting information such as earnings, book value, and dividends with market-based data (like stock prices) to estimate a company's intrinsic value. The model is particularly notable for its simplicity, as it provides a direct link between accounting fundamentals and equity value.

Feltham et al. (1995) proposed a model that allows for the valuation of a firm's equity by using a combination of two primary accounting metrics. Book value of equity (BV) – representing the value of a company's assets minus its liabilities. Earnings (E) – typically measured as net income or profits for the period. The model is based on the clean surplus relation, which assumes that changes in a firm's equity (except for dividends) are captured through earnings and the book value of equity.

The inclusion of intangible assets in the Ohlson model has improved its relevance and reliability by accounting for the growing importance of intangibles in firm value, particularly in industries where intellectual property and brand equity are pivotal. As companies in sectors like technology,

pharmaceuticals, and consumer goods increasingly rely on intangible assets for competitive advantage, their value cannot be accurately captured through traditional accounting measures that focus on tangible assets.

The study performed by Dahmash et al. (2009) investigated the relevance and reliability of goodwill and other identifiable intangible assets in financial reporting. It evaluates how these intangible assets affect the valuation of companies and their utility to investors in making decisions. The study examined a dataset of companies listed on the Australian Stock Exchange (ASX) and focused on the value relevance of reported goodwill and identifiable intangible assets by analysing their relationship with market valuation and accounting metrics. Dahmash et al. (2009) employed multiple regression analysis based on the Ohlson model framework, linking firm market values to book values, earnings, goodwill, and identifiable intangible assets. The study measured value relevance as the ability of goodwill and intangible assets to explain variations in the firm's market value. The reliability of goodwill and intangible assets was assessed by examining the consistency and stability of reported figures across reporting periods. Goodwill was found to have a significant and positive association with firm market value, indicating that investors consider it relevant in their valuation decisions. However, the value relevance of goodwill was lower compared to tangible assets and earnings. The results showed that identifiable intangible assets are less value-relevant than goodwill but still contribute to explaining market valuation. The study highlighted challenges in the reliability of goodwill, particularly regarding impairment testing, which is subjective and can result in inconsistent reporting practices. The study focused only on Australian firms, which may limit the generalisability of the findings to other jurisdictions, particularly emerging markets like South Africa. Although the study critiques the reliability of impairment testing, it does not provide a comprehensive analysis of alternative approaches to mitigate subjectivity. The study does not stratify its analysis by industry, potentially overlooking differences in the relevance of intangible assets across sectors. The research was conducted on data that was subject to Australian GAAP and not IFRS. While Dahmash et al. (2009) focuses on Australian firms, applying Australian GAAP, this study investigates JSE-listed companies in South Africa applying IFRS, providing insights into intangible asset valuation in an emerging market context. This study not only applies the Ohlson model to value relevance but also

explores how well standard valuation techniques (cost or revaluation model) reflect reliable estimates of intangible asset values, offering a more holistic perspective. This study includes an industry-specific analysis of intangible assets, addressing the gap in Dahmash et al. (2009) research and identifying variations in intangible asset relevance and reliability across sectors. This study critically examines differences between identifiable intangible assets and goodwill within the South African context, providing a deeper examination of valuation practices and their alignment with IFRS standards.

Eloff et al. (2015) examined the value relevance of goodwill under IFRS 3 and its predecessor, IAS 22, focusing on JSE-listed companies. The study analysed financial data and stock prices before and after IFRS 3 adoption, using regression analysis to compare the impact of both standards on market value. The findings showed that goodwill reported under IFRS 3 had higher value relevance, suggesting that annual impairment testing provides more decision-useful information than the amortisation approach under IAS 22. Investors responded more positively to goodwill disclosures under IFRS 3, as they were perceived to better reflect a company's financial position.

The study was limited to JSE-listed firms and did not examine industry-specific differences in goodwill relevance, potentially overlooking sectoral variations. While Eloff et al. (2015) focused solely on goodwill, this study takes a broader approach by analysing various intangible assets, such as patents, software, and intellectual property. It also investigates how intangible asset values differ across industries on the JSE, offering a more comprehensive analysis of sectoral dynamics in an emerging market context.

The study by Zahra et al. (2017) explored the value relevance of goodwill under IFRS in the South African context, evaluating how the reporting and valuation of goodwill under the IFRS framework are perceived by investors and their impact on firm value. The research focused on JSE-listed companies across various industries in South Africa and included the collection of financial data, including reported goodwill from financial statements. Zahra et al. (2017) employed regression analysis to assess the relationship between reported goodwill and the market valuation

of firms. The study applied a modified Ohlson model to evaluate goodwill's incremental value relevance, alongside other financial metrics like earnings and book value. The study compared pre- and post-IFRS goodwill reporting to determine whether the adoption of IFRS had enhanced the value relevance of goodwill. The study found that goodwill is positively associated with firm market value, indicating its relevance to investors in the South African context. Post-IFRS reporting showed improved value relevance of goodwill, suggesting that the IFRS framework contributes to better investor understanding and use of goodwill information. Certain sectors, particularly those heavily reliant on intangible assets, demonstrated a stronger association between goodwill and firm value. The study focuses exclusively on goodwill, potentially overlooking the broader category of intangible assets and their relevance. Although focused on South Africa, the findings may not be fully generalisable to other emerging markets due to unique economic and regulatory environments. This study examines both goodwill and other intangible assets, providing a more holistic understanding of value relevance under IFRS for JSE-listed companies. This study uses more recent and extended datasets to account for evolving IFRS practices and their impact on intangible asset reporting. This research critically evaluates the cost and revaluation models for intangible asset measurement and their implications for relevance and reliability, providing a deeper methodological critique compared to the focus on goodwill alone in Zahra et al. (2017) study.

Omarjee et al. (2019) investigated the relationship between the age of goodwill and its value relevance for firms, primarily focusing on listed companies. Omarjee et al. (2019) analysed how older goodwill balances affect the perceived relevance of financial information in decision-making by investors. The study used financial data from companies listed on the JSE, with specific attention given to firms reporting goodwill in their financial statements. Statistical methods, including regression analysis and the Ohlson model, were applied to determine the relationship between goodwill balances and stock prices. Goodwill was categorised by age (e.g., aged vs. newly acquired goodwill) to evaluate differences in value relevance. Older goodwill was found to have lower value relevance compared to more recent goodwill balances. This indicates that investors may discount the relevance of goodwill as it ages due to concerns over impairment or overvaluation. Firms with higher goodwill impairments were associated with reduced investor

confidence, reflecting on the reduced reliability of aged goodwill in financial statements. Newly acquired goodwill was seen as more value-relevant, potentially because it reflects recent investments or acquisitions. The analysis was restricted to JSE-listed firms, which may limit generalisability to other markets with different economic and regulatory environments. The study did not explore sectoral differences in goodwill value relevance, which could influence the findings given that goodwill is more significant in certain industries. While Omarjee et al. (2019) focus specifically on the value relevance of goodwill (with an emphasis on its age), this study examines all intangible assets, including intellectual property, patents, and software, in addition to goodwill. Unlike the study by Omarjee et al. (2019), this research includes industry stratification, analysing how intangible asset values differ across sectors on the JSE.

Recent empirical research studies, such as those of Chirairo and Molele (2024), have used the Ohlson (1995) model in the application of research concerning some beverage firms in South Africa. The study investigated the relationship between financial and non-financial capitals (social, human, intellectual, manufactured, and financial) and the value of companies listed on the JSE. The study aimed to enhance the Integrated Reporting (IR) framework by introducing the Augmented Integrated Reporting Model (AIRM), which measures and manages these capitals' impact on company value. The study utilised a quantitative research design, employing panel data regression analysis with fixed effects in EVIEWS software. The sample consisted of JSE-listed companies over a specific period, and the dependent variables used to measure company value included market share price, Economic Value Added (EVA), Tobin's Q, and share price relative to book value. The study found that with regards to social and relationship capital there is a positive impact on the market share price, EVA, and Tobin's Q, but negatively influences share price relative to book value. In terms of human capital, there was a positive influence on market share price but a negative relationship with EVA, Tobin's Q, and share price at book value. The intellectual and manufactured capital demonstrated a positive association with all dependent variables, reinforcing their importance in corporate value creation. The study confirmed that financial capital has a fundamental role in driving company value while integrating non-financial capital as complementary drivers. These findings have concluded that while the model is useful for value-relevant research, more research is needed to define the additional information variable

fully. This is supported by the low coefficients of tenacity, which vary from 0.15 to 0.46. This study differs from that of Chirairo et al. (2024) by specifically focusing on intangible assets, such as goodwill and other intangible assets, and their valuation using the Ohlson model. By narrowing the scope to intangible assets and applying a different valuation technique, this study fills a gap by providing more in-depth insights into the reliability and relevance of intangible asset valuations, especially in the South African context, with additional information such as the measurement models applied, the significance of the investment in intangible assets over fixed assets and industry-related results.

### **2.5 SO3: The significance of intangible assets in relation to the total assets**

The ever-changing commercial landscape and related financial report mechanisms warrant the recognition of intangible assets as a key source of corporate value, and they have become increasingly important. The prominence and significance of the value of intangible assets, particularly for large JSE-listed companies, further drive the fact that the significance of intangible assets as a determination of the company market value is vital. Assessing the prominence of the investment in intangible assets supplements the understanding of the relevance and reliability of intangible asset values, which is of critical importance.

The authors van Zijl et al. (2022) illustrated that intangible assets have become more prominent within the ambit of the annual financial statements over time. The prominence of intangible assets was further echoed by Maluleke (2020), who noted that the values associated with intangible assets have grown and become more significant compared to the other assets represented in the annual financial statements. An explanation of the reason that intangible assets have grown to such a significant level is posited by Chirairo et al. (2024), who found that intangible assets have been seen to be more of an important factor when it comes to gaining a competitive edge over other companies, as well as differentiating themselves in the crowded commercial landscape.

### **2.5.1 Intangible asset investment impact on financial performance**

The significant role of intangible assets in shaping a company's financial performance has long been a subject of academic inquiry. Andonova and Ruíz-Pava (2016) presented compelling empirical evidence suggesting that between 1980 and 2000, equity values in the United States stock markets systematically deviated from firms' basic valuations. During this period, economists developed numerous explanations for the rise in the ratio, with the increasing percentage of intangible assets to market capitalisation being significant. According to Gerpott, Thomas, and Hoffmann (2008), the economic value of a company cannot be simply calculated as the sum of the cost of replacement, historical costs, or current market values of its tangible assets. In addition, it encompasses the worth of intangible assets such as inventories of innovative goods, expertise in adaptable and superior manufacturing procedures, employee motivation and proficiency, consumer allegiance; and an understanding of products, dependable supplies, streamlined distribution networks, and similar resources (Dancaková et al., 2022). These intangible elements are central to a firm's long-term competitiveness and growth, often going beyond what traditional financial measures can capture.

Further studies have explored the significant impact of intangible assets on corporate value. A study was conducted between 2007 and 2009 to evaluate the correlation between intangible assets, financial policies, financial performance, and business value in South Africa's publicly traded companies (Mans-Kemp et al., 2020). Notably, intangible assets, financial policies, and financial performance were found to have a substantial influence on a company's value. Although significant assets do not have a substantial effect on financial policies, they do have a favourable and significant effect on financial performance (ROA) and the value of the organisation (Ntshobane, 2021). The firm's pricing has been significantly influenced by its debt policy and financial performance, namely its return on assets (ROA). The inability of financial statements to accurately measure and disclose intangible assets results in a substantial disparity between the book value and market value of equity (Louw, Hall, & Brümmer, 2024).

This notion was echoed by other studies across different contexts. Pinto, Hawaldar, Rahiman, and Sarea (2017) empirically investigated the correlation amongst intangible assets, financial policies, financial performance, as well as the firm valuation of firms undergoing an initial public offering (IPO) in Indonesia. The research revealed that intangible assets have a favourable and substantial impact on a company's financial performance and value. Similarly, Shah and Jan (2014) examined the effect of intangible assets on the generation of value and the financial performance of German public limited corporations. The results demonstrated that intangible assets have a favourable impact on the viability and efficiency of companies. In addition, these studies underline the growing importance of intangible assets in modern financial markets, suggesting that their role extends well beyond traditional measures of financial success.

Managers have the ability to prudently employ accounting options for intangible assets in order to convey certain messages to the financial market. Ewens et al. (2024) stated that management accounting choices communicate details about the firm to investors. Therefore, the valuation, depreciation, and loss of intangible assets are thought to indicate management's expectations and enhance the value market of accounting information (Van Criekingen et al., 2022). While accounting procedures for intangible assets may not have a direct effect on cash flows, numerous studies have shown that share market valuations do respond significantly to accounting information on intangible assets (King, Linsmeier, & Wangerin, 2023). This response is attributed to the indirect influence of intangible assets. On the other hand, intangible assets are often considered the primary factor determining a business's future success.

Accounting information related to intangible assets is, therefore, crucial in signaling a firm's prospects to investors. This information influences investors' judgements and, therefore, the market value of the firm (Qureshi et al., 2021). The research consistently supported this result by presenting evidence that intangibles are a topic of discussion in external interaction with investors in the financial market (Ievdokymov et al., 2020). This is because intangibles have the capacity to enhance or modify shareholder expectations about future cash flows and the associated risks. Amenc, Goltz, and Luyten (2020) proposed that investors highly value intangible assets valuation. They distinguished between the indirect effect, where research and development (R&D) impacts

market values through earnings, and the direct effect, which represents new information conveyed by R&D. Hence, Amenc et al. (2020) found that, on average, the indirect impact is greater than the direct effect.

R&D expenditure, particularly its reporting, further influences market perceptions. According to Widnyana et al. (2021), when whole R&D expenditures are reported, the connection between stock market prices and profits and book values becomes stronger in nations whose R&D expenses are fully deducted. In countries where the conditional capitalisation of R&D expenses is allowed, the distribution of these costs between capitalisation and expenditure gives additional and specific information beyond just the overall R&D costs (Lim et al., 2020). In the South African context, earlier research has shown similar findings to those of the USA. The findings reflect the accounting and corporate responsibility models in both countries, which are focused on the financial markets and investor-based decision-making. This aligns with research conducted in South Africa, where Aguiar, Tortoli, Figari, and Pimenta (2021) conducted a study on the value relevance, and dependability of brand assets in 33 South Africa-listed firms from 1985 to 1997. The findings demonstrated that brand assets had value relevance as they exhibited a positive and statistically significant association with stock prices, accounting for 96% of the variation in stock prices.

In a related context, Pechlivanidis, Ginoglou, and Barmpoutis (2022a) evaluated the significance of goodwill impairment losses after implementing IFRS 3. Based on a sample of 528 observations from 2005 and 2006, the findings indicated a noteworthy negative correlation between goodwill impairment losses and market prices. This suggests that investors regard these losses as a downturn in the firm's profitability. In their study, Ognjanović (2020) examined the significance of goodwill and other intangible assets in terms of their value throughout the decades, before the introduction of IFRS. The study used a sample of 350 firms from South Africa, covering the years 2002 to 2007. The findings indicated that goodwill and other intangible assets had value relevance. In their study of South African and UK enterprises, Ionita and Dinu (2021) discovered a direct relationship between the stock market value and intangible assets. Mohammed and Al Ani (2020) have shown interest in the value relevance of R&D after the mandated implementation of IFRS. The findings from a study conducted between 2005 and 2007 using a sample of 418 observations

indicate a positive correlation between capitalised R&D expenses and market prices. This suggests that the market views these investments as profitable initiatives with potential future economic advantages. Research and development (R&D) costs have a negative correlation with market values, indicating that they do not provide any future advantages and should thus be seen as costs.

The literature has demonstrated that the impact of intangible assets on corporate valuation is complex and multifaceted. While some studies have found that these assets do not always affect stock prices directly, they provide strategic value, such as freeing up cash or helping meet debt covenants. Corrado et al. (2022) are intrigued by intangible assets as a significant component of financial reporting. A study of 176 French firms and 85 Spanish companies showed that intangible assets do not have an impact on stock prices. However, they do provide the opportunity to free up cash or meet debt covenants. Moreover, significant disparities were seen between the two nations. During the period 1994 to 1999, Abebe Zelalem and Ali Abebe (2022) conducted a study using a sample of 470 French companies. The study found a significant statistical correlation between the market-to-book ratio and capitalised goodwill. However, no significant statistical correlation was found between the market-to-book ratio and expensed intangibles or other capitalised intangibles. They proposed that the various accounting methods used for intangible assets may be the reason why French capital markets do not include these items when valuing firms.

Steenkamp (2022) and Bravo, Santana, and Sarquis (2024) further reinforced the idea that intangible assets, particularly human and customer capital, are crucial to a firm's success. Steenkamp (2022) investigated the correlation between a fundamental set of intangible asset measures and the success of a corporation. The research, which is the first to establish a connection between intangible assets and a company's success, has determined a correlation between intangible assets and a firm's success. Bravo et al. (2024) also emphasised the significance of intangibles and investigated their impact on a firm's success. The results indicated that enhancements in crucial intangible assets lead to a rise in market worth. Erasmus (2010) examined the three components of intangible assets, namely the human, structural, and consumer components, along with their interconnections. The study's key findings indicate that human and

customer capital play a crucial role in the management of firms, while structural capital has a favourable impact on company success.

The literature presents a broad understanding of the impact of intangible assets on the market value and firm performance using financial ratios and correlations between book values and market values. However, distinguishing itself from those conducted previously, it does not address issues that have already been examined, such as assessing the impact of intangible assets on ROA and other financial performance indicators. This study further differentiates from previous studies in that the assessment with regards to the impact of intangible assets on market values is covered by SO2 through the application of the more robust Ohlson model as opposed to these studies that have performed correlations between book values and market values. This study provides further insight into the investment in intangible assets as opposed to fixed assets, including stratification of results by industry, providing a deeper understanding and insight into the results derived from the other objectives. Additionally, this study stratifies results by industry, offering a more granular understanding of how different sectors are impacted by intangible asset investments. This comprehensive approach allows for a more nuanced perspective on the relevance and reliability of intangible asset values disclosed in the financial statements.

### **2.5.2 Financial performance assessment through financial ratios**

Intangible assets have been converted into an unparalleled resource for generating value within a company. Although physical assets such as buildings, infrastructure, and equipment have traditionally been crucial for producing products and services, their relative value has diminished in recent years as intangible assets have become more significant (Maluleke, 2020). Sixpence, Adeyeye, and Rajaram (2021) proposed that investing in intangible assets may enhance the total assets of JSE firms. Investing in human capital and technology has the potential to enhance total assets, whereas an absence of investment may lead to worse firms' total assets. The relationship between intangible assets and total assets is particularly relevant in the South African context, where investment in human capital and technology can significantly impact firms' overall asset composition.

Hazan, Smit, Woetzel, Biljana Cvetanovski, Mekala Krishnan, and Brian Gregg (2021) provided a critical exploration of the growing significance of intangible assets in the global economy, highlighting their implications for business strategies and financial performance. Hazan et al. (2021) analysed large datasets, including financial data from global companies, to assess the proportion and impact of intangible assets across various industries. Additionally, case studies and anecdotal evidence are used to provide qualitative insights into how companies manage and leverage their intangible assets, such as intellectual property, brands, and customer relationships. The study found that intangible assets have grown significantly in importance over the past two decades, now accounting for the majority of corporate investments in many industries. Intangibles were shown to be a critical driver of innovation, competitive advantage, and long-term value creation. The authors highlighted that traditional accounting systems fail to adequately capture the value of intangibles, leading to undervaluation or misrepresentation of corporate assets in financial statements. While the study provides a broad overview of trends, its reliance on aggregate data may overlook regional differences in the valuation and management of intangible assets. Although the study emphasises the challenges of measuring and valuing intangible assets, it falls short of providing actionable solutions or frameworks for improving financial reporting or valuation practices. The study primarily draws on data from developed economies, which may limit its applicability to emerging markets like South Africa, where the dynamics of intangible assets could differ significantly. Unlike Hazan et al. (2021), this study focuses specifically on South African companies listed on the JSE, addressing the unique economic, regulatory, and market conditions of an emerging economy. While Hazan et al. (2021) provided a high-level overview of intangible asset trends globally, this study employs an empirical approach to analyse the measurement, valuation, and significance of intangible assets in financial statements using specific methodologies, such as ratios and the Ohlson model. This study critically evaluates the relevance and reliability of valuation techniques (cost or revaluation models) for intangible assets, providing industry-specific insights that are absent from Hazan et al. (2021) broader analysis. Hazan et al. (2021) focused on global trends, while this study investigates industry-level disparities within South Africa, offering more granular insights into the role of intangible assets in various sectors.

The study conducted by Bavdaž, Bounfour, Martin, Nonnis, Perani, and Redek (2023) provides an analysis of intangible asset measurement, combining historical reviews of surveys and statistical techniques. Bavdaž et al. (2023) employed empirical methods to assess the impact of intangible assets on productivity and global value chain participation. The study found that intangible assets significantly influence productivity, with both direct and indirect effects. Indirectly, these assets promote participation in global value chains, improving production efficiency. However, the research highlighted that intangibles often go unrecorded in accounting systems, making their accurate valuation challenging. Intangible assets are frequently created in-house and spread across multiple periods, which complicates their measurement and tracking. The study also emphasised the role of statistical methodologies in improving the measurement and valuation of intangibles, alongside policy recommendations for harmonising definitions and adapting corporate accounting standards to better capture intangible investments. This study specifically focuses on the role and significance of intangible assets concerning total assets for South African JSE-listed companies. Unlike the Bavdaž et al. (2023) study, which has a broader global scope, this research narrows down to the South African context. It aims to use ratios to assess the proportion of intangible investments, providing localised insights into the role of these assets within a developing market. Moreover, this study directly addresses the gap in understanding how intangible assets are reported and valued in South Africa's unique economic and regulatory environment, which was not a focus of Bavdaž et al. (2023) broader empirical analysis.

Hunter, Webster, and Wyatt (2012) employed a qualitative, conceptual approach to analyse the challenges and practical issues related to the measurement, management, and reporting of intangible assets. The study developed a framework for understanding intangible assets' value creation potential, drawing on case studies, existing literature, and financial reporting practices. It focused on real-world practices and the disparities between conceptual frameworks and their application in financial reporting standards. The study highlighted the increasing importance of intangible assets (e.g., intellectual property, brand value, human capital) in the knowledge economy. These assets were found to be central to firm value creation and competitiveness but often underrepresented in financial statements. The authors noted significant challenges in reliably measuring intangible assets due to their unique characteristics, such as non-physical nature,

volatility, and dependence on future benefits. They argued that existing accounting standards often fail to capture the true value of intangible assets, leading to a disconnect between financial reporting and market valuation. The study proposed a conceptual framework emphasising greater disclosure and innovative valuation techniques to enhance the relevance and reliability of intangible asset reporting. The study relied heavily on examples and practices from developed markets, limiting its generalisability to emerging economies like South Africa. The research was predominantly qualitative and did not include empirical testing or quantitative analysis of its proposed framework. While the study provided a broad view, it lacked a detailed sectoral analysis, leaving gaps in understanding how intangible assets differ across industries. Unlike Hunter et al. (2012), this study focuses on JSE-listed companies in South Africa, providing insights specific to an emerging market context where intangible asset practices may differ significantly. This study incorporates quantitative methods, using ratios and models (e.g., the Ohlson model) to evaluate the proportion of intangible assets relative to total assets and their reliability in reflecting firm value. This study stratifies data by industry, offering a more granular analysis of how intangible assets' significance varies across different sectors. While Hunter et al. (2012) broadly discuss accounting frameworks, this study critically examines specific valuation techniques (e.g., cost vs. revaluation models) under IFRS, assessing their relevance and reliability in the South African context. By addressing these gaps, this research contributes to a deeper understanding of intangible asset valuation and reporting practices in South Africa, offering practical implications for JSE-listed firms, policymakers, and standard-setters.

## **2.6 SO4: Industry-specific Variations of Intangible Assets**

The evolving significance of intangible assets in financial reporting has been a subject of considerable academic interest, particularly in the context of regulatory changes and industry dynamics. One such study is that of Arnott, Harvey, Kalesnik, and Linnainmaa (2021), who investigated the impact of the dependability of intangible assets on their value relevance over the post-IFRS era (2000-2009) in comparison to the pre-IFRS period. The research found that the importance of intangible assets in determining value decreased after implementing IFRS. However, intangible assets are still more significant in organisations where the reported intangibles are seen to be more trustworthy after the adoption of IFRS.

Building on this theme, Panasenko, Karashchuk, Krasil'nikova, Mayorova, and Nikishin (2020) conducted a study to evaluate the significance of identified intangible assets and goodwill that were recorded in the financial statements of non-financial businesses listed on the JSE between 1998 and 2008. After implementing IFRS, it was discovered that the significance of goodwill, R&D, and other intangible assets in terms of their value had grown.

Taking a broader perspective, Cañibano (2000, 2018) highlighted that the shift in the importance of technology drove intangible elements to become more of a fundamental driver in terms of value. The historical cost of intangible assets had lost relevance over time, but the underlying cost valuation is a reliable form of measurement (Cañibano, 2000). Similarly, García-Ayuso (2003) described it as an inefficient valuation of intangible assets, sometimes resulting in the overvaluation of intangible-intensive entities. García-Ayuso (2003) also suggested a need for transparency when disclosing intangible assets noting that more narrative information should be provided to users to achieve this.

It is important to note that a disparity exists between industries when it comes to investment in intangible assets, with some industries being said to be more intangible-intensive while others are considered to be more fixed asset-intensive. Examining which industries have more investment in intangible assets will supplement the understanding derived from the previous objectives by providing a deeper context to the results.

### **2.6.1 Industry-specific studies**

There is reason to engage in more industry-specific studies due to particular industries having a heavier use and reliance on intangible assets, such as the technology, pharmaceutical, and entertainment industries (Bhaumik, Driffield, & Pal, 2010). It is valuable to assess the relevance and reliability of intangible assets for specific industries in order to gain a deeper understanding of the mechanics and factors that impact the intangible asset value presented in the financial statements (Cañibano et al., 1999b). Throughout history, there has been an increasing discrepancy between companies' intangible assets and market value as measured by market indices worldwide (Brown & Kimbrough, 2011).

### **2.6.1.1 Technological sector**

The technological sector has emerged as a key area for investigating intangible asset-intensive operations. Brynjolfsson and Hitt (2000) found the technological industry to be significant in relation to hosting intangible asset-intensive operations. The study focused on the impact of information technology investments on productivity and company financial performance. The authors postulated that investment in information technology could not improve company performance in isolation as the utilisation and integration of the technology into the company is vital to gain maximum leverage from the investment (Brynjolfsson et al., 2000). The study revealed that investments in information technology positively impacted the company's performance, but only when accompanied by effective organisational transformation and integration of the technology into the company processes and procedures. Some of the benefits experienced by companies that successfully integrate information technology into the organisational structure include increased productivity, cost efficiency, and customer satisfaction. The study highlights the need for companies to strategically align their investments in information technology with changes in structures and procedures to gain the maximum value from the investment and to generate improved performance outcomes (Brynjolfsson et al., 2000). This study underscores the strategic importance of complementing technology investments with organizational transformation to unlock their full potential.

Building on the exploration of intangible assets in the technological domain, Fuertes Callen, Mar Molinero, and Serrano Cinca (2001) researched a sample of 76 internet-based companies whereby using four web-metric indicators to gather information, including 30 ratios combining accounting and web traffic information, 31 accounting ratios, and stock measures exchange performance (share prices), and a measure of efficiency based on Data Envelopment Analysis. Two intangible assets were identified from the six, which were evaluated to be the most significant. One intangible asset was related to internal structure (impacted by managerial efficiency) and external image (associated with customer loyalty). Fuertes Callen et al. (2001) highlighted the dynamic nature of the sector and the significant influence of these intangible assets on company performance and volatility.

Further contributing to the discourse, Naidu, Charteris, and Moores-Pitt (2022) examined how intangible assets affect the economic performance of information communication technology (ICT) businesses in South Africa. Financial success is assessed using many measures, including return on equity, return on assets, return on invested capital, profitability, and asset turnover. Information management and information communication are two of the most recently established disciplines in the field of management that have gained recognition in the scientific world (Naidu et al., 2022). The findings of Naidu et al. (2022) suggest no notable disparities in economic performance across various ICT segments. This research underscores the growing recognition of information management and communication as pivotal areas within the broader management discipline.

Adding a unique dimension to the discourse, Grosse et al. (2023) conducted an empirical analysis to examine the connection between intangible assets, financial policies, financial performance, and company value in South Africa's public business context. The research utilises a mixed-methods approach, combining quantitative analysis of firm-level financial data from South African companies listed on the JSE with qualitative insights from governance and regulatory frameworks. Regression models were applied to identify the key factors affecting firm performance, including financial metrics, governance practices, and broader macroeconomic conditions. The study found that effective governance practices, including transparency and ethical leadership, were strongly correlated with improved firm performance. Additionally, the macroeconomic environment, particularly political stability and trade policies, played a significant role in firm outcomes. The research highlighted that firms with robust governance structures were better able to weather economic challenges, demonstrating higher profitability and resilience.

One limitation of the study is its reliance on secondary data from JSE-listed firms, which may not capture the full scope of governance practices in non-listed or smaller firms. Additionally, while the study incorporates macroeconomic factors, it may not fully address industry-specific nuances or other qualitative aspects, such as corporate culture or stakeholder engagement. Finally, the study's conclusions may not be generalisable to firms outside of South Africa due to unique regional challenges. While Grosse et al. (2023) focused on governance and macroeconomic factors

in explaining firm performance, this study narrows its scope to the significance and valuation of intangible assets in JSE-listed companies. By using specific methodologies such as ratio analysis and models like Ohlson's framework, this research aims to assess how intangible assets contribute to overall firm value and performance—a dimension that Grosse et al. (2023) do not deeply explore. This adds a layer of understanding regarding the financial and operational dynamics of firms in South Africa.

### **2.6.1.2 Pharmaceutical sector**

Another industry that has been found to have a significant investment in and reliance on intangible assets is the pharmaceutical industry. Russell (2016) investigated a variety of intangible assets that play a significant role in the pharmaceutical industry, including the valuation of intellectual property and patents. A qualitative approach was engaged by Russell (2016) to conduct the study through the use of interviews with intellectual property valuation experts and pharmaceutical industry professionals. The purpose of the research was to ascertain the various factors and considerations that are relevant to the valuation of intangible assets within the pharmaceutical industry. The study found that several notable factors were identified as having a meaningful impact on pharmaceutical intangible assets, including the strength and enforceability of patents, stage of the product life-cycle, competitors, regulatory environment, and potential risks associated with intellectual property rights. The authors discuss the various approaches (cost approach, market approach, and income approach) used to value intangible assets within the pharmaceutical industry, illustrating the strengths and limitations of each approach and the practical implementation for valuing pharmaceutical intangible assets (Russell, 2016). This finding underscores the complexity of valuing intangible assets in the pharmaceutical industry and highlights their critical role in sustaining innovation and competitiveness.

An investigation of the value relevance of patent data as a measurement basis for intangible assets was conducted by Hirschey, Richardson, and Scholz (2001), whereby the disclosure of said patent data was examined, including the impact of the company market price and overall market performance. The results of the study were that patents have value relevance and a strong positive

association with company value. The study further determined that those companies with a higher number of patents or patent quality tended to generate higher market performance. The results were interpreted by Hirschey et al. (2001) to reveal that patent-related information was deemed to be valuable by providing additional information over and above what was disclosed in terms of traditional accounting standards. The incremental and valuable information provided by patent-related data contributes to a more holistic understanding of the company's growth and future forecasts. When analysing and interpreting the results, Hirschey et al. (2001) noted that there are varying degrees of success, dependent upon industries and sectors. The study highlights that non-financial information is vital to the understanding of intangible assets and further understanding the company, providing for a more detailed analysis by an investor regarding the company's performance and market valuation. While emphasising the relevance of patents, the authors also note variations in their impact across different industries, further advocating for the integration of non-financial information in the evaluation of intangible assets.

A compelling case study by Hodgson and Hoque (2017) shifts the focus to the strategic growth of Aspen Pharmacare, a leading African pharmaceutical company with global aspirations. The authors investigated the growth strategies employed by Aspen Pharmacare, one of the largest pharmaceutical companies in Africa, in its efforts to become a global player in the industry. The research methodology is primarily qualitative, involving a detailed case study approach. The study reviews corporate documents, annual reports, and press releases by Aspen Pharmacare. It also examines secondary data on industry trends, competitive landscapes, and market strategies in global pharmaceutical markets. The authors use a strategic management framework to analyse Aspen's growth strategies, including acquisitions, partnerships, and market expansion. The study identifies key growth strategies employed by Aspen Pharmacare, including aggressive acquisitions of multinational pharmaceutical companies, the expansion into emerging markets, and diversification into biologics and generic drugs. The authors conclude that Aspen's growth has been primarily driven by strategic mergers and acquisitions, including the purchase of global brands in key therapeutic areas, such as anesthetics and thrombosis drugs. Furthermore, the company has emphasised a strategic focus on operational efficiencies and the effective integration of acquired companies. The results also highlight the importance of geographic diversification,

with Aspen expanding its footprint into Asia, Latin America, and other high-growth markets. The case study found that these strategic moves have enabled Aspen to increase its market share significantly, while also mitigating risks associated with over-reliance on its home market, South Africa. This study offers a nuanced understanding of Aspen's global positioning while acknowledging the need for more comprehensive evaluations of its financial performance and long-term sustainability.

One limitation of the study is its reliance on qualitative analysis, with little quantitative data used to assess the impact of Aspen's strategies on financial performance and long-term value creation. A more detailed financial analysis, perhaps using financial metrics or ratios, would strengthen the understanding of how Aspen's strategies translate into tangible results in terms of return on investment or share value. The study focuses solely on Aspen Pharmacare, which limits its generalisability to other pharmaceutical companies or sectors. While it provides in-depth insights into Aspen's strategies, the conclusions might not apply to other firms with different business models or in different stages of growth. The study also does not fully address the long-term sustainability of Aspen's strategies. Given the rapidly evolving nature of the pharmaceutical industry, a more extended study might have provided insights into whether Aspen's aggressive expansion model will continue to be effective in the future. While Hodgon et al. (2017) focus on the strategic growth of Aspen Pharmacare, this study is centered on the valuation and measurement of intangible assets in JSE-listed companies, particularly those in the pharmaceutical sector. This research seeks to assess how intangible assets such as intellectual property, goodwill, and brand value are valued by companies, whereas Hodgon et al. (2017) focus on Aspen's growth strategies and market expansion. This study adopts a quantitative approach, using financial metrics and models such as ratio analysis and the Ohlson model to assess the significance of intangible assets within the company's statement of financial position and their effect on market capitalisation. In contrast, Hodgon et al. (2017) used a case study approach with qualitative methods to explore strategic decisions, without much emphasis on financial or intangible asset valuation.

### **2.6.1.3 Tobacco sector**

In stark contrast to the pharmaceutical sector, the tobacco industry faces unique challenges due to heavy regulation and societal scrutiny. The study by Linsley and Shrives (2006) examines risk disclosure practices in UK companies, including tobacco companies, and explores the importance of intangible assets in financial reporting. The study employed the use of content analysis of annual reports of UK-listed companies. The study highlights that companies in heavily regulated sectors, such as tobacco, tend to have higher levels of risk disclosure, with intangible assets (e.g., trademarks, patents) playing a central role in mitigating business risks. The study focuses only on the UK, limiting its applicability to other regions. The analysis also does not specifically consider the valuation of intangible assets. This study explores intangible assets, specifically within South Africa's JSE-listed tobacco sector, and addresses their valuation and relevance in market value.

There are limited studies conducted within the tobacco sector, paying specific attention to intangible assets. This study aims to address the gaps in the lack of sectoral examination with regard to intangible assets, particularly for South Africa and emerging markets, through a holistic approach to the study, including an understanding of the methods of measurement selected (cost or revaluation model), the relevance and reliability of values disclosed for intangible assets through the application of the Ohlson model. Furthermore, the study examines the significance of intangible assets in proportion to total assets to ascertain the magnitude of investment in intangible assets over fixed assets. This nuanced approach not only fills a critical research void but also highlights the evolving importance of intangible assets in sectors often overlooked in academic literature.

## **2.7 Research Gap Identified**

Despite the growing body of literature on intangible asset valuation, prior studies often neglect the unique regulatory, economic, and industry-specific factors influencing intangible asset measurement in South Africa. Recognising this void, this study incorporates industry stratification and contextual factors to provide more granular insights. Prior studies assess intangible assets in isolation without additional contextual information to deepen the insights derived from the results.

This study bridges this gap by employing the Ohlson model to test the relevance and reliability of intangible asset values in conjunction with understanding the measurement model applied to derive the results. Many studies concentrate on the value relevance of goodwill specifically while ignoring other forms of intangible assets, which is addressed by this study.

The literature review reflects the wealth of information and research that has been conducted regarding the valuation of intangible assets on an international basis. A significant amount of research is conducted regarding the value of human capital within an entity, which is not recognised by IFRS and thus not within the scope of this research. This study has shown that research on the importance of intangible assets tends to be limited to value relevance and, more specifically, to goodwill. Researchers have been paying more attention to human capital in recent years and include isolated research that does not represent the unique landscape attributable to South Africa. For instance, Khanna, Jones, and Boivie (2014) focused on India, Omokhudu and Ibadin (2015) studied Nigeria, Jeketule Soko (2014) conducted research in Kenya, Binh and Trang (2020) explored Vietnam; Salamudin, Bakar, Kamil Ibrahim, and Haji Hassan (2010) investigated Malaysia; Sivalogathan (2015) examined Sri Lanka; Firer (2005) studied South Africa; and Viriri (2003) conducted research in Zimbabwe. However, there is limited literature that specifically addresses South Africa. There has been little research conducted on the intangible assets of South Africa, which is JSE based on value relevance and, more specifically, goodwill. There is a lack of understanding in this area, and this study aims to fill that gap. An additional contribution made through this study is due to the updated data that has been utilised post-2015, and thus, the most updated form of the IAS 38 accounting standard is applicable.

The novel approach encompassing holistic information on a single dataset, including understanding the measurement models applied by the companies, the results relating to relevance and reliability from the Ohlson model, and the further investigation relating to the significance of intangible asset investment by certain industries in South Africa provided a uniquely extensive investigation adding a new viewpoint and set of information as well as a methodology for potential future studies on other stock exchanges.

## **2.8 Chapter Summary**

The chapter covered the research's review of empirical literature. The chapter included empirical literature reviews connected to intangible assets recognised in terms of IFRS, focusing on how these assets that cannot be physically touched are valued by applying IFRS 13 amongst listed companies within South Africa. While a range of literature has been established regarding the recognition and measurement of intangible assets, there is little knowledge and understanding of the relevance and reliability of the figures posed in the financial statements and whether the application of IFRS results in an accurate representation of intangible assets given their unique nature and valuation difficulties. The next chapter will include the theoretical literature review as well as the conceptual framework for this research and explain the inter-relationships among research variables discovered through a review of the literature on intangible assets in JSE-listed firms, which links with the research questions.

## **CHAPTER THREE: THEORETICAL AND CONCEPTUAL LITERATURE REVIEW**

### **3.1 Introduction**

The previous chapter explained the empirical literature relevant to this research in line with each of the research objectives. A comprehensive understanding of the theoretical literature is essential to contextualise the study and frame its objectives within established scholarly paradigms. This chapter explores relevant theoretical literature, which is vital for understanding the topic under study.

### **3.2 Theories**

The existing models and theories will act as a framework and grounding by which the study will be guided. In addition, this chapter covers the following theories relating to the relevance and reliability of intangible asset values and the corresponding objectives: Positive accounting, resource-based view (RBV), stakeholder theory, accounting conceptual framework, signaling theory, dynamic capabilities framework and institutional theory. Each offers a distinct lens through which the research objectives can be examined and understood. The following section will provide a detailed theoretical literature review of the relevant theories and frameworks.

#### **3.2.1 Positive Accounting Theory**

This research follows a Positive Accounting theory approach to assess the extent to which the values are relevant and reliable for intangible assets. Kejriwal (2022) argues that positive accounting research explores the motivations of management and regulations while making market-related accounting decisions. According to Patty, Lamawitak, Goo, and Herdi (2021), positive accounting theory aims to clarify why some accounting procedures are preferred over others. Positive accounting theory investigates accounting issues using accounting information. A study employing a positive accounting theory approach aims to articulate and anticipate how accounting varies over time.

According to the preceding sentence, this research is a type of positive accounting research that aims to explore the impact of the intangible assets being recognised on the quality (relevance) of accounting information. Market value and intangible assets are typically addressed when deciding

on accounting decisions, both on an opportunist and efficient basis. Traditionally, market value and intangible assets are linked to increased labour and capital investment (Firmansyah & Saksessia, 2020). Technological advancements and intangible asset investment drive development that cannot be attributed to labour or capital investments. These insights are reinforced by Wiratama and Asri (2020), who postulated some concepts, including explaining intangible assets and market value, human resources, inventiveness, cognitive expenditures, and new growth/evolutionary ideas. In addition, the innovation and new growth theories, both of which are components of positive accounting theory centered on the clean surplus connection, offer an acceptable framework for this research. This is supported by Schroeder, Clark, and Cathey (2022) definition of inventiveness as the diffusion of products into the marketplace, which is the principal function of most intangible assets.

The Ohlson model has helped academics better comprehend positive accounting theory's impact on capital markets-based research. The Ohlson model is also called the Putri and Herawaty (2020) model. The Ohlson model calculates company value as an inverse function of the book value of stock and the current value of predicted prospective abnormal revenue. The model presupposes ideal capital markets, and with the extra presumption of a non-linear knowledge change, the company's worth may be described as a linear function of the value of books, income from operations, and payouts (Noviyanti & Agustina, 2021). The Ohlson pricing model and its extensions include the concept of economic rentals, which refer to profits that exceed the cost of capital for a restricted number of times. This is reflected in the long-term persistence variables for anomalous earnings. Zahro (2021) states that the Ohlson model accounts for economic rent by incorporating the current price of anticipated cash flows from recognised assets into equity book value. Zahro (2021) also emphasised that many intangible assets are due to economic rents, which are defined as the extra amount earned by a resource as a result of its present use. The approach aligns with the idea of value relevance, which states that the market value of stock takes into account all information that is accessible to everyone. The model uses the "clean surplus accounting" connection to calculate an organisation's intrinsic worth as the sum of its initial investment (purchase worth) and the current value of any future exceptional profits.

The positive accounting theory is applicable to objective one, which examines the measurement and valuation of intangible assets. According to the positive accounting theory, companies select accounting policies for intangible assets that minimise their agency costs or political costs. This can include the decision between the cost model or revaluation model for measuring intangible assets. Firms may prefer the cost model if it provides more predictable outcomes and less political scrutiny (Watts & Zimmerman, 1986). The positive accounting theory suggests that firms' choices regarding intangible asset valuation are influenced by the incentives of management and owners to maximise firm value while minimising potential conflicts with regulators, investors, and other stakeholders. This theory is relevant to this study as it helps to explain potential biases in intangible asset valuation and reporting. Thus, positive accounting theory offers a robust theoretical foundation for exploring the strategic choices underlying intangible asset valuation.

### **3.2.2 Resource-based view**

The Resource-Based View (RBV) theory has emerged as a critical framework for understanding how firms can achieve and sustain competitive advantage through their unique resources. At its core, the RBV emphasises the pivotal role of intangible assets such as intellectual property, human capital, and organisational processes, contributing to long-term success and value creation. This theory hinges on the fact that intangible assets have a significant role to play in terms of creating and sustaining a competitive advantage for companies (Kristandl & Bontis, 2007). The resource-based view focuses on intangible assets that are not recognised in terms of accounting standards, such as intellectual property, human capital, and organisational processes that are anticipated to contribute to a company's long-term success and value creation (Connor, 2002). These resources, which are challenging to imitate or substitute, form the foundation of a company's strategic advantage in a competitive marketplace.

To deepen the understanding of this perspective, Kraaijenbrink, Spender, and Groen (2010) engaged in a study to review and assess the critiques associated with the resource-based view. The study provides a broad overall review of the literature for a critical analysis of the resource-based view. Also, it explores further how resource-based view techniques can assist in understanding the relevance and reliability of intangible asset values within the context of company resources and

capabilities. Three primary critiques of the resource-based view were recognised by Kraaijenbrink et al. (2010) as follows. The tautology critique defines a resource-based view as being circular in nature, thereby determining that company resources are, in fact, the drivers of competitive advantage without detailing how such was acquired or developed. The lack of dynamic perspective critique argues that a resource-based view does not consider the dynamic and ever-changing nature of resources over a period of time. The lack of clear and casual logic critique questions whether it is possible to examine a direct causal relationship between resources and performance by applying a resource-based view. Kraaijenbrink et al. (2010) provide a balanced overview of the strengths and pitfalls associated with the resource-based view while concluding that even though the resourced-based view has certain limitations, it ultimately remains a valuable and influential framework for understanding the competitive advantages of companies.

Building on this, Helfat and Peteraf (2003) studied the concept of the capability life-cycles of companies, assuming that capabilities to create competitive advantages change over time, thus not being static in nature. The study by Helfat et al. (2003) suggests that competitive advantage capabilities follow four stages through a life-cycle model as follows:

- **Emergence:** during this stage of the lifecycle, the capability begins to develop and shows initial promise.
- **Growth:** the growth stage occurs while the capability expands and improves, thereby contributing positively to the company's competitive advantage.
- **Maturity:** the maturity portion of the life cycle reflects the capability's peak performance and impact.
- **Decline:** after the peak performance of the capability, it will begin to experience a decline where the capability becomes less effective and loses the ability to generate a sustained competitive advantage for the company.

Helfat et al. (2003) highlighted that an overview and understanding of the capability life cycles are vital for management to be able to make informed strategic decisions, particularly with regard to resource allocation. The resource-based view framework was expanded through a study conducted

by Helfat, Kaul, Ketchen Jr, Barney, Chatain, and Singh (2023) to consider the dynamic nature of both resources and capabilities. The resource-based view is deemed to be an established tool when assessing intangible assets in relation to the company's performance.

The RBV also offers a lens to explore how management exploits imperfections in resource and product markets to drive efficiency. By considering the RBV, one can more fully understand how management might be capable of taking advantage of market flaws in the product and resource marketplaces to improve business efficiency (Gerhart & Feng, 2021). RBV links the internal and external contexts in which management functions and gives them a significant role. RBV further sets off the field of academic research on managerial strategy from manufacturing organisation economics in a similar manner (Khanra, Kaur, Joseph, Malik, & Dhir, 2022). The latter has advanced much in evaluating how the company should react to its external environment, particularly the actions of its competitors, but it still maintains the conventional view of the company's internal operations as a "black box" that is impervious to examination (Barney, Ketchen, & Wright, 2021). In addition, management is viewed primarily as algorithms that seek to be optimised. Repositioning the company as possibilities arise, as well as its resource-based changes is one of the responsibilities of management under the RBV (Freeman, Dmytriiev, & Phillips, 2021). Corporate organisation economics, on the other hand, views management as reactive. As a result, management in the RBV is aggressive and flexible, or "enactors," according to Zahra (2021).

In contrast, managers in the field of industrial organisation economics play a role similar to those that managers play in monitored utilities, with most of the choices they make involving marginal changes to input and output stages. The origins of imperfections in the market and the responsibilities those in management hold are what give the RBV its fascinating qualities (Collins, 2021). Management alters the character of market competitiveness via their judgements. Management's decisions are closely related to how they view the internal features of their own companies, as well as the outside conditions in which they operate (Helfat et al., 2023). There are three main components of the Resource-Based views (RBV), namely: Functionality of Resources, Recombination of Resources, and the Development and Decay of Resources.

In sum, the RBV offers profound insights into the strategic management of intangible assets, emphasising the importance of adaptability and innovation. By addressing its critiques and integrating dynamic considerations, the RBV continues to serve as a vital theoretical foundation for exploring the sources of competitive advantage and guiding firms in achieving sustainable success.

### **3.2.2.1 Functionality of Resources**

In the RBV literature, resource functioning is a longstanding problem, as scholars strive to understand how resources contribute to a firm's competitive advantage. Estensoro, Larrea, Müller, and Sisti (2022) postulated that a corporation's development is constrained by the size of its collection of production opportunities. Managers' perspectives and the assets at their disposal define a successful set of profitable opportunities. Ployhart (2021) states that the company's potential set could possibly be increased by looking for creative ways to employ its current resources. There may be room for expansion when a company's resources have not been utilised entirely because there continues to be some wiggle room. The resources could require to be coupled with other accessible resources in order to provide profitable services, which is a topic the study returns to later, allowing for any surplus ability of current resources to be utilised (Beamish & Chakravarty, 2021). Beamish et al. (2021) further emphasise that businesses make an effort to learn more about the possible applications of their current resources through study and other proactive inquiries. They emphasise the proactive role businesses play in understanding the possible applications of their resources through research and exploratory efforts.

Adding depth to this discussion, Gibson, Gibson, and Webster (2021) raised the question of what materials do, using the idea of dualism to explore the connection between resources and the products and experiences that arise from their use. The authors assert that businesses may be categorised based on the assets they possess or their goods and services. These two represent the opposing aspects of the same thing. The usefulness and application of the resource are more important than the sort of material in and of itself (Greve, 2021). Materials may be used in various marketplaces throughout time since they may serve many purposes. Determining the most

profitable use for the assets that are at their disposal is a crucial responsibility for management (McGahan, 2021). Therefore, management's subjective views impact how resources are used. Moreover, how resources are used determines the competitive environment (Hagen, Risselada, Spierings, Weltevreden, & Atzema, 2022). These management businesses define the parameters of sector participation by using their resources similarly to those of their rivals. For example, Muench, Benz, and Hartmann (2022) illustrate this concept through the lens of the management (owner) of a bar or restaurant, who view their property as a vital resource for the retail sale of their beverages and other commodities, but the structure may be used for a variety of purposes (Muench et al., 2022). One possible application for the structure might be a pet store. The sector to which the firm corresponds is determined by how the resource is used. As previously stated, finding the most lucrative way to use the resources at their disposal is a crucial responsibility of managers (Muench et al., 2022).

The worth of a collection of resources will vary depending on how they are used in various markets. The game of poker will be used to illustrate the concept, which has an increase in the permissiveness of the guidelines, as well as the complexity of the game (Huang, Wang, Lee, & Yeung, 2023). Allowing resources to be used in a variety of marketplaces is similar to allowing a poker player to use his hand of cards to engage in play on various tables at various games. The value of the poker player's cards will fluctuate according to the guidelines of the game, which will differ among tables. A poker player's job is to decide quickly which variants they would like to engage in, or more specifically, where their cards may be used to their greatest advantage. Thus, the challenge confronting management is how to comprehend both the functioning of the resources within the organisation and those that are under the supervision of other companies (Huang et al., 2023).

However, the literature also highlights the limitations of managerial understanding. Nandi, Nandi, Moya, and Kaynak (2020) contended that management may be bad at comprehending the variety of prospective functionalities from their resource base for a variety of causes, namely a shortage of time and concentration, restricted reasoning, psychological prejudices, and reframing restrictions. The inability of management to recognise rivals in industries other than their own is

rooted in Chahal, Gupta, Bhan, and Cheng (2020) research and the issues surrounding management's myopia. It is not enough for management to know how their resources work; they need to know how much use they can give them. Certain resources have the ability to be utilised in numerous ways at once, in addition to serving various purposes (Ren, Wu, Lim, & Tseng, 2023). In other words, an asset may be highly consumable, meaning that using it in a particular industry does not prevent using it elsewhere. For intangible resources like understanding, there is virtually no restriction as to how much of them may be given (Andersen, 2021). On the other hand, physical resources might quickly run out as using them in one market keeps them from being utilised in a different one.

Through this multifaceted exploration, the RBV provides a comprehensive framework for understanding how firms can maximise the functionality of their resources, thereby advancing their competitive advantage. This understanding is essential for achieving the research objective of exploring the relevance and reliability of intangible asset valuation using standard valuation techniques.

### **3.2.2.2 Recombination of Resources**

The concept of resource recombination takes center stage in the Resource-Based View (RBV) literature. According to Andersen (2021), resources are rarely useful on their own. In actuality, it is improbable that one is able to blame a single resource for the achievement of a company (and hence sustainable competitive advantage (SCA)). As such, it could be more beneficial to think about combining resources. If resources are complementary and connected, businesses may be able to generate value by bringing them together (Ilg, 2019). The question of how resource combinations might produce value is addressed by the notions of cooperation, connection, and co-specialisation (Awan, Arnold, & Gölgeci, 2021). A fundamental concept in the literature on capacities is that of resource combination (and recombination). According to Dangelico (2016), an advantage is a company's ability to engage in productive endeavours, which is achieved via the concurrent application of resources and elements of production. The importance of resource recombination lies in its transformative potential. It is best to think of the ability to change

literature as an addition to the RBV. Lee (2023) contends that resource utilisation has an impact on the company's profitable potential set but that capacity utilisation also has an effect on the probability set due to management's capacity to integrate resources to provide beneficial services (or competencies).

It is doubtful that the established profitable activities resulting from a particular package of resources would ever reach their optimum efficiency at any one time. There remains a chance that a company may grow (Qiu, Jie, Wang, & Zhao, 2020). Management decided to combine present assets in order to meet this imagined demand when they find shifts in client tastes and development. Therefore, the amount to which a company's management believes there are possibilities is prepared to act on them, and is able to capitalise on them with their own financial assets, determines the extent to which prospects for growth exist (Du et al., 2022). Therefore, in order for the business to develop, it must identify new market possibilities and adapt how it uses its current resources to take advantage of them. A more thorough understanding of resource recombination is provided by Sirmon, Hitt, and Ireland (2007), who concentrated on the characteristics of resource recombination and how they affect capacities. They differentiate between the tasks of stabilising, improving, and innovating in the process.

Gradual enhancements to current resources in order to stabilise them require small cumulative changes to current capabilities. In a context with little risk to the environment, stabilisation may be a means of preserving a present competitive advantage (Yuan & Cao, 2022). By acquiring new things or incorporating complementary resources, enrichment entails developing and expanding one's present competencies (Guinot, Barghouti, & Chiva, 2022). Innovation is a more sophisticated form of resource recombination. In order to develop unique capacities, this method incorporates innovation and exploratory instruction (Li, Tian, Liu, & Lu, 2022). Management may be able to provide fresh results for the company if they possess the ability to re-organise their resources in a variety of approaches.

An illustrative example of resource recombination can be drawn from the seemingly unrelated businesses of a pub and a pet store. For instance, going back to the pub proprietor mentioned above,

one discovers that they also operate a pet store (Muench et al., 2022). To get customers into the pet store, management purchases a huge snake, an item that he or she can offer for sale if necessary. However, the snake is only used at the pet store from Monday through Saturday from 9am to 5pm. Since the snake does not have to provide labour to earn its keep and is not used much outside of business hours, management begins to consider ways to exploit the resource more profitably. Management then has the bright idea to pair the snake with one of the bartenders, and voilà, a creative re-purposing of resources results in the production of an exotic dancer to be shown on Sundays and/or evenings (Muench et al., 2022). By pooling resources, the pub's management has expanded into a leisure business. Using the comparison from earlier, resource recombination, like consumption, increases the permissiveness of the game's regulations. One might be capable of creating a variety of situations that are able to be used in various activities by rearranging a pack of cards. Additionally, individuals may work together to re-organise their cards if one loosens the restriction that the re-assembled cards must be in the control of just one person (Huang et al., 2023). The number of possibilities for recombination that may be feasible is significantly increased by the possibility of cooperation. This perspective reinforces the argument that resource recombination is essential for firms seeking sustainable growth and competitive differentiation in an ever-changing environment.

### **3.2.2.3 Development and Decay of Resources**

The dynamic nature of resource generation and utilisation has long intrigued researchers seeking to unravel the mechanisms behind company growth and decline. Lockett, Thompson, and Morgenstern (2009) were the first to address the problem of resource generation by attempting to theorise the process of company expansion. According to Lockett et al. (2009), businesses create extra resources in their resource foundations over time due to their profitable operations. A resource base's surplus capacities provide the foundation for business development. Over time, the company's operations will result in the creation of resources. Therefore, the company's financial standing will intimately correlate with its historical operations. In other words, the company's base of assets will be route-dependent. While Penrose (2009) pointed out that resources may be produced via market competition, the topic of resource generation has received less attention, as

concluded by Othman, Arshad, Aris, and Arif (2015). In another significant contribution, Bromiley and Rau (2016) made an effort to compile an overview of the development and depletion procedures that impact the intangible assets that are the basis of the RBV.

The factors underpinning resource variability and their impact have also received considerable attention. Wang (2014) looked at the root causes of company variability, while El Shafeey and Trott (2014) looked at the effects of it (for a specific collection of resources). Kraaijenbrink (2011) proposes that crucial resources are not obtained in "strategic factor markets" but accumulate because factor markets for intangible assets are insufficient. Moreover, they contend that the features of the asset accumulating procedure are connected to the rigidity of a resource situation. Their vocabulary has gained widespread usage, and the following is a concise summary of their accumulation of assets classification: Becerra (2008) theorise that the marginal cost of accumulating a particular asset decreases with the size of the current relevant asset base, which is known as asset mass effectiveness. This is best observed in situations when research and development (R&D)-related operations show (at least regionally) rising returns that visibly favour existing R&D-intensive businesses (Becerra, 2008). This effect is especially pronounced in research-intensive firms, where increasing returns favor entities already deeply invested in R&D.

The noticed propensity of the expense of asset accumulation to increase within a specific time span is known as a time-compressing diseconomy. *Ceteris paribus*, the procedure will be more expensive the more a company seeks to shorten the time horizon for asset building (Barney et al., 2021). Once more, research and development (R&D) is a prime illustration of a recognised trade-off involving the time and expense incurred in speeding up the rate of solving issues. According to Carmeli (2004), causal ambiguity refers to the challenges experienced by strangers, and possibly even those in the know, in identifying the specific elements that provide a business with a competitive edge. The concept of asset interconnectivity suggests that the expense of increasing the company's inventory of resources might be influenced by the cost of maintaining its current stock of resources. Chatterjee, Chaudhuri, Vrontis, and Thrassou (2023) give an instance of an enterprise whose client service department generates input that reduces the expenses of developing products. The term "asset degradation" describes the decrease in the company's inventory of

intangible property due to wear and tear, depreciation, and development by competitors (Mahoney & Pandian, 1992). It is the statement of financial position degradation for physical assets' counterpart for intangible assets. It emerges from the rivals' conduct, as well as from the corporation's solitude.

The company is essentially a collection of assets whose worth is constantly changing. In their synthesis of these processes, Barney et al. (2021) warned that if supply and demand conditions are flawless, the expense of getting resources will be roughly comparable to the value of those assets once they are utilised in implementing product market strategies. The work by Barney (2001) bears many similarities. Therefore, regardless of defects in the resource market, achieving SCA will be challenging for a corporation that purchases resources and uses them in the same way as before. In line with Kostopoulos, Spanos, and Prastacos (2002) research, Nemati, Bhatti, Maqsal, Mansoor, and Naveed (2010) offer a broader perspective of resource procurement by defining two scenarios in which SCA could be feasible. Firstly, due to advertiser's apathy, one can get fortunate and purchase the resources for less than their full marketplace worth. Secondly, one can possess or have possession of additional unique resources that add to the worth of the assets and are not accessible to other businesses.

The RBV is relevant to objective two regarding the reliability and relevance of valuation techniques in that it suggests that firms are likely to choose valuation techniques for intangible assets that align with their strategy of maximising competitive advantage. The reliability and relevance of the valuation model are essential in ensuring that these intangible resources are accurately reflected, as stakeholders use this information to assess the firm's future potential and competitive position (Barney, 2001). According to the RBV, firms with valuable intangible resources will prioritise valuation methods that make these assets more visible to investors, as this can impact their stock market performance and ability to attract capital (Teece, 2007). This is relevant when considering whether standard valuation techniques (cost or revaluation models) provide an accurate reflection of intangible asset values.

The third objective relating to the significance of intangible assets in relation to total assets is relevant to the RBV. The RBV emphasises that intangible assets, particularly those that are rare and difficult to imitate, are a key source of sustained competitive advantage. Therefore, the significance of intangible assets in relation to total assets is not just a financial measure but also an indicator of the firm's strategic position (Teece, Pisano, & Shuen, 1997). Firms with a large proportion of intangible assets relative to total assets may be seen as more innovative and future-oriented, which could influence their valuation in the eyes of investors and other stakeholders (Barney, 1991). This aligns with the growing importance of intangible assets in sectors where innovation and intellectual property are central to success.

The fourth objective relating to industry-specific value disparities is relevant to RBV. The RBV suggests that the value of intangible assets will vary significantly across industries because the sources of competitive advantage differ. In industries such as technology or pharmaceuticals, intangible assets like patents, trademarks, and proprietary knowledge are more central to firm performance, whereas, in manufacturing, tangible assets might dominate (Barney, 1991). Different industries may have varying standards for reporting intangible assets based on the types of resources that are most valuable to their competitive position. This is reflected in how firms in different sectors choose to value and report their intangible assets, with some industries placing greater emphasis on intellectual property and others focusing more on human capital or brand value (Teece, 2007).

The Resource-Based View provides a strategic framework for understanding the importance of intangible assets in a firm's long-term competitive success. In the context of this study, the RBV helps explain why JSE-listed companies might prioritise the recognition and accurate valuation of their intangible assets, as these resources are critical to their sustained advantage. Incorporating the RBV into this research ensures a better understanding of the strategic motivations behind how firms measure and report intangible assets, as well as how industry differences influence this process.

### **3.2.3 Stakeholder Theory**

Stakeholder theory, as introduced by Freeman (1984), posits that organisations should create value not only for shareholders but also for a broad range of stakeholders, including employees, customers, suppliers, communities, regulators, and society at large. The theory emphasises that organisations exist in a web of relationships, and their success depends on effectively managing these relationships. The theory is particularly relevant to this study on intangible assets because these assets (e.g., goodwill, brands, patents, intellectual capital) often have value that extends beyond financial performance, impacting various stakeholders in different ways. This perspective challenges purely shareholder-focused valuation methods and emphasises the need for reporting systems that reflect the broader implications of intangible assets.

The application of the stakeholder theory to this study is relevant to objective three in terms of the significance of intangible assets in relation to total assets. From a stakeholder perspective, understanding the proportion of intangible assets relative to total assets is crucial for evaluating a company's long-term sustainability and growth potential. Stakeholders such as investors, regulators, and policymakers might view this ratio as an indicator of a company's innovation capacity or industry competitiveness. The proportion of intangible assets to total assets provides stakeholders, such as investors and analysts, with insights into a company's innovation, competitive positioning, and long-term sustainability (Lev & Zambon, 2003). Stakeholder theory reinforces the idea that financial disclosures, including the significance of intangible assets, should cater to the informational needs of a broad audience beyond shareholders (Donaldson & Preston, 1995).

By integrating stakeholder theory into this analysis, the study addresses the broader implications of intangible asset valuation for different stakeholder groups. This alignment will not only enhance the practical relevance of the findings but also contribute to ongoing debates about how intangible assets should be recognised and reported in financial statements, especially in a dynamic market like the JSE. Such integration addresses the varied informational needs of stakeholders while

fostering a more holistic understanding of how these critical assets contribute to organisational success and long-term sustainability.

### **3.2.4 Accounting Conceptual Framework**

The accounting conceptual framework provides a foundation for accounting principles, guiding the development of accounting standards and practices. It outlines the objectives of financial reporting, the qualitative characteristics of financial information, and the definitions of the key elements of financial statements, such as assets, liabilities, equity, incomes, and expenses. The goal of the framework is to ensure that financial statements provide useful information for decision-making by stakeholders, particularly investors, creditors, and regulators (IFRS, 2023a).

In the context of this study, the accounting Conceptual Framework is crucial because it helps to define how intangible assets should be recognised, measured, and reported in financial statements. The framework emphasises the importance of relevance, reliability, understanding, and comparability in financial reporting, which directly impacts how intangible assets are valued and disclosed.

In relation to the first research objective regarding the measurement models employed for the purposes of valuing intangible assets, the accounting Conceptual Framework stresses that financial information must be both reliable and relevant for the purposes of decision-making. Reliability means that the information can be depended upon to represent faithfully what it purports to represent, while relevance means that it can influence the decisions of users (IFRS, 2023a). When valuing intangible assets, the cost model and revaluation model are both used to ensure the reliability and relevance of the information presented. The framework suggests that if the revaluation model is chosen, it should reflect the asset's fair value, as this provides more relevant information, especially when market values are available (IFRS, 2023c). On the other hand, the cost model provides more reliable data but may lack relevance in certain contexts, especially when the asset's value has significantly changed over time.

The accounting Conceptual Framework plays a critical role in determining how intangible assets are recognised, measured, and reported in financial statements. Its emphasis on relevance and reliability guides firms in choosing appropriate valuation models for intangible assets, ensuring that these resources are accurately reflected in financial statements. In the context of this study, the framework provides the underlying principles for understanding the methods JSE-listed companies may use to value intangible assets and how these valuations impact stakeholders' decision-making.

### **3.2.5 Signaling Theory**

Signaling theory explains how parties with more information (insiders) communicate valuable information to those with less information (outsiders) through signals. In financial reporting, managers use accounting choices, disclosures, and valuation methods to signal the company's financial health, strategic advantages, or potential for future growth to stakeholders, such as investors, creditors, and regulators (Spence, 1978). A credible signal should reduce information asymmetry and influence stakeholder perceptions positively.

In relation to objective two regarding the reliability and relevance of the valuation of intangible assets, the signaling theory suggests that companies strategically choose valuation techniques for intangible assets to convey specific signals to stakeholders. For example, using the revaluation model to report fair values of intangible assets may signal the company's confidence in the future benefits and current market worth of these assets, thus enhancing perceived growth potential (Akerlof, 1978; Spence, 1978). Conversely, the cost model may be used when firms prioritise signaling conservative financial management. Stakeholders often interpret the choice of valuation technique as a reflection of management's strategy or intent, with more sophisticated methods (such as fair value accounting) signaling greater transparency and relevance, while less volatile methods (like historical cost) signal reliability and stability (Ross, 2020). The effectiveness of these signals depends on their credibility, which is enhanced by third-party verification (e.g., audits) or alignment with market benchmarks. Managers in JSE-listed companies might adopt valuation techniques that align with stakeholder expectations for reliability and relevance to maintain credibility and trust (Watson, Shrives, & Marston, 2002).

The signaling theory is relevant to objective four regarding the stratification of results by industry because the theory emphasises that firms in different industries send diverse signals through the reporting of intangible assets. In technology or pharmaceutical industries, signaling the value of patents, R&D, and intellectual property may be crucial to demonstrating innovation and future growth potential (Lev, 2000). These industries often use valuation models that highlight the strategic importance of their intangible assets. Conversely, in manufacturing or utilities, tangible assets may dominate, and signaling focuses more on operational efficiency and physical capital. These firms might downplay intangible assets to avoid scrutiny or misalignment with industry norms (Spence, 1978). Industry norms also influence the effectiveness of signals, such as in industries where intangible assets are core drivers of value; the absence of robust valuation and disclosure could send a negative signal, leading to reduced investor confidence (Connelly, Certo, Ireland, & Reutzel, 2011). Disparities across industries can arise because of differences in how stakeholders interpret intangible asset values. Managers use signaling to align stakeholders' perceptions with the firm's strategic objectives, ensuring that their intangible asset disclosures accurately reflect competitive positioning (Ross, 1977).

The signaling theory provides a robust framework for understanding why JSE-listed companies select specific valuation methods for intangible assets and how these choices vary across industries. The second objective highlights the role of valuation models as signals of reliability and relevance, shaping stakeholder perceptions. The fourth objective explains how industry-specific norms and expectations influence the signaling of intangible asset values, leading to observed disparities. Through the application of the signaling theory, this study can offer insights into the strategic considerations behind intangible asset reporting and its impact on stakeholder decision-making.

### **3.2.6 Dynamic Capabilities Framework**

The Dynamic Capabilities Framework emphasises a firm's ability to integrate, build, and reconfigure internal and external resources to respond to changing environments. The framework was proposed by Teece et al. (1997) and highlights that sustainable competitive advantage arises not only from possessing valuable resources but also from the firm's capacity to adapt, innovate,

and leverage those resources effectively. Intangible assets, such as intellectual property, brand equity, and organisational knowledge, are critical in this context because they enable firms to navigate dynamic markets.

The Dynamic Capabilities Framework posits that firms in different industries face unique competitive and environmental challenges, which shape how they value and utilise intangible assets, which is particularly relevant to objective four. For example, technology and pharmaceutical companies operating in rapidly evolving markets require strong dynamic capabilities to innovate and capitalise on intellectual property. These industries may report higher values for intangible assets, reflecting their strategic importance (Teece et al., 1997). Industries characterised by slower rates of change, such as utilities or traditional manufacturing, might not rely as heavily on dynamic capabilities. Consequently, the valuation and prominence of intangible assets in these sectors are likely to be lower. These firms may focus more on operational efficiency and tangible assets (Eisenhardt & Martin, 2000). Dynamic capabilities also explain how firms in the same industry may differ in reporting intangible asset values. Firms with stronger capabilities to adapt and innovate may create more value from their intangible assets, leading to higher valuations. This is particularly important in sectors like media, where firms leverage brand equity and digital transformation strategies differently (Teece, 2007).

The framework highlights that the value of intangible assets depends on a firm's ability to reconfigure and renew these assets to meet market demands. For instance, a brand's value is not static but depends on how it is continuously reinforced through marketing, innovation, and customer engagement (Eisenhardt et al., 2000). Firms in dynamic industries often report intangible assets at higher values not only because they are more reliant on them but also because these assets represent a significant portion of their adaptive strategies. For example, firms in high-growth sectors may adopt the revaluation model to showcase the strategic relevance of their intangible assets, while those in stable markets might use the cost model to signal consistency and reliability (Teece et al., 1997).

The Dynamic Capabilities Framework provides a compelling explanation for industry-specific disparities in intangible asset values. With regard to the fourth objective, the Dynamic Capabilities Framework highlights how differences in the rate of market change, competitive pressures, and the strategic importance of intangible assets drive variations in their valuation and reporting. By applying this framework, this study can explore how JSE-listed companies in diverse industries leverage their intangible assets and how these differences influence their financial disclosures.

### **3.2.7 Institutional Theory**

The institutional theory examines how institutional environments, including norms, rules, and cultural-cognitive structures, influence organisational behavior and practices. The theory suggests that organisations conform to institutional pressures to gain legitimacy, stability, and social acceptance, often prioritising these goals over purely economic efficiency (DiMaggio & Powell, 1983). Institutional theory emphasises three types of pressures: coercive (from regulations and laws), normative (from professional standards and industry practices), and mimetic (from uncertainty driving imitation of successful peers).

The institutional theory is particularly relevant to the fourth objective in terms of the stratification of results by industry. The institutional theory explains that industry-specific institutional pressures drive differences in intangible asset valuation and reporting practices. In highly regulated industries such as financial services, coercive pressures from accounting standards or regulatory bodies may result in conservative reporting of intangible assets, limiting the use of revaluation models (Scott, 2008). These firms often prioritise compliance over innovation in financial reporting. In contrast, innovative and less-regulated industries such as technology or media may experience strong mimetic pressures. Companies in these sectors often imitate successful peers, leading to higher valuations of intangible assets, as they seek to signal innovation and market leadership (DiMaggio et al., 1983). Professional norms and industry practices also play a significant role. For example, industries with a focus on intellectual property (e.g., pharmaceuticals) tend to recognise intangible assets more prominently because their value is inherently tied to patents and R&D investments. Normative pressures, such as those from industry

associations or professional bodies, encourage firms to align their practices with peers (Meyer & Rowan, 1977).

Institutional isomorphism explains how firms in the same industry adopt similar practices in response to shared pressures. Institutional isomorphism is a sociological theory that explains how and why organisations in the same field develop and influence each other. (DiMaggio et al., 1983). Coercive pressures from accounting standards like IFRS or local regulations drive uniformity in recognising and valuing intangible assets across industries. Mimetic behaviors lead firms in competitive industries to adopt valuation practices that align with market leaders, particularly when facing uncertainty. Normative influences from industry norms and professional networks result in conformity, with firms often adopting best practices shared among their peers (DiMaggio et al., 1983).

Institutional theory highlights that the legitimacy of intangible asset reporting is as critical as its economic rationale. Companies often align their reporting practices with institutional expectations to appear credible and compliant, even when those practices do not fully reflect the economic value of their intangible resources (Meyer et al., 1977). Variations in intangible asset reporting across industries may also reflect differences in institutional maturity. It is posited by Scott (2008) that emerging industries might lack well-established norms, leading to greater diversity in reporting practices, while mature industries with established regulatory frameworks might exhibit more homogeneity.

Institutional theory provides a powerful framework for understanding why industry-specific disparities exist in the valuation and reporting of intangible assets. In relation to the fourth objective, the institutional theory highlights how coercive, mimetic, and normative pressures shape industry practices, driving differences in how firms in diverse sectors report intangible asset values. By applying institutional theory, this study can reveal how external pressures influence the financial disclosures of JSE-listed companies and the broader implications for comparability and reliability in financial reporting.

### **3.3 Summary of the theories**

The following section provides a concise summary of the theories, models, and frameworks relevant to the area of research and applicable to the study. Table 1 provides a snapshot of the key models, theories, and frameworks that are applicable to each objective, including a short summary of the model/theory/framework.

**Table 1: Summary of theories and models**

Theories and models	Summary	Objectives
Positive Accounting Theory	Market value and intangible assets are typically addressed when deciding on accounting decisions, both on an opportunist and efficient basis. Traditionally, market value and intangible assets are linked to increased labour and capital investment.	SO1: To determine how intangible assets are measured and valued by JSE-listed companies in South Africa
Resource Based View	The Resource-Based View (RBV) is a strategic management theory that emphasises the importance of a firm's internal resources as key drivers of competitive advantage and long-term success.	SO2: To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies SO3: To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies SO4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in JSE-listed companies in South Africa
Stakeholder Theory	The stakeholder theory posits that organisations should create value not only for shareholders but also for a broad range of stakeholders, including employees, customers, suppliers, communities, regulators, and society at large.	SO3: To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies
Accounting Conceptual Framework	The accounting Conceptual Framework plays a critical role in determining how intangible assets are recognised, measured, and reported in financial statements. Its emphasis on relevance and reliability guides firms in choosing appropriate valuation models for intangible assets, ensuring that these resources are accurately reflected in financial statements.	SO1: To determine how intangible assets are measured and valued by JSE-listed companies in South Africa
Signaling Theory	Signaling theory explains how parties with more information (insiders) communicate valuable information to those with less information (outsiders) through signals.	SO2: To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies SO4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in JSE-listed companies in South Africa
Dynamic Capabilities Framework	The Dynamic Capabilities Framework emphasises a firm's ability to integrate, build, and reconfigure internal and external resources to respond to changing environments.	SO4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in JSE-listed companies in South Africa
Institutional Theory	The institutional theory examines how institutional environments, including norms, rules, and cultural-cognitive structures, influence organisational behavior and practices.	SO4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in JSE-listed companies in South Africa

Source: Self-generated

Table 1 summarises the link between the theories and models used in this study and how they relate to the objectives. Positive accounting theory investigates accounting issues using accounting

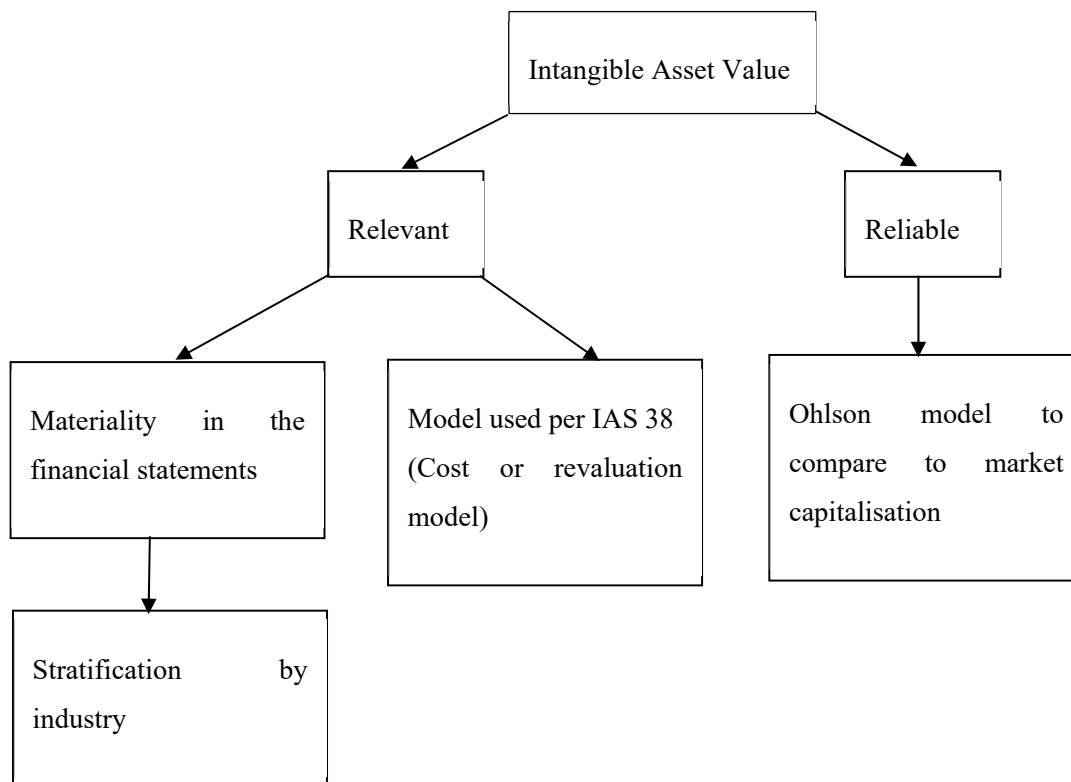
information to articulate and anticipate how accounting varies throughout the course of time. It has been related to determining how intangible assets are measured and valued by JSE-listed companies in South Africa. This objective was determined by investigating accounting issues using accounting information to measure intangible assets by JSE-listed companies in the study.

The resource-based view focuses on intangible assets that are not recognised in terms of accounting standards, such as intellectual property, human capital, and organisational processes, which are anticipated to contribute to a company's long-term success and value creation. The manner in which resources are used determines the competitive environment and how management businesses define the parameters of sector participation by using their resources similarly to those of their rivals. This is related to assessing the significance and impact of intangible assets on the total assets of South African JSE-listed companies.

### **3.4 Conceptual Framework**

The conceptual framework for this research explains the inter-relationships among research variables discovered through a review of the literature on intangible asset values in JSE-listed firms. Appropriate intangible assets give manufacturers a competitive advantage and increase JSE-listed firms' financial performance. By incorporating several characteristics and indicators, the conceptual model aims to illustrate the holistic snapshot of intangible assets in South African JSE-listed firms. The conceptual framework clarifies the connection among the variables in the research and helps to analyse how they influence one another.

Driven by the information that has been framed through the introduction, background, research problem, and literature review, Figure 4 has been generated to provide a breakdown of the topic and the pertinent drivers that are essential to position the study to adequately assess the topic and gain the necessary understanding to draw informed conclusions.



**Figure 4: Conceptual Framework of Study**

Source: Self-generated

The conceptual framework of this study is grounded in the Ohlson (1995) model, which provides a theoretical basis for examining the relevance and reliability of intangible asset valuations for JSE-listed companies. The model links firm market value to key accounting variables, including book value of equity and earnings, while incorporating additional explanatory factors such as intangible assets. By integrating this model, the study assesses the extent to which intangible assets contribute to firm valuation and financial decision-making, aligning with the broader objective of evaluating their significance and reliability in financial reporting.

The research is driven by the objective of assessing the significance of intangible assets relative to total assets in JSE-listed firms. Intangible assets, including goodwill and identifiable intangibles such as patents, trademarks, and software, have become increasingly important in financial reporting. However, concerns persist regarding their valuation reliability and impact on investor decision-making. The study examines these concerns by analysing the relationship between

intangible assets and market valuation while accounting for firm-specific characteristics such as industry classification, size, and financial performance.

The dependent variable in this study is the market value of equity, which serves as a proxy for firm value. Independent variables include the book value of equity, net income, and intangible assets, which are analysed to determine their relative contribution to firm valuation. Given that the study also explores the reliability of intangible asset valuations, it considers the impact of different valuation approaches, such as the cost and revaluation models permitted under IFRS, to assess how these influence financial reporting outcomes. Additionally, control variables such as firm size, leverage, and industry classification are incorporated to enhance the robustness of the analysis and account for potential variations in the valuation of intangible assets across different sectors.

The theoretical foundation of this study extends beyond the Ohlson model by incorporating signaling theory and value relevance theory. Signaling theory suggests that financial statements serve as a mechanism for firms to convey relevant information to investors, particularly regarding intangible assets, whose valuation is often subject to managerial discretion and investor interpretation. Value relevance theory supports the argument that financial information is useful when it influences investment decisions and is reflected in stock prices. These theoretical perspectives reinforce the study's approach in assessing the extent to which intangible assets provide decision-useful information to investors and whether their valuation methodologies impact perceived reliability and market reactions.

By integrating these theoretical perspectives, the study develops a comprehensive empirical model that examines the relationship between intangible assets and market valuation within the South African context. The alignment between the research objectives, theories, and variables ensures a structured approach to analysing intangible asset valuation, addressing gaps identified in previous literature while contributing new insights into financial reporting practices in emerging markets. The conceptual framework thus provides a coherent structure that guides the research process, ensuring that the study's empirical analysis effectively addresses the stated research objectives

while offering practical implications for firms, investors, and regulators in understanding the financial significance of intangible assets.

The conceptual framework for this study integrates theoretical foundations and methodological approaches to address the relevance and reliability of intangible asset valuations for JSE-listed companies. By leveraging theories such as the Accounting Conceptual Framework, Resource-Based View, Institutional Theory, and others, the framework provides a robust structure for examining how intangible assets are measured, valued, and reported. Each objective is underpinned by specific variables and analytical techniques, such as the Ohlson Model and ratio analyses, enabling a comprehensive evaluation of intangible asset significance across firms and industries. This framework not only facilitates the achievement of the study's objectives but also contributes to the broader understanding of intangible asset accounting in South Africa's corporate landscape.

### **3.5 Chapter Summary**

This chapter provides an overview of the theoretical and conceptual frameworks that guide this study on the relevance and reliability of intangible asset values for JSE-listed companies. The review integrates key accounting theories and models to build a foundation for the research objectives.

The accounting Conceptual Framework is explored as a fundamental theoretical basis, emphasising the concepts of relevance and reliability in financial reporting. It highlights the importance of these principles in valuing intangible assets and establishing their role in corporate financial statements. The Signaling Theory is examined to understand how firms use intangible asset disclosures to convey financial stability and growth potential to investors. This theory suggests that the choice of valuation method can signal management's confidence in the company's future performance. Positive Accounting Theory is discussed to explain the motivations behind firms' choices in applying cost or revaluation models for intangible asset valuation, suggesting that firms may select accounting methods that minimise political costs or reflect a favorable financial position. The Resource-Based View is introduced to highlight the strategic importance

of intangible assets as valuable resources that contribute to a firm's competitive advantage. This perspective frames intangible assets not only as financial metrics but as key drivers of corporate success. The Ohlson Model, used in the second objective, is detailed as a quantitative tool for linking accounting figures to market value, allowing the assessment of how intangible asset valuations reflect the true worth of a company in the eyes of the market. Institutional Theory is also incorporated, emphasising how external forces such as industry regulations, norms, and market pressures shape the valuation practices of intangible assets across different sectors. This theory provides insights into the role of institutional influences in creating disparities between industries in terms of intangible asset recognition and reporting. Finally, the Dynamic Capabilities Framework and its application to sectoral adaptability are briefly discussed to understand how firms in different industries may treat intangible assets differently based on the strategic capabilities they require to thrive.

The chapter concludes by presenting a conceptual framework that synthesises these theories and models, providing a clear structure for analysing the study's objectives. This framework guides the investigation of how intangible assets are measured, the reliability of valuation models, the significance of intangible assets in relation to total assets, and the disparities across industries. This review not only establishes the theoretical underpinnings for the study but also ensures that the research is grounded in established accounting principles, offering a comprehensive perspective on intangible asset accounting in South Africa.

## **CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY**

### **4.1 Introduction**

This chapter describes all the study's methods utilised in the present research that empirically examines the intangible asset values for JSE-listed companies in South Africa to assess the extent to which the values are relevant and reliable. The accomplishment of the research objectives is unquestionably dependent on the suitability of the research methods as articulated by conducting an appropriate determination of research philosophy, research procedure, research findings, research plan, study population, sample process, data collection techniques, data analysis, and the method employed in research completion. In order to solve this issue, the chapter opens with the selection of the research design and research philosophy, explaining the philosophical views, approaches to research, and procedures used. As discussed in Chapter 2, the review of existing literature indicates that there has been limited research regarding the relevance and reliability of intangible assets since the majority of the studies within this area have focused specifically on goodwill or intangible assets in countries that did not apply IFRS or prior to the latest updated IAS 38 standard. This study is based on the established Ohlson model using a quantitative approach, which is explained in the following sub-sections: Section 4.2 details the research paradigm that was employed within this study. Furthermore, Section 4.3 describes the research design, while Section 4.4 provides the data collection sources (such as published annual financial statements from JSE-listed companies) and procedures. Section 4.5 outlines the study population and sampling method. Section 4.6 details the data analysis and appropriate presentation of results. Section 4.7 addresses the validity, reliability, and trustworthiness of the data. Section 4.8 provides the ethical considerations necessary for the study, which is then followed by section 4.9 detailing the research map to be followed. Lastly, the chapter concludes in section 4.10.

### **4.2 Research Paradigm**

A key to understanding and interpreting the data in a meaningful manner is to determine the perspective and philosophy with which to approach the research. The research philosophy is considered to be an overarching framework and point of reference to guide the researcher's

approach to the study, which ultimately shapes their ontological, epistemological, and methodological perspectives. The dominant research paradigms that scholars commonly employ include positivism, interpretivism, critical realism, and pragmatism. These dominant research paradigms are discussed in the paragraphs below.

Positivism is rooted in the belief that knowledge is derived from the application of empirical observation and measurement with an emphasis on objectivity, quantification, and the use of deductive reasoning (Bryman, 2016). This paradigm seeks to uncover universal laws through rigorous data analysis, often employing statistical techniques to establish correlations and causal relationships. The emphasis for this paradigm is on replicability and generalisability, aiming to minimise subjective bias.

Conversely, interpretivism research philosophy, also known as constructivism or hermeneutics, holds the outlook that reality is socially constructed, and thus, any form of understanding is based on subjective interpretations of the results. The interpretivism philosophy places reliance on qualitative methods and, therefore, holds a preference to derive meaning from interactions with the research participants within the context of the study parameters (Denzin & Lincoln, 2011). The focus shifts from objective truth to exploring diverse perspectives and interpretations of lived experiences.

Critical realism offers a nuanced approach, lending itself more to a mixed methods evaluation of data encompassing elements of both quantitative and qualitative information. The application of a critical realism mindset has the aim of revealing underlying causal relationships, mechanisms, and structures that could influence observable phenomena with the acknowledgement that an objective reality exists but recognising that social and cognitive constructs will drive the understanding thereof (Aliamutu & Mkhize, 2024e). Critical realists strive to uncover underlying causal mechanisms and structures that may not be directly observable, employing mixed methods to gain a more comprehensive understanding of complex phenomena.

Pragmatists, in contrast, draw on information derived from quantitative or qualitative methods within the context of the research question that is to be investigated. The pragmatism approach places reliance on the practical consequences that arise from ideas and actions with a particular focus on what works in practical terms as opposed to the application of strict philosophical concepts (Creswell & Creswell, 2017). The emphasis is on finding workable solutions rather than adhering to strict philosophical tenets

Weygandt, Kimmel, and Kieso (2018) hold the view that quantitative analysis is an essential and preferred method in relation to evaluating financial information from a positivist perspective. This view is further held by Deegan (2013), who delves into the examination of how positivist doctrines, such as objectivity, empiricism, and hypothesis validation, serve as the foundation for quantitative research methodologies in the field of accounting, encompassing archival investigation and empirical scrutiny of financial information. A similar stance is taken by Nobes and Parker (2008), who scrutinises accounting methodologies and criteria through a positivist lens, highlighting the significance of empirical investigations and quantitative assessments in elucidating variations in accounting systems across nations. Stickney and Weil (2000) underscores the application of positivist methodologies, including statistical examination and financial simulation, in deciphering financial information and evaluating the fiscal viability of entities. The application of a positivist approach coupled with quantitative data analysis is underpinned by Watts et al. (1986), which has been a cornerstone for quantitatively analysing accounting information.

The above outline of the common research philosophies that exist provides some context and direction for the interpretation of data and results. For the purposes of this study, the researcher is considered to be a positivist by nature. The data that was analysed was quantitative in nature. The research objectives were determined, and the information derived from the data was used to achieve the objectives based on the output of the application of the research method. As such, the research was reliant upon quantitative information and statistical analysis in an effort to derive meaningful results. As such, a positivist research philosophy approach is considered to be the most appropriate given the quantitative data, the research methodology that was followed, and the intention of the research as detailed through the research questions.

The positivist approach is particularly suited to this study as it aims to produce objective, measurable results based on statistical analysis. For example, techniques such as regression analysis were employed to analyse the data, with the goal of uncovering generalisable patterns and relationships. As such, the positivist philosophy not only complements the research design but also enhances the ability to derive meaningful insights from the quantitative data.

### **4.3 Research Design**

The research design is considered to be a map or a plan to guide the collection, measurement, and analysis of information, created with the purpose of answering the identified research questions (Sekaran & Bougie, 2016). The research design is based on various factors to ascertain whether the study will be derived using a quantitative, qualitative, or mixed-methods approach (Aliamutu & Mkhize, 2024b). Once the method has been determined, the research objectives and questions can be formulated (Ritchie, Lewis, Nicholls, & Ormston, 2013). The research design is developed in such a manner to ensure that the research questions are answered unambiguously through an established structure (Vogt, Gardner, & Haeffele, 2012). From the definitions that have been provided, it follows that research is a planned activity with the intention of establishing new facts and information in relation to a particular phenomenon. The research process includes the identification of a specific problem or interest area, thereafter converting the problem into a research problem, collecting relevant data, and ultimately reporting on the results and findings of the research.

This research intended to conduct an empirical analysis of the relevance and reliability of intangible asset values for JSE-listed companies in South Africa. The data required to derive conclusions for the posed research questions are secondary, as the information was drawn from the annual financial statements of the selected companies as well as market capitalisation data from Bloomberg. The type of method used was a quantitative empirical analysis following a positivist approach.

The selection sample was considered to be quantitative in nature due to the ability to assign numerical values to the accounting policy selected for measurement by the management of the

company, as well as the determination of the allocated useful life as represented in the annual financial statements. The quantitative research design provides an appropriate structure and platform for the examination of factors and variables that impact the intangibles, as disclosed in the annual financial statements described by Creswell et al. (2017).

As derived from the theoretical, conceptual, and empirical literature reviews, the factors that influence the measurement of intangible assets include the useful life as determined by the management of the company in conjunction with the guidance provided by the accounting standards, any residual value that may be applicable in the event that a finite useful life is deemed to be appropriate and the measurement model that is applied to measure the intangible assets (Aliamutu & Mkhize, 2024d).

Quantitative research methodologies are esteemed for their dependability, particularly within the realm of financial analysis, as they prioritise uniformity, impartiality, and replicability. Employing standardised techniques such as ratio evaluation and statistical examination allows scholars to derive conclusions grounded in quantifiable evidence, thereby mitigating the potential for researcher bias (Saunders, Lewis, & Thornhill, 2019). These characteristics render quantitative studies especially apt for assessing the financial significance of intangible assets, which necessitates accurate and comparable data.

Through the use of quantitative data for the purposes of this study, various quantitative analysis techniques were utilised in the pursuit of achieving meaningful interpretations and conclusions as derived from the data. The data was collected at a point in time, and thus, cross-sectional data was employed for the purposes of this study. Cross-sectional data is defined by Gujarati and Porter (2009) as data that is collected at a point in time (which will be the identified data to be collected from the selected annual financial statements). Given that this study employed the use of quantitative data, it is crucial to understand the variety of quantitative analysis techniques that are available to perform an appropriate analysis of the data. The following are considered to be common methods applied when undertaking quantitative analysis:

- **Descriptive statistics:** Descriptive statistics are used as a data analysis tool when a researcher intends to summarise and describe the basic features evident from the data. Typical measures used through the application of descriptive statistics include the mean, median, mode, standard deviation, variance, and range (Trochim & Donnelly, 2010).
- **Inferential statistics:** Inferential statistics are applied in an effort to make inferences or predictions concerning a population on the basis of the analysis of the sample. This method of analysis typically includes techniques such as hypothesis testing, confidence intervals, and regression analysis (Field, 2013).
- **Correlation analysis:** A correlation analysis is performed with the objective of measuring the strength and direction of the relationship between two or more variables. A correlation analysis includes techniques such as the Pearson correlation coefficient, Spearman rank correlation coefficient, and Kendall's tau (Hair, Black, Babin, Anderson, Black, & Anderson, 2019).
- **Regression analysis:** Regression analysis is utilised in order to examine the relationship between a dependent variable and one or more independent variables. A regression analysis includes techniques such as linear regression, logistics regression, and multiple regression analysis (Gelman & Hill, 2006).
- **Analysis of variance (ANOVA):** An analysis of variance is used when the researcher intends to compare means across multiple groups or categories. Analysis of variance includes the employment of techniques such as one-way ANOVA, factorial ANOVA, and repeated measures ANOVA (Kirk, 2013).
- **Time series analysis:** A time series analysis may be utilised to analyse data that is collected over a period of time with the purpose of identifying patterns, trends, and seasonality. Time series analysis includes the use of techniques such as trend analysis, seasonal decomposition, and autoregressive integrated moving average modeling (Shumway, Stoffer, & Stoffer, 2000).
- **Factor analysis:** Factor analysis is useful in identifying underlying factors or dimensions that explain the patterns of correlations among a set of variables. Factor analysis includes the employment of techniques such as exploratory factor analysis and confirmatory factor analysis (Tabachnick & Fidell, 1983).

- Cluster analysis: A cluster analysis is performed in an effort to group similar observations or cases into clusters or segments based on a particular set of characteristics as defined by the research objective parameters. Cluster analysis includes techniques such as hierarchical clustering and k-means clustering (Everitt, Landau, Morven, & Stahl, 2011).
- Comparative analysis: Comparative analysis denotes the methodical examination of entities, groups, or variables to elucidate similarities, disparities, and trends, thereby facilitating comprehension and informed decision-making (Bryman, 2016).
- Financial ratio analysis: Financial ratio analysis is a methodical approach to evaluating a company's financial performance by analysing the relationships between various financial metrics derived from its financial statements (Bodie, Kane, & Marcus, 2018).

The evaluation of numerical data is critically essential for assessing the relevance and reliability of intangible assets held by firms on the JSE in South Africa. This methodology is predicated on the utilisation of numerical data, statistical techniques, and descriptive analysis to produce objective conclusions. This inquiry explores the assessment of intangible assets through the application of quantitative methods, including inferential statistics, comparative analysis, descriptive statistical analysis, and financial ratio analysis, highlighting their effect on total assets and how established valuation techniques (cost or revaluation model) shape financial reporting outcomes. The merits of quantitative analysis in financial research are particularly pronounced, as it allows for a rigorous, replicable, and systematic evaluation of extensive datasets, thereby enabling comparisons across various sectors, corporations, or temporal contexts (Bryman, 2016).

#### **4.4 Data and Data Sources**

A variety of quantitative analysis methods were engaged for the purposes of this study, including descriptive statistics, inferential statistics, financial ratio analysis and comparative analysis through the application of various different techniques. Table 2 summarises the variables, data types, and type of analysis related to each objective.

**Table 2: Description and Measurement of Variables**

<b>Objective</b>	<b>Data Variables</b>	<b>Type of data and method</b>	<b>Type of Analysis</b>
To determine how intangible assets are measured and valued by JSE-listed companies in South Africa	Presence of IA (goodwill, other IA or both)	Secondary, quantitative	Descriptive statistical analysis
	Measurement model (cost or revaluation model)	Secondary, quantitative	Descriptive statistical analysis
	Useful life (finite or indefinite)	Secondary, quantitative	Descriptive statistical analysis
To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies	Share price/market capitalisation	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	Net value of assets	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	Net income is represented by total comprehensive income in the financial statements.	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	Book-to-market residual is derived from the market capitalisation figure recorded by Bloomberg.	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	Total intangible assets	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	The book value of equity is derived from the total equity in the statement of	Secondary, quantitative	Ohlson model

	financial position in the financial statements.		Inferential statistical analysis Descriptive statistical analysis
	Net goodwill	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
	Other intangible asset value	Secondary, quantitative	Ohlson model Inferential statistical analysis Descriptive statistical analysis
To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies.	<ul style="list-style-type: none"> <li>Total intangible asset value</li> <li>Total asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis Descriptive statistical analysis Financial ratio analysis
	<ul style="list-style-type: none"> <li>Total intangible asset value</li> <li>Total non-current asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis Descriptive statistical analysis Financial ratio analysis
	<ul style="list-style-type: none"> <li>Other intangible asset value</li> <li>Total asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis Descriptive statistical analysis
	<ul style="list-style-type: none"> <li>Other intangible asset value</li> <li>Total non-current asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis Descriptive statistical analysis
	<ul style="list-style-type: none"> <li>Goodwill value</li> <li>Total asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis Descriptive statistical analysis
	<ul style="list-style-type: none"> <li>Goodwill value</li> <li>Total non-current asset value</li> </ul>	Secondary, quantitative	Inferential statistical analysis

			Descriptive statistical analysis
	<ul style="list-style-type: none"> <li>• Total intangible asset value</li> <li>• Other in tangible asset value</li> <li>• Goodwill value</li> </ul>	Secondary, quantitative	Descriptive statistical analysis
To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies	<ul style="list-style-type: none"> <li>• Total intangible asset value</li> <li>• Total asset value</li> <li>• Total non-current asset value</li> <li>• Other intangible asset value</li> <li>• Goodwill value</li> </ul>	Secondary, quantitative	Comparative analysis Descriptive statistical analysis

Source: Self-generated

The table above reflects each of the objectives as well as the relevant variables that were used for the analysis, including a description of the type of data that was utilised in order to adequately process the collected data.

#### 4.4.1 Data Collection

The data that was used for the purposes of this study was quantitative in nature and the data was extracted from the annual financial statements of each selected company from the sample for a period of five years. This archival approach allowed for the systematic extraction of key financial data points relevant to the research objectives. Specifically, the data collection process focused on several critical aspects of intangible asset recognition, measurement, and valuation.

First, Objective 1 addressed the presence or absence of recognised intangible assets for each company in each year. Subsequently, for those companies recognising intangible assets, the composition of these assets was analysed, differentiating between goodwill, other intangible assets, or a combination thereof, again contributing to the first objective. A crucial element of the data extraction process for Objective 1 involved determining the useful life categorisation of the identified intangible assets (both goodwill and other intangibles), distinguishing between finite and indefinite useful lives. Furthermore, to achieve Objective 1, the study obtained the

measurement model employed for these intangible assets (cost or revaluation model), providing further insight into their financial reporting treatment.

Beyond these qualitative classifications, the study also captured quantitative data, including the total value of intangible assets, the value of goodwill, and the value of other intangible assets. These data points are central to addressing Research Objectives 2, 3, and 4. Contextual financial metrics were also gathered, including total equity, total net income (both relevant to Objective 2), total assets, and total non-current assets (relevant to Objectives 2, 3, and 4). Further data that was collected, which is not featured in the annual financial statements, included the market capitalisation value for each selected company for the years 2015 to 2019 as derived from Bloomberg.

The proper use of data collection methods is designed to ensure that data is collected in a consistent and scientific manner. The systematic implementation of data collection techniques ensures the enhancement of accuracy, validity, and reliability of the research results and findings. The importance of accurately carrying out the data collection methods aims to achieve high-quality research with reliable results and findings. Secondary data for the purposes of this research was expected to be reliable due to the extensive testing of the underlying data sources and interrogation of the information validated by the auditors in line with the stringent parameters determined by the JSE.

Bloomberg or the direct company websites was the medium used to obtain financial information for the top 40 JSE-listed companies in South Africa after obtaining a list of the top 40 companies per market capitalisation as at 31 December 2019 (Appendix 1) from the Financial Times Stock Exchange (FTSE, 2019). Annual financial statements and related information collected from Bloomberg are secondary data. Secondary data allowed the researcher to monitor the sample of selected listed South African companies over five years, which provided the researcher with multiple observations on each company selected as part of the sample (Hsiao, 2014).

The research was based on historical secondary quantitative data as it required data analysis based on transactions that have occurred in the past and scrutinisation of information provided in the financial statements. The researcher used financial statements to calculate the relative value of intangible assets to other company assets and inspect policies employed to value the intangible assets as well as derived data necessary for the components of the Ohlson model.

The quantitative data was collected from Bloomberg and maintained in a Microsoft Excel spreadsheet (Appendix 2). The financial statements were collected from the individual company websites for data source triangulation as well as to obtain any additional/missing information. The steps as developed by Binh et al. (2020); Chander and Mehra (2011); Dahmash et al. (2009) were tailored to this research using empirical analysis as follows:

1. Obtained a listing of the top 40 JSE-listed companies in terms of market capitalisation as of 31 December 2019. (Appendix 1)
2. Obtained the data for each of the top 40 JSE-listed companies described in step 1 for 2015 to 2019.
3. Obtained the sets of financial statements for each of the top 40 JSE-listed companies described in step 1 for 2015 to 2019.
4. Inspected the financial statements obtained in step 2 and scrutinised the accounting policy applied to the valuation of the intangible assets (Appendix 2).
5. Performed data source triangulation to ensure the validity and correctness of the data as well as to complete any missing fields.
6. Evaluated the data obtained in step 4 and calculated the value of the intangible assets in relation to the non-current assets and the total assets of the company (Appendix 3). This established the magnitude/materiality/significance of the valuation of the intangible assets in relation to the company's other assets.
7. Tabulated the relevant information from steps 4 and 5, segregated by industry, to establish any companies' / industry trends in intangible assets valuation (Appendix 3).
8. Used the adapted Ohlson Model as per equation 3 to populate Appendix 4, 5, and 6 using SPSS and AMOS software.

9. Discussed findings from the research and developed a substantiated conclusion on the valuation basis used in measuring intangible assets.

The steps detailed above were tailored for the information relating to JSE-listed companies and for the purposes of the various objectives outlined in this study.

#### **4.4.2 Justification for the use of pre-pandemic data**

For ease of reference and to ensure the workability of the data, a Microsoft Excel spreadsheet was used to record and maintain the data for further analysis. The five-year window period was determined to be appropriate for the period 2015 to 2019, which was the most recent period prior to the COVID-19 pandemic. The rationalisation for using the period directly prior to the COVID-19 pandemic was to limit any effects from the pandemic in relation to the decisions made by the entity that may impact the annual financial statements abnormally. Campbell, Giglio, Polk, and Turley (2018) noted the value of pre-pandemic data in an effort to gain reliable results regarding patterns and trends. Baker, Bloom, Davis, and Terry (2020) also highlighted the importance of pre-pandemic data, particularly in analysing trends and information over a period of time.

Potential limitations arising from the use of historical financial data typically include changes in accounting standards. However, this limitation is mitigated in terms of IAS 38 for intangible assets, as the standard was last changed in 2014 for implementation in 2015. As such, there are no changes in the IAS 38 accounting standard for the period 2015 to 2019.

Another potential limitation includes the changing economic conditions, which may impact the results over the five-year period. During the interval spanning from 2015 to 2019, South Africa encountered a multitude of economic tribulations, encompassing volatile GDP growth, alterations in interest rates, inflationary pressures, and political instability (Taylor, 2022). It is plausible that these components influenced how effectively companies on the JSE operated, affecting the way their intangible assets were evaluated. In particular, the overarching economic conditions might have affected corporate strategies, investments in innovation, and revenue generation, thereby

complicating the generalisation of findings pertaining to the valuation of intangible assets across diverse temporal frameworks.

In the years 2017 and 2018, South Africa was subjected to economic downgrades, which adversely impacted investor confidence and the cost of capital. Such economic transitions could have directly influenced the reliability and pertinence of financial data, especially regarding the manner in which companies acknowledged and appraised their intangible assets (KPMG, 2018). In addition, the instability of South Africa's exchange rates might have consequences for global companies, altering the assessment of intangible assets, including trademarks, patents, and goodwill (Canton, 2021).

Although historical financial data from 2015 to 2019 provides significant insights into the trends and methodologies of companies listed on the JSE, it is imperative to recognise that economic fluctuations during this timeframe may restrict the generalisability of the outcomes. By acknowledging these constraints and enriching the analysis with broader contextual elements, the findings of the study can be interpreted with heightened caution, thereby rendering its conclusions more robust.

#### **4.4.3 Justification for a five-year period**

A five-year period is considered to be sufficient in an effort to provide a realistic and meaningful picture of the true reflection of events related to intangible assets. The application of a five-year window period for the assessment of financial statement measurement is supported by Lev and Sougiannis (1996), who investigated the capitalisation of research and development costs to intangible assets, whereby a strong correlation and association were evident between the capitalised research and development costs in conjunction with market capitalisation. There were further findings determined by Lev et al. (1996), which were corroborated by Fama and French (1995), who were able to establish that there was an under-reaction by investors to the capitalisation of the research and development costs, thereby resulting in an underpricing of the company's market valuation. Overall, the practice of capitalising research and development costs in line with the financial reporting standards was considered to be value relevant, as concluded by

Lev et al. (1996). Barth, Beaver, and Landsman (1998) echoed the use of a five-year window period with their study involving the book value of equity as a form of representation of the overall statement of financial position as well as net income as an overall representation of the statement of profit or loss and other comprehensive income.

Interestingly, the authors found that a five-year period was sufficient to determine that five years prior to bankruptcy, the coefficient of the book value increased in contrast to the net income, which was found to decrease, thereby determined to be in a less healthy financial position than is desirable. An economic approach was engaged by Gu et al. (2011), who took a keen interest in estimating the value of intangible assets that were not reflected in the statement of financial position. The authors found it appropriate to implement a five-year period to their investigation, which revealed that ventures in a number of intangible assets, including research and development, marketing, brand investment, and information technology, were considered to be key elements to provide a platform for the success of the company. Value was placed on expected future earnings, in particular for companies with a significant investment in intangible assets.

Given the articulation above regarding the literature available within the field of analysis involving annual financial statements, a five-year period was considered to be reasonable for the purposes of this study in the assessment of the intangible asset values as reflected on the statement of financial position coupled by the fact that there were no changes to the IAS 38 accounting standard during the period 2015 to 2019, noting that the last change to the accounting standard was in 2014.

#### **4.4.4 Justification for use of the top 40 JSE-listed companies**

By looking closely at the top 40 companies on the JSE ranked by market capitalisation, this study intended to scrutinise the most significant and influential enterprises in South Africa. These firms are generally characterised by superior financial reporting protocols and are presumed to possess intangible assets of sufficient significance to warrant comprehensive analysis (Saunders et al., 2019). Given their considerable contribution to the South African economy and representation across various sectors, the selected sample can be posited to provide a pertinent cross-section of diverse industries. The population included all the companies on the JSE as of 31 December 2019,

which amounts to 273 companies with a total market capitalisation of R17.3 trillion. The selection of the top 40 JSE-listed companies represents a market capitalisation of R11.3 trillion, which is approximately 65.32% of the total market capitalisation, and, thus, a suitable representation of the population.

The leading 40 companies on the JSE encompass a multitude of industries, including but not limited to mining, finance, retail, technology, and others. By ensuring a spectrum of sectoral representation, this study effectively captures a diverse array of business models and practices pertinent to intangible assets, thereby enhancing its relevance across various industrial landscapes. Saunders et al. (2019) noted that ensuring heterogeneity within a purposive sample can enhance its generalisability to a broader context.

Representativeness is attained within the framework of large, well-established corporations that are likely to employ methodologies for the valuation of intangible assets. As this study is centered on firms listed on the JSE, these entities are already subjected to rigorous financial reporting standards (such as IFRS), rendering them particularly suitable for the exploration of the research objectives. Bryman (2016) highlights that the concept of representativeness in business research ought to be closely aligned with the particular objectives and parameters of the investigation, especially when engaging with subgroups within extensive organisations.

Although the sample was derived from the South African JSE, the resultant findings may potentially be juxtaposed with analogous studies conducted on other stock exchanges or within different nations. This facilitates the augmentation of the study's relevance within a global framework and introduces a comparative element.

#### **4.4.5 Data required for each objective**

A structured approach to data analysis was employed to address each research objective. Appendix 2 provides a visual representation of the table that was used for the purposes of data extraction and collection from the selected sample of annual financial statements. From the data that was collected

from the selected sample of annual financial statements, the following was analysed in detail for each objective.

For Objective 1, which aimed to determine the measurement elements for intangible assets chosen by the companies, the research focused on the measurement models employed. After excluding companies without intangible assets, the analysis considered two distinct components: other intangibles and goodwill, both derived from the intangible asset note within the financial statements. For each of the components (intangible assets and goodwill), the examination focused on the useful life categorisation of the assets: finite or indefinite. These data were derived from the accounting policy note in the financial statements. Similarly, for each of the components (intangible assets and goodwill), an examination was made to identify the company measurement model (cost or revaluation), also from the asset accounting policy note in the financial statements.

Objective 2 investigated whether standard valuation techniques (cost or revaluation) provide a relevant and reliable estimate of intangible asset value. This involved examining the relationship between reported intangible asset values and company market value to assess potential under- or overvaluation. Furthermore, the relevance and reliability of intangible asset valuation were evaluated using the Ohlson model. The model's components were derived as follows: book value of equity from the statement of financial position; total intangible assets (including goodwill) from the intangible asset line item; net income from total comprehensive income; intangible assets (excluding goodwill) from the intangible asset note; and the book-to-market residual from Bloomberg's market capitalisation data. Correlations, patterns, and trends between these components were examined using unstandardised and standardised coefficients, T-statistics, P-values, and collinearity statistics (tolerance).

Objective 3 assessed the significance of intangible assets relative to total assets. This involved calculating financial ratios based on the 2015 and 2019 annual financial statements (again, excluding companies without intangible assets) to determine the significance, materiality, and proportion of intangibles within the overall asset structure. The calculated ratios included: total intangible assets/total assets; total intangible assets/total non-current assets; other intangible

assets/total assets; other intangible assets/total non-current assets; goodwill/total assets; and goodwill/total non-current assets. The proportion of intangible assets represented by other intangible assets and goodwill was also determined. Inferential statistical analysis, specifically regression analysis, was employed. Descriptive analysis was used to identify the highest and lowest investments in various forms of intangible assets, supplemented by company-specific articles and investor communications for richer context.

Finally, Objective 4 explored whether different industries exhibit varying degrees of value disparity in intangible asset values. This entailed a further analysis of the data from Objective 3, categorised by industry, to identify potential inter-industry differences in intangible asset valuation. The goal was to pinpoint industries with potentially more under- or overvalued intangible assets. Correlations, patterns, and trends were analysed across industries, and the findings were compared with results from studies on other international stock exchanges.

#### **4.4.6 Ohlson Model**

The Ohlson model (1995) provides a rigorous valuation framework in accounting and finance by linking firm value to fundamental financial statement variables. The Ohlson model expresses firm market value as a function of its book value of equity and abnormal earnings, incorporating other value-relevant information to capture factors influencing investor perceptions. The model's foundation in clean surplus accounting ensures that earnings and book values provide a comprehensive basis for valuation, making it particularly useful for assessing the relevance and reliability of intangible assets.

This study employed the Ohlson model to examine how intangible asset valuations influence the market value of JSE-listed firms. Specifically, it evaluates whether different valuation methods, such as the cost and revaluation models, produce value-relevant and reliable measures of intangible assets. By incorporating intangible assets into the Ohlson model's framework, the research determines their explanatory power in firm valuation relative to book value and earnings, thereby assessing their significance in investor decision-making.

The model is well-suited for this study as it directly addresses the relationship between accounting variables and market valuation, aligning with the research objective of evaluating the relevance and reliability of intangible asset values. Unlike purely descriptive approaches, the Ohlson model facilitates empirical analysis by quantifying how intangible asset values contribute to firm valuation. This enhances the study's methodological rigor and allows for statistical inference on the extent to which intangible asset valuations under IFRS are reflected in market prices. By applying this model, the research provides empirical evidence on whether the valuation techniques used for intangible assets in South Africa effectively convey useful information to investors, thereby strengthening the study's theoretical and practical contributions.

#### **4.5 Population and Sampling**

The act of undertaking research requires the ability to clearly describe the relevant population and to ensure that the sample selected is an accurate depiction of the entire study population (Casteel & Bridier, 2021). Sampling refers to the process involved in selecting a subset from a larger population with the purpose of ensuring that the selected sample is appropriately representative of the population as a whole. The population included all the companies listed on the JSE as at 31 December 2019, which amounted to 273 companies with a total market capitalisation of R17.3 trillion. The selection of the top 40 JSE-listed companies represented a market capitalisation of R11.3 trillion which is approximately 65.32% of the total market capitalisation and, thus, a suitable representation of the population.

For the purposes of this research, a combination of probability and non-probability sampling was considered to be suitable. Each aspect of the probability and non-probability components with reference to this study is discussed as follows. The probability sampling component involved stratified sampling. This method was employed through the ranking of the JSE-listed companies based on their market capitalisation values for the base year of 2019 to determine the more significant representation of the population based on the company size relative to the rest of the population. The purpose of ranking the companies in terms of the market capitalisation values was to gain a more statistically significant representation of the population as a whole. In terms of intangible assets, it is more likely for bigger companies to possess intangible assets within their

financial statements either through having purchased intangible assets, developed and appropriately capitalised research and development costs to an intangible asset, or alternatively engaged in the acquisition of another company thereby giving rise to goodwill. Larger companies are thus more likely to have intangible assets present in a meaningful contribution to their financial statements, lending themselves to more relevant data for the purposes of this study. The non-probability sampling component utilised a purposive sampling method, which was employed to include the companies that are representative of top performers, market leaders, and industry giants. This ensured that the sample was representative of a variety of industries as included in the overall population. The inclusion of a variety of industries ensured that the research objectives in terms of identifying patterns or trends within a particular industry and how this differs from results between other industries were appropriately addressed.

It must be mentioned that using non-probability sampling, which only targets the 40 leading companies on the JSE according to market capitalisation, might introduce some sampling bias. This methodology inherently favors larger enterprises with considerable market influence, which are more inclined to comply with established reporting standards, particularly with respect to the valuation and disclosure of intangible assets (Etikan, Musa, & Alkassim, 2016). Section 4.4.4 details the justification for the use of the top 40 JSE-listed companies per market capitalisation.

In order to alleviate such biases, this study recognised its constraints and organised the analysis to yield significant insights into the foremost firms that exert a substantial impact on the financial markets of South Africa. The focus on larger enterprises was congruent with the research objectives, as these organisations are more likely to possess and disclose extensive portfolios of intangible assets. Moreover, the stratification of the sample according to industry enhances the contextual comprehension of sector-specific variances, thereby ensuring that a range of perspectives was captured (Saunders et al., 2019).

The intentional emphasis on larger firms was both deliberate and warranted, given their economic importance and the increased likelihood of reporting substantial quantities of intangible assets attributable to their scale and operational scope. These organisations typically attract heightened

scrutiny from regulatory bodies, investors, and auditors, resulting in more thoroughly documented practices (Lev, 2003).

While the results might not be relevant to every entity listed on the JSE, the analysis delivered a crucial understanding of the behaviors of South Africa's economically influential firms. Larger firms play an instrumental role in influencing market dynamics and accounting methodologies, and comprehending their strategies for intangible asset valuation holds significant implications for regulators, investors, and standard-setting bodies (Barth, 2018). This context-specific emphasis ensured that the study meaningfully contributed to the discourse surrounding the measurement of intangible assets within the distinct economic framework of South Africa.

A combination of the probability and non-probability sampling methods achieved the desired sample with the appropriate characteristics to adequately address the research objectives for the purposes of this study. The research established the population to be defined as JSE-listed companies, with the sample defined by the sampling criteria. The sampling criteria included the following:

- The JSE-listed companies must have been in operation from 2015 to 2019 to avoid the effects of the COVID-19 pandemic.
- The JSE-listed companies must be similar in size and stature.
- The JSE-listed companies must have publicly available annual financial statements for the period 2015 to 2019.
- Exclusion of JSE-listed companies with a negative book value of equity.
- Exclusion of JSE-listed companies who did not hold other intangible assets for the duration of the period 2015 to 2019.

The JSE-listed companies that were selected to form part of the sample were derived from the top 40 listings according to market capitalisation value (Appendix 1) as of 31 December 2019 to ensure that the selection included companies that were similar in size and stature. The selected entities were determined to have been in operation from 2015 to 2019 through the acquisition of the annual

financial statements that were readily available through their individual websites. The same sample and data set (annual financial statements from company websites and market capitalisations from Bloomberg) were used for the purposes of the quantitative research applications. JSE-listed companies with a negative book value of equity were considered inappropriate for the purposes of the comparison to market capitalisation. It is imperative to recognise that the exclusion of companies devoid of intangible assets may constrain the generalisability of the findings to only those firms that disclose such assets. Nonetheless, this exclusion was warranted to concentrate the research on entities for which the valuation of intangible assets was both applicable and pertinent.

The Ohlson model, which was determined to be the most appropriate model to achieve the research objectives, requires market values of equity as an independent variable; thus, only listed companies were considered to form the study's population. The analysis of the top 40 companies listed on the JSE from 2015 to 2019 provided sufficient information on the largest companies in South Africa. Thus, it should reveal statistically significant data to draw adequate conclusions (Marx & Mohammadali-Haji, 2014). The period was selected to exclude any effects of the COVID-19 pandemic. The top 40 companies listed on the JSE were selected as these would represent a more significant proportion of the total value of those listed on the JSE and should be more statistically relevant. The selected companies were grouped per industry (Appendix 1). Forty companies x five-year window period = 200 annual financial reports targeted for examination. Both Dahmash et al. (2009) (Australia) and Eloff et al. (2015) (South Africa) used a similar analysis to arrive at the final sample used in their research on the relevance and reliability of intangible asset valuations as per Appendix 7.

#### **4.6 Data Analysis and presentation of results**

The examination and presentation of data concentrated on the model description and the tools utilised for data analysis. The importance of analysing and interpreting data obtained from research cannot be overstated, as it is crucial for addressing research objectives and questions (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2015). Kerlinger (1966) outlined three primary reasons for employing statistical analysis: summarising large volumes of data in a manageable and

understandable manner; facilitating the examination of populations and samples, and assisting in decision-making and enabling the formation of reliable conclusions.

While the previous segment discussed the methods of data collection, this section explores the statistical analysis to be utilised. Statistical tests employed in data analysis are widely classified into parametric and non-parametric tests. Kinnear and Gray (2009) and Siegel (1956) established that parametric tests are appropriate under the following conditions: error-free observations, equal variance across treatment populations, normally distributed scores within treatment populations, and variables measured on at least an interval scale.

Non-parametric tests hold equal significance as parametric tests. Siegel (1956) contends that behavioral scientists frequently work with data that does not meet the assumptions necessary for parametric tests, such as the requirement for interval-scale measurements that allow for meaningful interpretations. Non-parametric approaches are seen as not reliant on distribution assumptions as they do not assume a specific distribution of scores in the population. These techniques do not mandate data to be measured on an interval scale, nor do they necessitate fulfilling the stringent assumptions of parametric techniques, such as normality and homogeneity of variance. Given this context, non-parametric techniques were more fitting for this study as the collected data is less robust than interval-scale measurements. The size of the information influences the choice of statistical examinations. Non-parametric techniques are designed to bypass the stringent assumptions needed by parametric techniques. Berenson, Levine, Szabat, and Krehbiel (2012), as well as Siegel and Castellan (1988), underscore several advantages of non-parametric tests, including applicability to various data types, comparable effectiveness (and greater effectiveness when parametric assumptions are violated), ease of implementation (especially with small samples), fewer and less stringent assumptions, resolution of issues without testing population parameters, and potential cost-effectiveness through smaller sample sizes.

Based on the information mentioned above, non-parametric techniques were utilised in this study to facilitate statistical analysis. A thorough statistical analysis should encompass both descriptive and inferential analysis types (Gliner, Morgan, & Leech, 2011). The statistical techniques employed for scrutinising the data in this study are elaborated upon in the subsequent section.

#### **4.6.1 Descriptive Statistics**

The application of descriptive statistics refers to the conversion of raw data to organised data provided in a form that aids the interpretation of the descriptive information. The purpose of descriptive statistics is to provide a simplification of the sample and relevant measures. The descriptive statistics technique typically includes calculation of the mean, median, frequency distribution, percentage distributions, rank, skewness, kurtosis, and standard deviation in order to assist the researcher in describing the characteristics, average scores, and variability of the scores evident in the sample (Cronk, 2017). It is important to note that descriptive statistics do not provide a platform to conclude on the data that has been analysed nor to reach conclusions based on the relevant hypotheses; instead, descriptive statistical techniques provide a more straightforward way to describe the data (Maxwell, 2010). Descriptive statistics are a crucial tool because the presentation of raw data causes difficulty in obtaining clarity and perspective in relation to what the data reflects. Descriptive statistical techniques propel the researcher to present data in a manner that is considered to be meaningful, facilitating a simpler way to interpret and analyse the relevant data. This study engaged with descriptive statistical techniques (including means, medians, and standard deviation) to determine the relevance and reliability of the values presented as intangible assets in the financial statements of companies listed on the JSE.

#### **4.6.2 Model Description**

There are a variety of standard valuation methods used to derive an amount for intangible assets for companies. The standard valuation methods are included within IFRS 13, paragraph 62, which Thornton (2013) categorises as the market approach, the income approach, and the cost approach. The market approach involves comparing sales transactions of similar assets or applying market multiples. The income approach encompasses methods like the relief from royalty, the comparative income differential, the multi-period excess earnings, and the direct cash flow method. The cost approach includes the reproduction cost and replacement cost methods. The market approach, although extensively employed in the appraisal of tangible assets, encounters considerable obstacles when utilised for the valuation of intangible assets. This technique is contingent upon the existence of analogous market transactions to ascertain the fair value of an asset. Nevertheless, in the context of intangible assets, various factors contribute to the limited

effectiveness of this methodology, ultimately complicating the valuation process and potentially resulting in an incomplete comprehension of the associated challenges (IFRS, 2023b; Lev et al., 2003). Factors contributing to the restricted applicability of the market approach include the absence of active markets, the heterogeneity inherent in intangible assets, and the complexities involved in valuation.

The constrained applicability of the market approach underscores the broader difficulties in appraising intangible assets, particularly in instances where the cost and income methodologies also present significant limitations. The market approach has limited use in practice due to the unique nature of most intangible assets, rarely resulting in relevant data (Pastor, Glova, Lipták, & Kováč, 2017).

#### **4.6.3 Data Analysis Tools**

Data analysis was conducted using Microsoft Excel spreadsheets as well as SPSS. Data analysis was conducted in line with the objectives to be achieved through empirical analysis as follows:

##### **Objective 1: To determine how intangible assets are measured and valued by JSE-listed companies.**

The researcher downloaded the annual financial statements of selected South African listed companies for the period 2015 to 2019. The intangible assets accounting policies and related notes within the annual financial statements were thoroughly reviewed to determine the methods used to measure intangible assets. The information was organised using a Microsoft Excel Spreadsheet and presented in a table for comparison between the entities and analysis of any changes to the measuring method over the five-year period.

The results of the analysis were presented using measures of central tendency, such as the mean, median, and mode. These statistical tools were essential for summarising the data to provide a clear, concise overview of the measurement methods used for intangible assets across the selected companies over the five-year period. Employing the measures of central tendency allowed the researcher to identify patterns and trends in the data by highlighting the typical or most

representative values. For instance, the mean provided an overall average, capturing the general approach to intangible asset valuation among the companies. The median, as the middle value, was particularly useful in mitigating the influence of outliers or extreme values that might skew the results. The mode, representing the most frequently occurring measurement method, helped pinpoint the dominant practices within the sample.

**Objective 2: To evaluate the relevance and reliability of intangible asset valuation using standard valuation techniques (cost or revaluation model) for JSE-listed companies.**

To achieve this objective, the study utilised the Feltham and Ohlson (1995) valuation model. This is a robust and widely acknowledged tool for examining the relationship between accounting metrics and market valuations. Feltham et al. (1995) developed a model that satisfies each of the three components required and is a well-established tool used to analyse such data. The basic Feltham et al. (1995) valuation model is expressed as:

$$MVE_{it} = \delta_1 BVE_{it} + \delta_2 NI_{it} + \varepsilon_{it} \quad (1)$$

Where:

$MVE_{it}$  is the market value of the firm's equity, index for firms  $i$ , time  $t$ ;

$BVE_{it}$  is the current book value of equity, index for firms  $i$ , time  $t$ ;

$NI_{it}$  is net income, index for firms  $i$ , time  $t$ ;

$\varepsilon_{it}$  is the book-to-market residual, generally referred to as the error stochastic term.

**Explanation of Model Variables**

$MVE_{it}$  - The Market Value of Equity signifies the market capitalisation of entity  $i$  at time  $t$ , computed as the product of the number of outstanding shares and the prevailing share price. In the context of this investigation, MVE was pivotal in assessing the extent to which the market accurately represented the valuation of intangible assets. The Ohlson model posits that the market value ought to correspond with the intrinsic value derived from accounting metrics such as book value and earnings.

$BVE_{it}$  - The Book Value of Equity denotes the value of the firm's equity as reported in the financial statements, encompassing both tangible and intangible assets while deducting liabilities. For entity  $i$  at time  $t$ , it signifies the accounting valuation of the firm's net assets. BVE functions as a

foundational metric for equity valuation and offers insights into the effectiveness with which intangible assets are integrated into the financial statements. A divergence between BVE and MVE may suggest that intangible assets are either undervalued or overvalued within the accounting framework.

**NI<sub>it</sub>** - Net Income refers to the firm's profit following the deduction of all expenses, taxes, and costs, pertaining to firm *i* at time *t*. It signifies the earnings accessible to equity shareholders. NI serves as a surrogate for the firm's profitability and its capacity to generate prospective cash flows, both of which are critical for evaluating the value of intangible assets. Elevated net income in firms possessing substantial intangible assets (e.g., technology firms) may imply that these assets play a role in enhancing profitability and should be appropriately reflected in valuation.

**ε<sub>it</sub>** - The Book-to-Market Residual constitutes the residual component within the Ohlson model, encapsulating the disparity between the market value of equity (MVE) and the values derived from accounting (BVE and NI). It embodies factors that are not explicitly captured by the financial statements. For the purposes of this study, ε<sub>it</sub> held particular significance as it underscored the impact of unrecognised or undervalued intangible assets. A notable residual could signify inconsistencies attributable to elements such as brand equity, intellectual property, or goodwill, which may not be fully accounted for by existing accounting standards such as IAS 38.

The equation was adapted to focus on the accounting items of interest to this study (goodwill and identifiable intangible assets), which are both components of net operating assets and book value of the equity, as shown in Equation (2).

$$MVE_{it} = \delta_1 BVE_{it} + \delta_2 NI_{it} + \delta_3 TIA_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

Where:

**BVE<sub>it</sub>** is the book value of equity less total intangible assets (GW + ID), index for firms *i*, time *t*;

**NI<sub>it</sub>** is net income, index for firms *i*, time *t*;

**TIA<sub>it</sub>** is total identifiable intangible assets including goodwill, index for firms *i*, time *t*;

**μ<sub>i</sub>** is unobserved heterogeneity, and

**ε<sub>it</sub>** is the book-to-market residual

**BVExIA<sub>it</sub>**: The Book Value of Equity less Total Intangible Assets delineates the tangible book value of equity, which omits the valuation ramifications of intangible assets, such as goodwill and other identifiable intangible assets. This metric elucidates the financial performance and valuation predicated exclusively on tangible assets. Within this research scope, this division supported a review of how the addition or omission of intangible assets altered the book-to-market ratio and, subsequently, the integrity and importance of approaches used to value intangible assets for JSE-listed companies. Within the Ohlson framework, this element furnished the foundational or core financial stance of the firm, devoid of the potentially erratic influences exerted by intangible assets.

**NI<sub>it</sub>**: Net Income encapsulated the firm's profitability throughout the designated time frame, indexed for firm *i* and time *t*. Net income constitutes a pivotal element of the firm's financial performance and is employed within the Ohlson model to encapsulate the firm's capacity to yield returns from its operational activities. This is congruent with the objective of the study, which seeks to ascertain whether the valuation models (cost or revaluation) sufficiently mirror the relevance and reliability of intangible asset valuations. Within the framework of the Ohlson model, net income serves as a predictive measure of upcoming performance and functions as a variable in evaluating equity worth.

**TIA<sub>it</sub>**: Total Identifiable Intangible Assets (including goodwill) signified the aggregation of goodwill and other identifiable intangible assets for firm *i* at time *t*. Total identifiable intangible assets (TIA) are integral to the research as they constitute the foundation for assessing valuation methodologies, their reliability, and their material significance. In relation to the Ohlson model, incorporating TIA into the framework yields insights into the manner in which intangible assets affect market equity valuation and whether these valuations correspond with the relationships between book and market values.

**μ<sub>i</sub>**: Unobserved Heterogeneity encapsulates firm-specific determinants that remain constant over time yet elude direct observation, including management quality, strategic positioning, or industry-specific risks. Addressing unobserved heterogeneity is paramount in order to avert

omitted variable bias. For companies listed on the JSE, this may encompass regulatory variances, market structure, or governance practices that influence the valuation of intangible assets. Within the Ohlson model, this term guarantees that the model accommodates firm-level fixed effects that are not captured by the quantifiable variables.

$\varepsilon_{it}$ : Book-to-Market Residual represents the unexplained segment of the book-to-market ratio, capturing deviations that remain unaccounted for by the incorporated variables (e.g., BVExIA, NI, or TIA). The residual underscores inconsistencies in valuation that may stem from market perceptions, investor behavior, or model inaccuracies. Analysing this term can yield insights into the confines of prevailing valuation models and the necessity for industry-specific modifications. In the context of the Ohlson model, this constitutes the error term in the regression equation, encapsulating random variability and model imperfections.

Equation (2) highlighted that the current book value of an entity is a linear function of the components (goodwill and identifiable assets) required to be examined. Amir et al. (1996) also chose to adopt a disaggregated variation of Equation (1) that is consistent with Feltham et al. (1995) while avoiding multicollinearity by omitting net operating assets and the current book value of the entity from Equation (1) in favour of using the constituents of the book value of the entity (which includes net operating assets).

As shown in Equation (3) below, the method followed by Dahmash et al. (2009) was employed for this study. This method includes that followed by Amir et al. (1996) and a variation of the Feltham et al. (1995) valuation model, which separates from net operating assets the two components of intangible assets (goodwill and identifiable intangible assets), the focus of this study. Thus, Equation 3 was used for analysis purposes.

$$MVE_{it} = \alpha_1 + \alpha_2 BVExIA_{it} + \alpha_3 GW_{it} + \alpha_4 ID_{it} + \alpha_5 NI_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Where:

**BVExIA<sub>it</sub>** is the book value of equity less total intangible assets (GW + ID), index for firms i, time t;

**NI<sub>it</sub>** is net income, index for firms i, time t;

**GW<sub>it</sub>** is total net goodwill, index for firms i, time t;

**ID<sub>it</sub>** is identifiable intangible assets, index for firms i, time t;

**$\mu_i$**  is unobserved heterogeneity;

**$\varepsilon_{it}$**  is book-to-market residual;

**$\alpha_1$**  is a constant; and

**$\alpha_2$  to  $\alpha_6$**  are estimated regression coefficients

**GW<sub>it</sub>**: Total Net Goodwill signified the goodwill acknowledged by firm i at time t. Goodwill emerges from the amalgamation of businesses, encapsulating the premium paid above the fair value of net identifiable assets obtained. Goodwill frequently faces scrutiny due to its inherent subjectivity and the absence of direct quantification; however, it can profoundly influence the valuation of intangible assets for entities listed on the JSE. Analysing its contribution to the model facilitates an investigation into whether goodwill conveys pertinent and trustworthy information within valuation methodologies such as the cost or revaluation model. The inclusion of goodwill as a variable delineates its distinct influence on the market value of equity and assesses its function as an explanatory variable for the valuation of firms.

**ID<sub>it</sub>**: Identifiable Intangible Assets denote intangible assets that are either separable or originate from contractual/legal entitlements, thereby excluding goodwill. Illustrative instances include patents, trademarks, and software. Identifiable intangible assets are frequently characterised by quantifiable future economic benefits, rendering them essential for evaluating the reliability of intangible asset valuation within financial statements. Distinguishing this category from goodwill permits a more nuanced examination of intangible asset valuation across diverse models. By isolating identifiable intangible assets, the model is enabled to assess their particular contribution to equity valuation and their credibility as delineated in financial disclosures.

$\alpha_1$ : The Constant represents a fixed parameter that signifies the foundational level of the dependent variable when all independent variables are held at zero. Within this study, the constant furnishes a baseline valuation for entities listed on the JSE, while controlling for the inclusion or exclusion of intangible assets within financial disclosures. The constant embodies the intrinsic valuation level, independent of the specific elements comprising intangible assets, goodwill, and net income.

$\alpha_2$  to  $\alpha_6$ : The Estimated Regression Coefficients are coefficients derived through regression analysis that quantify the influence of each independent variable (e.g., GW, ID) on the dependent variable (e.g., market value of equity, MVE). These coefficients elucidate the intensity and directionality of the correlation between the components of intangible assets and equity valuation. Within the Ohlson model framework, these coefficients offer valuable insights into the extent to which individual accounting variables (such as goodwill and identifiable intangible assets) contribute to elucidating the market value of equity.

Refer to Appendix 4 for a table summarising the components required to calculate Equation 3 and the various sources of data. In line with the research paradigms followed by Nissim and Penman (2001) and Dahmash et al. (2009), the market capitalisation value used was three months after the reporting date to allow for a delay in reporting financial results and to better reflect the market response to the latest information provided in the annual financial statements.

Refer to Appendix 5 for a table reflecting a summary of the descriptive statistics that were generated for analysis, which includes the determination of the following using SPSS software for each of the components for Equation 3: Mean, Median, Standard deviation, Minimum, and Maximum values.

Classical regression analysis was employed, with the results summarised in Appendix 6. This table presents data generated by SPSS and AMOS software for each component of the Ohlson Model Equation 3, encompassing both unstandardised (Beta) and standardised coefficients. The regression was conducted to ascertain whether independent variable coefficients differed

significantly from zero and one. Critically, the Abnormal Operating Earnings (AOE) coefficient was tested solely against zero.

The assessment of intangible asset valuation reliability hinged on these coefficients. A coefficient not significantly different from one suggested reliable valuation, implying that the reported book value is a reasonable proxy for market value. Conversely, a coefficient significantly smaller or larger than one indicated unreliable valuation. It is imperative to acknowledge that interpreting a coefficient near one as definitive proof of reliable valuation risks oversimplifying the complexities of market dynamics. While such a value suggests alignment between reported and estimated values, this interpretation is potentially reductionist. To mitigate this, the analysis incorporated insights into industry-specific challenges and the broader South African economic context. This approach aimed to provide a more nuanced and comprehensive understanding of intangible asset valuation reliability.

Theoretically, under the assumption that all companies accurately recorded intangible assets at fair value, all independent variable coefficients should equal one. In this idealised scenario, the absence of AOE for the average company would result in a zero coefficient for this variable (Feltham et al., 1995). Appendix 6 additionally presents the T-statistics, significance levels, and collinearity statistics (tolerance) associated with each model component.

**Objective 3: To assess the significance of intangible assets in relation to the Total Assets of JSE-listed companies.**

For Objective 3, the study used the annual financial statements of 40 selected South African JSE-listed companies to collect data on various intangible assets, including goodwill, other intangible assets, total intangible assets, total non-current assets, and total assets. Inferential statistical analysis, specifically regression analysis, was applied to assess the significance of intangible assets in relation to total assets. The descriptive analysis helped identify the highest and lowest investments in different forms of intangible assets, with additional insights drawn from company-specific articles and investor communications to enrich the findings.

**Objective 4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies**

For Objective 4, the study segregated the results by industry, using the information in Appendix 1, to examine whether there are differences in intangible asset values across different industries. The analysis included identifying correlations, patterns, and trends within industries, and comparing these results with studies from other international stock exchanges to explore any industry-specific differences in intangible asset valuations.

**4.7 Validity and Reliability**

Bloomberg's information was deemed credible, given Bloomberg's excellent reputation as a research tool. The financial statements downloaded from the individual company websites were deemed credible and reliable. The financial statements were audited by a firm of Chartered Accountants, which included an audit report of the opinion determined after scrutiny of the financial data. According to Messick (1990), validity in the form of research follows the ethos that validity refers to the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretations. Furthermore, validity is applied to a specific purpose and is thus not valid for all purposes (Sireci, 2013). Validity within this study was achieved by using established research methods and an extensive sample size consistent with studies conducted in this field of study. The study's methodology was modeled on various renowned studies conducted in the intangible assets valuation field, with the comparisons of the conclusions being carefully scrutinised by the researcher, specifically for the South African environment.

Reliability is underpinned by the notion that the study and methods applied could be used by several researchers under stable conditions and yield consistent results. The reliability of the undertaking applied in the study should contribute to the study's validity and not oppose it (Messick, 1990). The use of 200 annual financial statements was targeted as per the sampling section proposed. The large number of financial statements that were examined warranted the use of coders to aid in the data collection for the study. The minimum requirement for each coder was to have a degree in financial accounting. They were briefed on the study and the existing literature

review to understand the objectives and tasks better. The researcher provided a comprehensive guideline to the coders to complete the task.

The researcher created the guidelines after undertaking the tasks for five companies, which the coders then analysed to ensure that they were competent in following the guidelines provided. Where the coders experience discrepancies/ambiguities/difficulties, the researcher would be provided with the information to interpret and analyse. The researcher tested a random selection of decoded information to ensure its accuracy. The reliability of the coder's work was required to be 90% or above to be deemed accurate; otherwise, the work conducted by the coder had to be re-performed. A target of 90% accuracy is considered acceptable and above the benchmark of 80%, which has been the basis for other researchers (MacPhail, Khoza, Abler, & Ranganathan, 2016; Stevens, Lyles, & Berke, 2014). This data was further triangulated by comparison to the data obtained from Bloomberg, and any missing data or discrepancies were investigated by the researcher to ensure accuracy and reliability.

The data that was used was secondary data, which was collected from the information contained within the company's annual financial statements. Due to the companies being listed on the JSE, they were legally required to publish their annual financial statements, thereby ensuring that the information was readily available. All the data, with the exception of the market capitalisation figure, was derived directly from the annual financial statements and Bloomberg due to the convenience of the readily available information, which was considered to be reliable given that they would be audited, thereby providing a level of comfort and assurance with regard to the figures and information presented therein. Assurance of the audit, as well as the fact that no adverse findings were encountered, was evidenced through the signed unqualified audit report at the front of the annual financial statements.

The annual financial statements, in particular for JSE-listed companies, were considered to be reliable given the rigorous testing and undertakings by the auditors to enable them to issue an unqualified opinion as required for JSE listing. Lennox and Pittman (2010) investigated the

credibility of annual financial statements, noting the enhanced reliability and quality of audited financial statements specifically.

#### **4.7.1 Limitations of the Ohlson model**

Despite the usefulness associated with the Ohlson model, there are some limitations that must be considered with reference to the findings from the research, including the following:

*Simplified Assumptions:* The model is dependent on simplifying assumptions, such as assuming a linear correlation between accounting metrics and equity value, a premise that may not always be valid in practical settings.

*Reliance on Accounting Data:* The Ohlson model predominantly relies on accounting-related metrics like profits and book value of equity, potentially disregarding other factors impacting value, such as non-accounting data or market sentiment.

*Lack of Consideration for Intangible Assets:* Intangible assets, like brand recognition or intellectual property, are frequently not completely accounted for in the Ohlson model, resulting in possible underestimation or distortion of a company's genuine value.

*Sensitivity to Model Inputs:* Minimal alterations in input metrics, such as growth projections or discount rates, can result in substantial variations in the model's estimations of worth, rendering it susceptible to assumptions and inputs.

*Market Efficiency Assumption:* The Ohlson model presupposes market efficiency, suggesting that market prices wholly embody all accessible information. Nevertheless, if markets are inefficient, the model's forecasts may deviate from actual market prices.

*Limited Applicability to Certain Industries:* The model might be less appropriate for sectors with distinct attributes or intricate business structures where conventional accounting indicators may not adequately encompass value determinants.

*Inherent Uncertainty:* Analogous to any valuation model, the Ohlson model is vulnerable to inherent uncertainty, particularly concerning forthcoming cash flows and growth rates, factors that can influence the precision of valuation approximations.

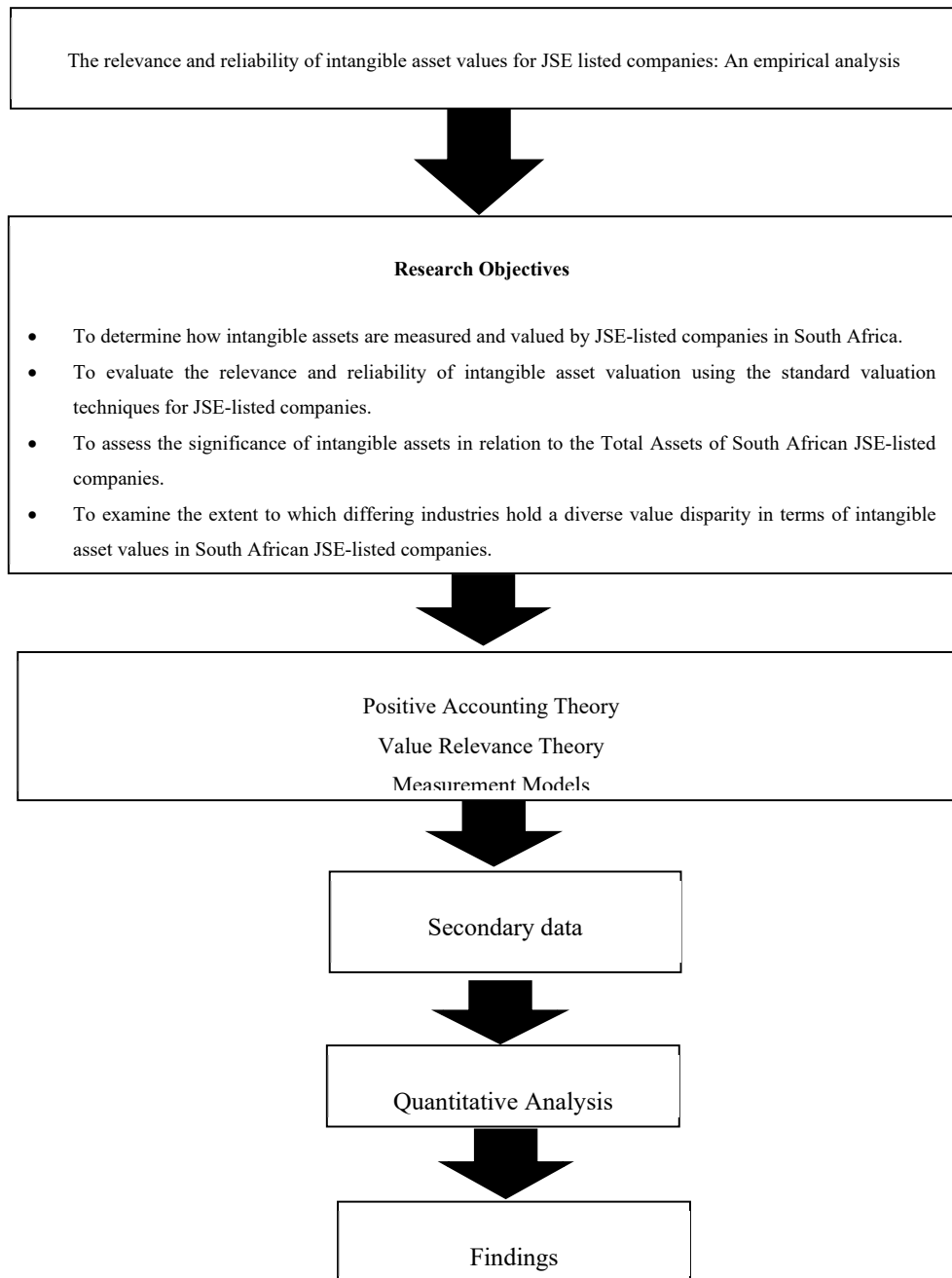
*Lack of Consideration for Market Dynamics:* The model does not explicitly incorporate market dynamics, such as investor sentiment or market bubbles, elements that can impact equity value autonomously of accounting metrics.

Given the above limitations relating to the Ohlson model, caution must be exercised when extrapolating the data over the population or concluding on the various outcomes. Generalisation of outputs may be limited given the shortcomings of the Ohlson model. Despite the limitations associated with the Ohlson model, the model was still considered to be the most appropriate method for the purpose of achieving the objectives of the study, as supported by Penman (2013), advocating for the usefulness of the information derived through the application of the Ohlson model despite its limitations.

#### **4.8 Ethical Considerations**

A completed ethical clearance application must be granted before engaging in the research procedure. Ethical clearance was required to collect secondary data (obtaining the financial statements data for the Top 40 JSE-listed companies in South Africa – Appendix 1). The researcher obtained the ethical clearance certificate from the University of KwaZulu-Natal. The collection of secondary data was considered to be low risk in terms of ethical considerations. There were no ethical issues regarding data retrieval and usage. The information contained in the annual financial statements of South Africa-listed companies is required to be publicly available.

## 4.9 Research map



**Figure 5: Research map diagram**

Source: Self-generated

A research map was provided above as a roadmap for the reader to follow the process intended by the researcher for the purposes of this study. Sanders (2008) noted the importance of using a research map within the context of the complex methods and areas involved in academic research with the aim of visually presenting the research to be undertaken in terms of the bigger picture. For this study, the title gives rise to the four research objectives to be satisfied, which feed into the relevant existing theories and literature that, through the collection of secondary data and the quantitative analysis thereof, the researcher expected to derive appropriate findings.

#### **4.10 Chapter Summary**

This chapter detailed the methodologies utilised in this study. The researcher applied a descriptive, inferential, financial ratio analysis and comparative analysis research framework to achieve its particular aims. The section commenced by outlining the established research paradigm. Moreover, positivism was selected as the epistemological stance for the study. The investigation constructed an empirical framework that was beneficial in assessing the importance and reliability of intangible assets as a whole (goodwill and other intangible assets) through a thorough evaluation of theoretical and empirical research. The sampling framework was developed using a list of the Top 40 JSE-listed companies in South Africa from 2015 to 2019. The sample size comprised 40 JSE-listed companies. The annual financial reports of these companies were acquired from the company websites by retrieving the published yearly financial reports in the public domain to compute financial ratios, establish correlations, stratify by industry, and process using the Ohlson model.

The secondary data for the variables originated from the extracted annual financial data of the chosen sample of companies, namely their statement of financial position, statement of profit or loss and other comprehensive income, and notes/policies to the annual financial statements. Data was scrutinised by employing descriptive statistics, specifically means, medians, and standard deviations, demonstrating the presence of intangible assets and their structure, the selection of measurement models, and the implementation of useful life over the years for all companies. The subsequent chapter provides the data results and analysis.

## **CHAPTER FIVE: DATA PRESENTATION AND ANALYSIS**

### **5.1 Introduction**

This segment delves into the thorough examination and critical analysis of the information acquired throughout the entire duration of the investigative process. The outcomes that emerged from the extensive exploration are intricately and systematically presented and deliberated upon in accordance with the objectives that were clearly illustrated at the outset of the study. Within the contents of this particular chapter, the results pertaining to the scrutiny of the primary aim and specific objectives are exhaustively expounded upon and elucidated with meticulous attention to detail. Moreover, in order to facilitate the elucidation and scrutiny of the amassed dataset, a variety of analytical tools, such as tables and other commonly utilised econometric methodologies encompassing descriptive statistics, inferential statistics, and correlation analysis, were effectively deployed. Furthermore, concise and informative explanatory discussions have been integrated alongside the tabulated data to facilitate a straightforward comprehension and to augment the overall clarity for the readership. The investigative process also incorporated the utilisation of the Ohlson model as a mechanism for assessing the relevance and reliability of the intangible assets under review. The subsequent section provides a comprehensive and in-depth analysis of the data presentation and interpretation, furnishing a holistic perspective into the complexities inherent in the findings and the potential implications that they may entail.

### **5.2 Data Presentation and Analysis**

Data was collected from the annual financial statements published by each of the selected sample of JSE-listed companies for the period 2015 to 2019 through the investor relations section from their respective websites for the purposes of extracting the information requisite for the variables under consideration. The research equally provided an analysis using a variety of techniques in order to offer a comprehensive overview and detailed analysis of the characteristics and properties inherent within the dataset. This analytical approach aids in capturing the essence and distribution of the data, enabling a deeper understanding and interpretation of the underlying patterns and trends present in the research findings.

The following table represents a roadmap for the analysis and interpretation of the data collected for the respective objectives of the study:

**Table 3: Study Roadmap**

<b>Objective</b>	<b>Type of Analysis</b>	<b>Output</b>
1. To determine how intangible assets are measured and valued by JSE-listed companies	Descriptive statistical analysis using ratios to determine the proportion of companies that use different measurement models.	Ratios
	Descriptive statistical analysis	Stratification of the above information in terms of industries to identify any patterns or trends that may emerge from the data analysis.
2. To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies	Ohlson model Inferential statistics (Components of the Ohlson model include Market capitalisation, book value of equity, Goodwill, intangible assets, and net income)	Mean, median, standard deviation, minimum, maximum, unstandardised coefficients, standardised coefficients, t statistic, p-value, and collinearity statistics tolerance.
3. To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies.	Descriptive statistical analysis Regression analysis (Analysing ratios between companies to assess the materiality of intangible assets)	Financial ratios
4. To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies.	Descriptive statistical analysis (Analysing ratios between industries to assess the materiality of intangible assets)	Stratification of the above information in terms of industries to identify any patterns or trends that may emerge from the data analysis.

Source: Self-generated

The roadmap presented in the table above fulfills the important function of offering a brief overview of the manner in which the data is intended to undergo processing, as well as the outcomes that are expected to be generated for every individual objective that has been identified.

This tabular representation plays a supportive role in shaping the overall framework within which the analysis and processing of the data will occur, presenting the information in a manner that is streamlined and easily comprehensible for the purpose of facilitating quick reference and promoting a deeper understanding of the subject matter at hand. The subsequent sections will present the results for each objective, followed by a discussion of the findings derived from these results. These findings will be analysed in light of the research questions and objectives, offering insights into the significance and implications of the results.

### **5.3: Objective 1: To determine how intangible assets are measured and valued by JSE-listed companies in South Africa**

Objective 1 was derived for the purpose of determining the choices made by the management of the selected sample of companies with reference to the measurement of their intangible assets. This held the purpose of ascertaining how intangible assets were measured in financial statements so that when the Ohlson model was employed, there was an understanding regarding what measurement models were used, and thus, informed insights regarding the results from the Ohlson model were able to be developed and discussed.

#### **5.3.1 Introduction**

In terms of the accounting standards, choices can be made between a finite useful life or an indefinite useful life, as well as the cost model or the revaluation model. The choices made regarding the measurement of intangible assets may be different for each of the two broad categories of intangible assets, including goodwill and other intangible assets. An analysis was performed on the choices made regarding the measurement options for goodwill and other intangible assets for the selected sample of companies in order to identify any correlations between the type of intangible asset as well as the choices made by the management of the companies. A further stratification of these results per industry was conducted to identify any trends.

### **5.3.2 Company Stratification Analysis**

The purpose of the first objective was to ascertain which intangible asset measurement technique (either the cost or revaluation model) is considered to be the most commonly used among the top JSE-listed companies. Furthermore, the analysis considered the factors used to measure the intangible assets of the selected JSE-listed companies, including whether a finite or indefinite useful life was applied in the measurement thereof. The researcher wished to determine whether there were any correlations between the measurement models chosen and the resulting selection of a useful life policy as well as to use the information derived as part of this objective to provide deeper insights for the objectives to follow by having a background knowledge of which measurement model is prominent when analysing the results from other objectives.

#### **5.3.2.1 Data Formulation**

The annual financial statements for each of the selected JSE-listed companies for the period 2015 to 2019 were obtained by downloading the relevant documents from the individual company's website. The following information was gathered through the inspection of each annual financial statement using an Excel spreadsheet:

- Company name
- Annual financial statement year
- The industry within which the company operates
- Whether the company held intangible assets in its statement of financial position
- Types of intangible assets (goodwill or other intangible assets) identified through inspection of the intangible asset note
- Method of measurement applied to the company's intangible asset (cost or revaluation model)

The data obtained in line with the research methodology were further analysed for the purposes of the relevant objective to derive appropriate analyses, findings, and conclusions.

### 5.3.2.2 Company Stratification Data Analysis

Through the initial inspection of the data collected in line with the research methodology, it was apparent that there was a clear distinction between the measurement policies applied to goodwill as opposed to all other categories of intangible assets. All other categories of intangible assets included software, brands, licenses, patents, trademarks, intellectual property, and research and development. An analysis was performed to determine the percentage of companies that measured goodwill by applying the cost model and the revaluation model, as well as whether a finite or an indefinite useful life is preferred. The same analysis was conducted for the other intangible asset categories to determine the percentage of companies that measured goodwill by applying the cost model or the revaluation models, as well as whether a finite or an indefinite useful life is preferred. The outcome of the above analysis is shown in Table 4 below.

**Table 4: Measurement basis applied for goodwill and other intangible assets**

<b>Intangible assets present</b>	<b>Yes</b>	<b>No</b>	<b>Undetermined</b>	
	77.5%	17.5%	5%	
<b>Goodwill</b>	<b>Cost model</b>	<b>Revaluation model</b>	<b>Undetermined</b>	<b>Not applicable</b>
	77.5%	0%	2.5%	20%
	<b>Finite useful life</b>	<b>Indefinite useful life</b>	<b>Undetermined</b>	<b>Not applicable</b>
	0%	77.5%	2.5%	20%
<b>Other intangible assets</b>	<b>Cost model</b>	<b>Revaluation model</b>	<b>Undetermined</b>	<b>Not applicable</b>
	77.5%	0%	0%	22.5%
	<b>Finite useful life</b>	<b>Indefinite useful life</b>	<b>Undetermined</b>	<b>Not applicable</b>
	77.5%	0%	0%	22.5%

Source: Self-generated

Table 4 shows that a majority (77.5%) of the top 40 JSE-listed companies reflect intangible assets as a category of non-current assets as per their statement of financial position. Companies who did not have intangible assets (17.5%) were classified as “no” under the section and companies who did not have intangible assets for the full duration of the period 2015 to 2019 were classified as undetermined (5%). In addition, 22.5% of the companies either did not have other intangible assets

or did not have other intangible assets for the duration of the 2015 to 2019 period, which is consistent with the data for the other intangible assets rows.

Goodwill resulted in all companies who held goodwill (77.5%) opting to apply the cost model (77.5%) and an indefinite useful life (77.5%). As such, a positive correlation between the cost model and the determination of an indefinite useful life is observed as being the preferred selection for goodwill, which is consistent with the prohibitions illustrated in IAS 38. As per IAS 38, the revaluation model is prohibited for goodwill due to the lack of an active market for it, making it impossible to reliably measure it at fair value. The cost model, on the other hand, requires goodwill to be measured at cost less any accumulated impairment losses, which aligns with the treatment of goodwill as having an indefinite useful life. Additionally, under this model, any increases in the value of goodwill are prohibited, reinforcing the requirement for conservatism and the focus on impairment rather than potential appreciation in value. It is noteworthy to include the fact that 77.5% of the top 40 JSE-listed companies (as per market capitalisation), had goodwill, inferring that all these companies had purchased other companies in the past. The existence of goodwill signifies previous business combinations, emphasising a strategic orientation towards external growth through the acquisition of other companies instead of relying solely on organic growth. For companies listed on the JSE, this phenomenon reflects the prevailing economic conditions and competitive dynamics both within South Africa and on a global scale. Elevated levels of goodwill frequently suggest that firms are utilising acquisitions to achieve synergies, enhance market share, obtain technological advancements, or gain access to essential intangible assets such as brand equity or customer databases.

The significance of goodwill is corroborated by the research conducted by Lev et al. (2016), which indicates that mergers and acquisition (M&A) activities are particularly prevalent in sectors characterised by high intangible value. Furthermore, Barth, Clement, Foster, and Kasznik (1998) assert that goodwill frequently constitutes a substantial portion of intangible assets in sectors where firms are compelled to secure competitive advantages through acquisition strategies.

The existence of goodwill implies that the leading companies on the JSE top 40 likely adopted growth strategies that are heavily reliant on acquisitions. Sectors such as technology, pharmaceuticals, and consumer goods typically engage in acquisition activities to secure intellectual property, patents, or brand assets (Lev & Daum, 2004). Certain sectors represented among the JSE top 40 companies, including mining and financial services, may display elevated levels of goodwill attributable to high-value acquisitions of subsidiaries or operations in international markets. Goodwill embodies the premium paid for assets such as mineral rights, customer bases, or access to regional markets.

The result substantiates the assertion that a majority of the top 40 JSE-listed companies engaged in acquisition activities either prior to or during the sampling period (2015–2019). This observation reflects broader trends within the South African economic landscape, where firms endeavour to diversify their revenue streams, expand their regional influence, or adapt to challenges posed by a constrained domestic market. Research has also demonstrated that acquisitions serve as a vital mechanism for entering new markets and sectors both within South Africa and internationally (Wilson & Vencatachellum, 2020).

In contrast, a strong positive correlation between the cost model and a finite useful life is observed as being the preferred selection for other intangible assets. The strong correlation between the selection of the cost model and a finite useful life for other intangible assets is evidenced by the fact that all companies that held other intangible assets (77.5%) selected the cost model (77.5%) as well as applying a finite useful life (77.5%). Approximately 77.5% of the leading JSE-listed enterprises exhibit a tendency to adopt the cost model with a limited useful life for assessing intangible assets, a selection driven by practical factors, compliance with accounting standards, and the trustworthiness of valuation methods. The cost model, as detailed in IAS 38, necessitates that intangible assets be evaluated at cost less accumulated amortisation and impairment losses. This methodology is deemed less complex than the revaluation model, which entails periodic assessments of fair value. For JSE-listed companies, particularly those functioning across various sectors, the cost model mitigates complexity and reduces resource requirements. The cost model offers a coherent framework for financial reporting, particularly for assets with finite useful lives,

where amortisation schedules are typically predictable and straightforward to compute (IFRS, 2023b). This model obviates the necessity for frequent revaluations, which can incur substantial costs and demand considerable time (Kabir & Rahman, 2016).

IAS 38 allows for the application of either the cost model or the revaluation model for intangible assets; however, the revaluation model is only applicable in instances where an active market for the intangible asset is present. Nevertheless, for a significant number of intangible assets, the presence of active markets is unavailable, rendering the revaluation model impractical or inapplicable. The absence of observable market prices complicates the reliable measurement of fair value for companies, compelling them to revert to the cost model (IFRS, 2023b). Firms possessing intangible assets that are highly specialised or specific to certain industries frequently find the finite life cost model to be more congruent with the principle of reliability in financial reporting (Lev et al., 2016). The cost model yields more dependable and consistent valuations for intangible assets in contrast to the revaluation model, which may induce volatility in financial statements.

The cost model diminishes the likelihood of misstatements or impairments resulting from inflated fair values, thereby ensuring alignment with the principle of prudence (Barth et al., 2008). For intangible assets possessing finite useful lives, the cost model is well-aligned with the framework governing amortisation and impairment evaluations. Impairment evaluations under the cost model guarantee that the carrying amount does not exceed the recoverable amount, thus providing a balance between conservatism and precision in financial reporting. The cost model eliminates the necessity for regular fair value evaluations, which can be costly and necessitate the involvement of external valuers or appraisers. For organisations with a multitude of intangible assets, the administrative challenges associated with the implementation of the revaluation model outweigh its prospective advantages (Kabir et al., 2016). Consequently, the cost model emerges as a more economically viable and appealing option for firms aiming to enhance their financial reporting processes, as can be seen by the data where all companies who have intangible assets have opted for the use of the cost model over the revaluation model.

The inclination towards the cost model among JSE-listed corporations signifies a reconciliation of practicality, compliance, and reliability within the sphere of financial reporting. Although the cost model may not completely encapsulate the fair value of intangible assets, its straightforwardness and congruence with established accounting standards render it the prevalent selection in South Africa.

A study by Ross (2020) highlighted an increase in the prevalence of intangible assets and how the value composition and magnitude of intangible assets have increased over time, showing a significant presence, particularly for technology and pharmaceutical companies. The author further noted that due to the specifics required by the accounting standard for intangible assets, a value of approximately 34% of the total worth of publicly-traded entities is not recognised in the annual financial statements. Ross (2020) underscores the significance of intangible assets like brand value, intellectual property, and customer relationships, pointing out that while tangible assets such as property and equipment can be quantified, intangible assets are frequently disregarded or underestimated. This viewpoint emphasises the crucial role that intangible assets play in enhancing company value, particularly in sectors like technology and healthcare, where innovation and intellectual property rights are paramount. The article sheds light on how intangible assets can represent a significant proportion of a company's total worth, demonstrating how crucial they are in today's economy. It stresses the imperative for investors and stakeholders to acknowledge and comprehend the impact of intangible assets on company performance and valuation in order to make informed decisions.

Given the fact that those companies, as per the selected sample, all chose the same measurement methods for the two categories of intangible assets (goodwill and other intangible assets), there appears to be no bearing in relation to which industry the company is operating in as an influential factor for the determination of the appropriate measurement model. The results of the data infer that there is a preference in selecting the cost model for goodwill, which has a positive correlation with the implementation of an indefinite useful life. Moreover, there is a preference for selecting the cost model for other intangible assets, which has a positive correlation with the implementation of a finite useful life. The results reveal that, typically, companies apply the cost model when

determining the measurement model for goodwill, in line with the strict rules per IFRS. It must be noted that there does not seem to be much choice available for goodwill given that there are strict accounting standards associated with goodwill, including that goodwill cannot be allocated a finite useful life and thus is unable to be amortised. Furthermore, the accounting standards stipulate that goodwill can never be revalued upwards but can only be written down to a lower value in the form of an impairment loss. This leaves little option when it comes to the selection of intangible asset accounting policies for goodwill. Despite the limitations associated with the measurement model options for goodwill, there are no limitations present for the choices available relating to other intangible assets. However, the data revealed that the selected sample of companies still opted to apply a cost model approach coupled with a finite useful life to amortise the intangible assets over their expected useful life.

The preliminary findings indicated a tendency towards opting for the cost model coupled with a determinate useful life, as opposed to the revaluation model in conjunction with an indeterminate useful life in the context of measuring intangible assets. The subsequent paragraphs offer a comprehensive understanding of the possible rationale behind the selection of measurement methodologies by firms operating in environments where accounting standards allow for such discretion.

First, the selection of the cost model over the revaluation model is considered to be due to the support for the concept of conservatism and being prudent in accounting, particularly in selecting the cost model. The cost model, per Dechow and Dichev (2002), adheres closely to the fundamental principle of conservatism by emphasising the importance of not overstating assets. Through valuing intangible assets using historical cost, companies can reduce the risk of potential overvaluation that may arise when using the revaluation model, which involves measuring assets at their current fair value. Francis, LaFond, Olsson, and Schipper (2004) underscore the significance of applying the conservatism principle in accounting practices to ensure the reliability and transparency of financial reporting.

Another potential reason for the selection of the cost model over the revaluation model in measuring intangible assets is with reference to the stability in financial reporting. Stability within the context of financial reporting is considered to be a crucial aspect when dealing with intangible assets since they often lack an active market, posing challenges in accurately determining their fair value, as illustrated by Beaver (1998). Kieso, Weygandt, and Warfield (2016) note that the revaluation model necessitates periodic fair values based on market fluctuations to reflect the true value of these assets. This practice can introduce volatility in financial statements due to the inherent uncertainty in market conditions. Conversely, the cost model gives a sense of stability by recording intangible assets at their original cost, regardless of any changes in the market environment, presenting a more conservative approach to asset valuation.

Moreover, the revaluation model, while theoretically appealing, demands regular and costly appraisals to ascertain the fair value of intangible assets. This process is not only time-consuming but also intricate and susceptible to management biases, which could potentially distort financial reporting accuracy, as emphasised by Penman (2013). In comparison, the cost model emerges as a more practical alternative for many companies, as it is more straightforward and requires fewer resources, thus making it a feasible option for organisations looking to streamline their financial reporting processes effectively. The simplicity and efficiency of the cost model make it an attractive choice for businesses seeking a pragmatic approach to valuing their intangible assets, ensuring that financial statements reflect a more stable and reliable representation of the company's financial position.

Another possible reason for the choice of the cost model as opposed to the revaluation model to value intangible assets by the companies is the lack of an active market for intangible assets. The absence of sufficient market data poses a significant obstacle when assessing the fair value of intangible assets that lack an active or comprehensive market. This challenge is especially evident within the framework of the revaluation model, where the valuation process can be intricate and uncertain because of the restricted availability of relevant market information. Therefore, in scenarios where market data is scarce or ambiguous, the cost model emerges as a dependable and

unbiased alternative for determining the value of such assets, primarily due to its emphasis on the historical cost incurred in acquiring and developing these intangible resources (Lev et al., 2016).

Intangible assets, unlike tangible ones such as property, plant, and equipment, often lack active and liquid markets, making it problematic to determine their fair value accurately using market-based methods. The lack of observable market transactions for intangible assets poses a significant challenge in ascertaining their fair value (Barth et al., 2008). When it comes to employing the revaluation model, companies may encounter difficulties in acquiring pertinent and trustworthy market data to substantiate the fair value measurement requirement. This issue can be particularly conspicuous for specific categories of intangible assets, like internally generated goodwill or brand value, which possess distinct attributes and do not have comparable market transactions (King et al., 2023).

Furthermore, the process of estimating the fair value of intangible assets involves a notable level of subjectivity, leading to increased uncertainty and intricacy in financial reporting under the revaluation model. This subjectivity stems from various factors, including the reliance on managerial judgment, the utilisation of valuation models, and the inclusion of assumptions regarding future cash flows and discount rates.

Given these obstacles, it is reasonable for organisations to choose the cost model as it offers a more straightforward and objective approach to measurement by recording intangible assets at their historical cost. Although this method may result in assets being undervalued in comparison to their current economic worth, it establishes a conservative basis for financial reporting and diminishes the likelihood of overestimation.

### **5.3.3 Industry Stratification Data Analysis**

Through the initial examination of the data gathered in accordance with the prescribed research methodology, it became evident that the majority of industries possessed both goodwill and other

forms of intangible assets. The findings of the analyses are briefly presented in tabular format on the following page, encapsulating the outcomes of the evaluation process.

A brief introduction to each of the industry sectors of the JSE firms included in the sample is provided. The banking sector on the JSE includes firms that provide financial services such as commercial banking, investment banking, and wealth management. South Africa's mining industry is a cornerstone of its economy, historically built on gold and diamond extraction. The pharmaceutical sector focuses on the development, manufacturing, and distribution of medicinal products and healthcare goods. The general industrials category encompasses manufacturing, engineering, and diversified industrial services. The tobacco sector comprises companies involved in the production and distribution of cigarettes and related products. The logistics sector deals with the transportation, warehousing, and supply chain management of goods. The real estate sector includes firms that develop, own, and manage properties ranging from commercial and retail spaces to residential complexes.

The forestry and paper sector involves the production and distribution of paper, pulp, and wood products. Retail companies listed on the JSE include firms operating in food, clothing, and household goods. The technology sector comprises companies offering software, hardware, and IT services. The insurance sector provides life insurance, health insurance, and short-term cover. The financial services sector includes asset management, private equity, and financial advisory services. The personal goods industry includes companies producing cosmetics, clothing, and luxury goods. The food producer industry comprises companies involved in food processing, packaging, and distribution. After removing the 2 companies that did not have intangible assets for the full duration of the period 2015 to 2019, the following table was generated:

**Table 5: Industry stratification illustrating the presence of intangible assets**

Industry	No. of Co's on JSE	Has IA	Does not have IA	Has goodwill	Does not have goodwill	Has other IA	Does not have other IA
Banking	5	100%	0%	100%	0%	100%	0%
Mining	7	71%	29%	43%	57%	71%	29%
Pharmaceutical	2	100%	0%	100%	0%	100%	0%
General industrials	1	100%	0%	100%	0%	100%	0%
Tobacco	1	100%	0%	100%	0%	100%	0%
Logistics	1	100%	0%	100%	0%	100%	0%
Real estate	3	67%	33%	67%	33%	33%	67%
Forestry and paper	2	33%	33%	50%	50%	50%	50%
Retail	4	100%	0%	100%	0%	100%	0%
Technology	4	100%	0%	100%	0%	100%	0%
Insurance	3	67%	33%	67%	33%	67%	33%
Financial services	3	33%	67%	33%	67%	33%	67%
Personal goods	1	100%	0%	100%	0%	100%	0%
Food producer	1	100%	0%	100%	0%	100%	0%
<b>Average</b>		<b>85%</b>	<b>15%</b>	<b>83%</b>	<b>17%</b>	<b>82%</b>	<b>18%</b>

Source: Self-generated

Table 5 shows that a majority (85%) of the industries included in the selected sample reflect intangible assets as a category of non-current assets as per their statement of financial position. On average, an analysis of the data reveals that 85% of the selected sample of companies have some form of intangible assets (goodwill or other intangible assets or both) present in their annual financial statements, as opposed to 15% having no intangible assets included in their financial statements. Most companies that held intangible assets in their financials held goodwill (83%) as one of the forms of intangible assets, with few who reported evidence of intangible assets not holding goodwill but only other intangible assets. More companies that presented intangible assets in their financial statements held goodwill (83%) as opposed to other intangible assets (82%). Conversely, 17% of the companies from the selected sample did not hold goodwill as a form of intangible assets (15% held no intangible assets at all). In comparison, 18% did not hold other

intangible assets as a form of intangible assets (15% held no intangible assets at all). Of the selected sample of top JSE-listed companies, the following industries all had some form of intangible assets in their statement of financial position for their particular industry: banking, pharmaceutical, general industrials, tobacco, logistics, retail, technology, personal goods, and food producers. It is interesting to note that there was no industry where no company held any form of intangible assets, despite financial services being revealed as one of the industries with the lowest uptake in terms of intangible assets.

A majority of the industries evidenced by the examination of the selected sample have intangible assets within their annual financial statements, with many possessing both goodwill and other intangible assets as the overall composition of their intangible asset balance. From the data derived from the selected sample, it appears that most industries hold intangible assets within their financial portfolio, with the exception of the financial services industry, where the majority do not possess any intangible assets. Most industries included in the selected sample size have some form of goodwill included within their intangible assets balance for inclusion in the statement of financial position. A similar trend was noticed with reference to the other intangible assets, which can include licenses, patents, etc., whereby most of the industries displayed evidence of some form of other intangible assets present to contribute to the total intangible asset balance when coupled with goodwill. Many companies within the industries tend to have both goodwill and other intangible assets present in their annual financial statements.

The study by Lev (2003) offers a thorough exploration of intangible assets, encompassing their supervision, quantification, and disclosure methods. Within his work, Lev (2003) delves into the sector-specific elements that impact the assessment and handling of intangible assets, underscoring those industries that appear to have a higher reliance and inclusion on intangible assets, such as fields like technology, pharmaceuticals, and financial services. The findings of this study are congruent with those of Lev (2003) with respect to the inclusion of intangible assets by the technological and pharmaceutical industries. However, the studies differ in terms of the assessment relating to the financial services industry, whereby the study by Lev (2003) found that the financial services industry was IA-intensive, whereas this study found the contrary to be the case.

Uz Zaman, Hassan, Arshad, Sultan, and Ashraf (2020) found that financial institutions predominantly handle tangible assets and financial instruments, with cash reserves, securities, and physical infrastructure being the primary components of their asset portfolio, which are easily observable and quantifiable. This stands in stark contrast to industries where intangible assets such as intellectual property or brand value hold a more significant role in their overall asset structure, as emphasised by Uz Zaman et al. (2020). The regulatory framework in the financial sector is characterised by strict standards that prioritise stability and transparency in financial reporting. Regulatory bodies enforce compliance requirements that necessitate clear valuation and disclosure standards, guiding financial institutions towards tangible assets that adhere to well-defined reporting frameworks, as highlighted by Bromwich and Scapens (2016). Risk management is a central focus for financial firms, with an emphasis on managing financial risks like credit, market, and liquidity risks rather than intangible risks. This risk-centric approach influences investment decisions towards tangible assets perceived to have lower risk profiles, as illustrated by Barth et al. (2001a).

The primary business model of financial institutions centers on offering financial services such as borrowing, wealth management, and coverage. While some institutions may possess valuable brands or proprietary technologies, these intangible assets may not be as crucial to their core business operations compared to other sectors, as noted by Barth et al. (2001a). In the competitive and regulated market dynamics of the financial sector, profitability is heavily influenced by factors like interest rates, market fluctuations, and regulatory changes. In this context, the focus shifts towards optimising financial performance through traditional banking products and services rather than making substantial investments in intangible assets, as analysed by Dechow, Ge, and Schrand (2010). The findings derived from this study are similar, noting that the financial services sector does not have a significant investment in and recognition of intangible assets within their financial statements.

#### **5.3.4 Discussion**

The analysis conducted in this study, centered on the relevance and reliability of intangible assets by JSE-listed companies, illustrates that intangible assets—most notably goodwill and other

intangible assets—are integral to the financial statements of many organisations. The analysis suggests that the cost model with a finite useful life predominates as the principal methodology for the valuation of other intangible assets, whereas goodwill is conventionally appraised utilising the cost model with an indefinite useful life. This methodology is congruent with the stipulations of IFRS, which mandate that goodwill be acknowledged as possessing an indefinite useful life unless an impairment is recognised.

A salient observation from the study indicates that a majority of companies in South Africa exhibit a preference for the cost model over the revaluation model in the assessment of intangible assets. This inclination is propelled by a multitude of factors, including the stability it affords in financial reporting, the conservative approach to asset valuation, and the practical challenges associated with determining fair values for intangible assets, which are often absent in active markets (Gierusz, 2020). The cost model, characterised by its emphasis on historical costs, is regarded as more dependable and less subjective, particularly in instances where intangible assets are challenging to appraise consistently.

The appraisal of intangible assets is further shaped by broader economic conditions. The economic landscape of South Africa, characterised by sluggish growth and currency fluctuations, exerts a profound influence on corporate decisions pertaining to the measurement of intangible assets. The depreciation of the South African Rand (ZAR) can significantly impact the valuation of international acquisitions, prompting firms to embrace the cost model for enhanced stability in financial reporting. Likewise, the prevailing economic climate and inflationary pressures can affect the valuation of intangible assets, rendering it arduous for companies to implement the revaluation model without necessitating frequent adjustments. This is corroborated by evidence from other global exchanges, such as the London Stock Exchange (LSE) and the New York Stock Exchange (NYSE), where the cost model persists as the favored approach for appraising goodwill and intangible assets, particularly within sectors that depend heavily on acquisitions and research and development (KPMG, 2023c).

When compared with international benchmarks, the inclination towards the cost model in South Africa reflects patterns observed in other established markets. In advanced economies such as the United States and the United Kingdom, enterprises operating in sectors like pharmaceuticals and technology frequently disclose substantial volumes of intangible assets, especially goodwill, and tend to rely on the cost model to ensure stability and adherence to regulatory mandates. Comparable trends are discernible in Asian markets, where regulatory frameworks such as IFRS or US GAAP exert influence over the preference for the cost model (Gierusz, 2020). The global uniformity of this preference accentuates the practical difficulties that firms encounter when attempting to revalue intangible assets, particularly in unpredictable or unstable economic climates.

The results of this investigation correspond with the prevailing empirical literature, which emphasises the prevalent preference for the cost model in the assessment of intangible assets within international markets. A multitude of studies have recognised the cost model as the preferred methodology due to its congruence with financial reporting standards and its capacity to alleviate the subjectivity inherent in asset valuation. Glaum, Landsman, and Wyrwa (2018) highlighted that businesses worldwide commonly opt for the cost model concerning goodwill due to the considerable hurdles in consistently gauging fair values when active markets are lacking. In a similar vein, Li and Sloan (2017) discovered that while the revaluation model theoretically promises superior transparency, it is utilised less frequently due to the volatility observed in reported asset values and the elevated costs linked to its implementation. The inclination toward the cost model is further corroborated by its provision of stability in economies undergoing macroeconomic fluctuations, such as South Africa, where exchange rate volatility and inflation render the revaluation model particularly arduous to apply. Moreover, empirical data from sectors such as pharmaceuticals and technology reinforces the efficacy of the cost model for firms possessing substantial intangible assets, as its application circumvents the regular fair value adjustments mandated by the revaluation model, thus fostering consistency in financial reporting (Qureshi et al., 2021). These conclusions resonate with broader international trends discerned across both developed and emerging markets, highlighting the global dependence on the cost model to navigate the complexities associated with intangible asset valuation.

The findings can be framed within the context of positive accounting theory (Watts et al., 1986) and stakeholder theory (Freeman, 1984). The positive accounting theory explains the preference for the cost model as it reduces subjectivity and provides more consistent and conservative financial reporting. In line with PAT, JSE-listed companies aim to minimise the volatility in reported earnings caused by fluctuating intangible asset valuations, particularly in a macroeconomically unstable environment. The stakeholder theory emphasises the transparent and stable reporting of intangible assets through the cost model, which enhances stakeholder confidence. Investors, creditors, and regulators rely on financial reports to make decisions, and the emphasis on historical costs aligns with their need for reliable and conservative reporting.

### **5.3.5 Conclusion**

The research uncovers essential insights into the practices of companies on the JSE regarding the assessment and valuation of their intangible assets, pointing out that goodwill and related intangible assets are crucial components of the financial disclosures made by numerous organisations. The cost model, with its focus on historical cost and its pragmatic applicability in the absence of active markets, remains the predominant technique for valuation. Economic factors, including currency fluctuations and inflation, in conjunction with regulatory frameworks such as IFRS, are instrumental in shaping the asset valuation tactics adopted by firms. The results obtained from South Africa resonate with global patterns, thereby underscoring the criticality of stability and conservatism within the domain of financial reporting.

### **5.4 Objective 2: To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies**

The purpose of the second objective is to provide an analysis and examination of the measurement of South African JSE-listed companies' intangible assets through the application of the Ohlson model in order to ascertain whether the measurement models as prescribed by IAS 38 and detailed in objective one produce relevant and reliable values.

### **5.4.1 Introduction**

The relevance and reliability of the value being attributed to intangible assets in the annual financial statements is considered to be a contentious issue, as described by the research problem section of this study. While the value represented as being the intangible asset figure for a company may be challenging to ascertain, there is a need to determine whether the measurement practices of intangible assets result in an output that adheres to the core characteristics of financial statements being both relevant and a faithful representation of the line item figure. The Ohlson model, as substantiated in the research methodology chapter, is determined to be the most effective measure relating to determining whether the figures presented in the annual financial statements are found to be relevant and reliable.

### **5.4.2 Descriptive Statistics**

The descriptive statistics derived from the data are summarised in the table to follow.

**Table 6: Company descriptive statistics**

<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
MVE – share price three months after year-end	112.836	107.347	69.290	22.058	300.394
BE – net value of assets	48.937	36.523	43.978	5.993	209.484
NI – net income	7.274	4.933	10.622	25.225	85.875
Eit – book to market residual	67.317	47.201	54.989	-4.674	197.654
GW – goodwill	5.739	2.296	10.001	0	46.163
ID – identifiable intangible assets	7.571	1.815	15.215	0.007	77.851
TIA – total intangible assets, including goodwill	13.311	3.954	22.613	0.015	124.013
BVExIA – book value of equity less total intangible assets	35.626	23.791	43.008	-58.325	187.161

MVE (Market Value of Equity) reflects a mean of 112.836, which indicates that, on average, the market values of these companies are significantly higher than their book value. The range (Min-Max) from 22.058 to 300.394 reflects substantial variation in the market valuation of companies. In contrast, the mean of the BE (Book Equity) is 48.937, with a median of 36.523, showing that most companies' net asset value is considerably lower than their market value. The standard deviation of 43.978 indicates high variability in book equity among the companies. Similarly, net income records a mean of 7.274, with a median of 4.933, demonstrating relatively modest earnings compared to market and book equity. The maximum value of 85.875 suggests a few firms with significantly higher profitability. The mean book-to-market residual of 67.317 and a median of 47.201 suggest that intangible factors (e.g., goodwill, brand, intellectual property) significantly contribute to market valuations. Goodwill reflecting a mean of 5.739, with a median of 2.296, shows goodwill as a key intangible asset but with considerable variation. The fact that the

minimum value for goodwill is 0 indicates some firms lack reported goodwill, possibly due to a lack of acquisitions or conservative accounting practices.

### 5.4.3 Regression results

The classical regression results, using the Ohlson model, are presented in the table below for the purposes of investigating the relevance and reliability of intangible asset values.

**Table 7: Regression results from Ohlson Model**

Model	Unstandardised coefficients		Standardised coefficients	T-statistic	p-value	Collinearity statistics tolerance
	B	Beta				
(constant)	44.293	5.533		4.274	0.000	
Book value of equity less other intangible assets	0.732	0.359	0.359	2.458	0.076	0.486
Net income	6.842	1.503	0.795	3.882	0.000	0.419
Other intangible assets	4.814	1.487	0.637	3.074	0.002	0.815
Goodwill	4.986	1.605	0.577	2.784	0.004	0.783

Next, we turn our attention to the results concerning "Other Intangible Assets" and their relationship with the dependent variable, market value of equity (MVE). The standardised coefficient offers a clear indication of the strength and direction of the correlation between "Other Intangible Assets" and MVE. A coefficient of 0.637 reflects a robust positive correlation, meaning that for each standard deviation increase in "Other Intangible Assets," MVE rises by 0.637 standard deviations, holding all other variables constant. This result underscores the pivotal role that "Other Intangible Assets" play in influencing the market valuation of companies listed on the JSE.

The t-statistic provides further insight into the significance of this relationship by quantifying how much the estimated coefficient deviates from zero, measured in terms of standard errors. With a t-statistic of 3.074, the evidence suggests that "Other Intangible Assets" exert a statistically significant influence on MVE. In typical significance tests, such as at the 5% level, a t-statistic greater than 2 (for a two-tailed test) is considered indicative of statistical significance. This high t-statistic reinforces the strength of the association between "Other Intangible Assets" and MVE.

The p-value, which measures the probability that the observed association (or one more extreme) is due to chance, is 0.002. This is well below common significance thresholds, such as 0.05 or 0.01, providing strong evidence that a relationship exists, thereby confirming that the observed relationship is highly unlikely to be due to random variation.

Finally, we examine the collinearity tolerance, which gauges the extent of multicollinearity among the independent variables in the regression model. A tolerance value of 0.815 suggests that multicollinearity is minimal, indicating that "Other Intangible Assets" remain sufficiently independent of the other variables. This is a positive outcome, as collinearity values below 0.10 typically signal problematic multicollinearity, which could distort the results. In this case, the model appears to be robust, with "Other Intangible Assets" adding value without significant issues of collinearity.

The empirical outcomes reveal that "Other Intangible Assets" represent a substantial and consequential element in the market valuation of the top 40 companies listed on the JSE. The affirmative standardised coefficient illustrates that these assets enhance market value, while the t-statistic and p-value corroborate the statistical significance of this correlation. The elevated collinearity tolerance further indicates that the variable is impervious to multicollinearity challenges, thereby reinforcing the integrity of the regression analysis. This implies that South African enterprises and investors acknowledge the significance of other intangible assets, such as patents, trademarks, and software, in augmenting firm value. It also underscores the pertinence of these assets in financial reporting and valuation assessments within the framework of the Ohlson model.

The positive standardised coefficient (0.637) and the statistical significance ( $p$ -value = 0.002) in the results suggest that "Other Intangible Assets" are a significant determinant of market value for JSE-listed companies. Studies like Zambon, Marzo, Girella, Abela, and D'Albore (2020) and Gu et al. (2011) emphasise the role of intangible assets in explaining firm value. The analysis by Gu et al. (2011) of U.S. firms revealed that intangible assets, such as patents, R&D, and brand equity, account for a significant portion of market value, often overshadowing tangible assets in terms of impact. Their findings are consistent with these results, which also highlight the importance of intangible assets in determining firm market value. Conversely, a study by Wyatt (2005) noted that while intangible assets positively impact market value, the extent varies significantly across industries and geographical locations. For example, in resource-driven economies, tangible assets like mining rights or physical infrastructure may dominate over intangibles. This study's findings regarding "Other Intangible Assets" align with global trends reported by Corrado, Hulten, and Sichel (2009), who observed that technology and pharmaceutical companies heavily rely on intangible assets to drive valuation. For instance, their study found that intangible investments in R&D and software positively correlate with market valuation. However, other sectors, such as banking and logistics, may not show the same strength of association. Studies by Beattie and Thomson (2007) highlight that in industries with fewer intangible-intensive operations, such as banking, goodwill plays a larger role in valuation than other intangible assets.

The  $p$ -value (0.002) and  $t$ -statistic (3.074) in this study strongly affirm the statistical significance of "Other Intangible Assets." This aligns with the findings of Abeywardhana and Magoro (2017), who observed that intangible assets explain a significant portion of firm value in emerging markets. However, they also noted that disclosure practices and financial reporting standards can affect the robustness of these findings. On the other hand, studies conducted on firms in Asia (e.g., Chen, Kurt, and Wang (2020)) found that intangible assets' significance was often diluted by limited transparency and inconsistent valuation practices, which may not be as much of a concern for JSE-listed firms due to IFRS compliance.

The collinearity statistics tolerance (0.815) in the results from this study suggests minimal multicollinearity, ensuring the reliability of the regression results. This finding is supported by a

study by Barth et al. (2008), who argue that when properly modeled, intangible assets provide a robust explanation for market value, and multicollinearity issues are often less prevalent for variables such as goodwill and identifiable intangibles. However, in studies like Lev (2000), multicollinearity often emerged as a concern when combining various types of intangible assets (e.g., goodwill and R&D) due to overlapping definitions and measurement challenges. In the context of African economies, Akinsomi, Kola, Ndlovu, and Motlounq (2016) found that intangible assets are less emphasised in market valuation compared to developed economies, possibly due to a more conservative approach to asset recognition and valuation under IFRS. This contrasts with the findings from this study, where "Other Intangible Assets" are shown to be significant, reflecting a growing recognition of their importance among South African firms.

#### **5.4.4 Discussion**

The outcomes generated from the Ohlson methodology present valuable interpretations of the relevance and reliability of intangible asset assessments for organisations listed on the JSE. The results indicate that both other intangible assets (such as trademarks, patents, and software) and goodwill demonstrate statistically significant associations with the market value of equity. The standardised coefficients (0.637 for other intangible assets and 0.577 for goodwill) imply that both classifications of intangible assets are positively correlated with market valuation, with other intangible assets exerting a marginally more pronounced effect. This suggests that market participants assign a considerable level of importance to these assets in evaluating the holistic value of the company.

The t-statistics (3.074 for other intangible assets and 2.784 for goodwill) alongside the p-values (0.002 for other intangible assets and 0.004 for goodwill) corroborate that these associations are statistically significant at conventional confidence thresholds ( $p < 0.05$ ). These findings substantiate the claim that intangible assets—encompassing both goodwill and other intangible assets—are pertinent to market valuations and offer decision-useful insights to investors. Furthermore, the collinearity statistics tolerance values (0.815 for other intangible assets and 0.783 for goodwill) denote minimal multicollinearity, thereby reinforcing the credibility of the regression estimates.

These outcomes are congruent with prior research, which underscores the significance of intangible assets in influencing corporate value and market perceptions. For example, Zambon et al. (2020) assert that intangible assets—particularly those arising from innovation, branding, and acquisitions—are pivotal in establishing sustainable competitive advantages, which is evidenced by their notable correlation with equity valuations. In a similar vein, Barth et al. (2023) identify that goodwill is especially esteemed in sectors characterised by elevated merger and acquisition activity, as it signals anticipated future synergies and growth opportunities.

The comparatively stronger standardised coefficient for other intangible assets relative to goodwill in this analysis aligns with the observations made by Brynjolfsson et al. (2000), who contend that specific identifiable intangible assets (e.g., patents, technology, and intellectual property) are frequently more directly correlated with organisational performance and innovation capacity. Conversely, goodwill represents an aggregate metric that encompasses premiums disbursed during acquisitions, which may be subject to subjective managerial evaluations or market overvaluation.

The findings affirm the significance of intangible asset valuations for JSE-listed companies by illustrating their robust, positive, and statistically significant relationships with market valuation. This accentuates the premise that investors regard intangible assets as essential to evaluating a firm's market standing and potential for growth. Furthermore, the legitimacy of these evaluations is backed by the reliability of the statistical evidence, showcasing a lack of multicollinearity concerns and alignment with significance criteria.

From a global standpoint, the outcomes of this study are consistent with patterns identified in advanced economies such as the United States and Europe, where intangible assets are progressively contributing to corporate valuation. Nonetheless, the dependence on the cost model for asset valuation in South Africa, as evidenced in this analysis, may hinder the capacity for fair value modifications that accurately reflect real-time market fluctuations. This situation mirrors broader obstacles highlighted by Kumaravel (2022), who contends that the absence of active markets for intangible assets frequently restricts the capability to fully actualise their valuation potential in accordance with existing accounting frameworks.

The findings align with the Conceptual Framework for Financial Reporting, which emphasises relevance and reliability as critical qualitative characteristics of useful financial information. The significant association between intangible assets and market value validates their relevance in aiding investors to assess a firm's financial standing and future growth prospects. Furthermore, the robustness of the statistical results and the lack of multicollinearity highlight the reliability of intangible asset valuations on the JSE. The Resource-Based View (RBV) posits that firms gain sustainable competitive advantages through unique and inimitable resources, such as intangible assets. The study supports this theory by showing that other intangible assets (e.g., patents, trademarks) have a slightly stronger impact on market value compared to goodwill. This aligns with Brynjolfsson et al. (2000), who argue that identifiable intangible assets tied to innovation and intellectual property are critical drivers of firm performance and competitive advantage. The positive association of goodwill with market valuation is consistent with signaling theory, which suggests that goodwill signals future synergies and growth opportunities to investors, particularly in sectors with high merger and acquisition activity. This finding echoes Barth et al. (2023), who noted that goodwill plays a vital role in industries reliant on acquisitions, as it reflects market confidence in a company's ability to generate future benefits.

#### **5.4.5 Conclusion**

In conclusion, the findings of the Ohlson model validate the dual significance of various intangible assets and goodwill in shaping market valuations for companies listed on the JSE. Although other intangible assets demonstrate a marginally more robust correlation with market value, both categories serve as pertinent and trustworthy indicators of corporate performance. These results not only resonate with global empirical research but also emphasise the necessity for precise and transparent reporting of intangible assets within South Africa's financial markets. Improving the measurement and disclosure of intangible assets, especially in sectors characterised by elevated levels of innovation and mergers and acquisitions, could further enhance the decision-making utility of financial information.

### **5.5 Objective 3: To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies**

The primary aim of Objective Three was to conduct a thorough assessment regarding the significance of intangible assets in relation to the Total Assets belonging to companies listed on the JSE. This objective helps to support results obtained from other objectives to obtain a deeper understanding and, therefore, more insightful and meaningful analysis.

#### **5.5.1 Introduction**

This particular objective is rooted in the information presented in Chapter One, as well as the extensive literature review conducted, both of which put forth the argument that intangible assets have steadily risen in importance within the financial statements over time, signifying a notable surge in investments directed towards intangible assets. This trend is especially prominent within specific sectors such as pharmaceuticals and technology. Recent years have witnessed a marked increase in the acknowledgment of intangible assets as crucial components influencing corporate worth within the domains of accounting and finance, a notion posited by Lev (2003). The JSE, serving as a principal hub for securities exchange within the nation, stands as the focal point for this particular study, owing to its representation of diverse sectors encompassing banking, mining, technology, and consumer goods. Consequently, the exchange provides a rich dataset conducive to carrying out cross-sectoral analyses pertaining to the role played by intangible assets. The assessment of both the significance and impact of intangible assets on total assets demands a meticulous examination of financial statements, particularly the statement of financial position where a detailed account of both tangible and intangible assets is provided, a concept expounded upon by Barth et al. (2008). The primary objective of this research is to underscore the importance of intangible assets within the asset base of JSE-listed entities through the quantification of their relative proportion of total assets. Delving into how corporations recognise and report information regarding their intangible assets can provide crucial insights into the reliability and relevance of financial data, in addition to shedding light on the factors that propel corporate value creation. By amalgamating various theoretical frameworks, empirical evidence, and industry-specific viewpoints, this study aims to enrich the existing body of literature concerning the valuation of

intangible assets and prevailing financial reporting methodologies. It is crucial to emphasise that intangible assets constitute a segment of both the total assets and total non-current assets values depicted on the face of the statement of financial position. In relation to the title of the study, it is important to understand the significance/materiality of the investment in intangible assets in relation to other assets to supplement the understanding of the reliability of the information provided and the necessity to avoid any misstatements in the values.

In order to conduct a thorough analysis of the data in relation to the pertinent objective at hand, the researcher delved into the following key aspects for the years 2015 and 2019. Firstly, an examination of the total intangible assets, comprising Goodwill and Other intangible assets combined, as a proportion of the total assets, was undertaken, alongside detailed scrutiny of any variations observed during the specified time frame. Secondly, the researcher explored the total intangible assets, including Goodwill and Other intangible assets combined, as a percentage of the total non-current assets for the years 2015 and 2019, followed by an in-depth analysis of the changes that occurred over the period.

The comparison between 2015 and 2019 was chosen to capture changes in the proportion of intangible assets relative to total assets over a meaningful time horizon while avoiding unnecessary year-to-year volatility. Selecting these two points in time allows for an analysis of medium-term trends rather than short-term fluctuations, which may be influenced by temporary economic conditions or accounting adjustments.

The year 2015 represents a period sufficiently removed from the global financial crisis and the immediate effects of IFRS 3 implementation, allowing for a more stable baseline of intangible asset reporting under IFRS. By contrast, 2019 was selected as the most recent pre-pandemic year, ensuring that the analysis reflects a period unaffected by COVID-19-related economic disruptions, which could distort asset valuations and investment trends.

Furthermore, these two years allow for a structured comparative analysis of whether the significance of intangible assets in total assets has increased over time in response to evolving

market conditions, changes in financial reporting practices, or shifts in investment strategies among JSE-listed firms. This approach maintains analytical focus while ensuring that observed changes are substantive rather than driven by short-term anomalies.

Moreover, a comprehensive assessment of Goodwill as a ratio of the total assets for the years 2015 and 2019 was conducted, accompanied by a meticulous examination of the fluctuations in this ratio over the specified duration. Furthermore, a study on the ratio of Goodwill to the total non-current assets for the years 2015 and 2019 was performed, followed by a comprehensive review of the adjustments in this ratio over the specified period.

Additionally, an exploration of the Other intangible assets as a percentage of the total assets for 2015 and 2019 was performed, along with a thorough analysis of any changes observed during the specified period. Likewise, an assessment of the Other intangible assets as a percentage of the total non-current assets for the years 2015 and 2019 was executed, followed by a comprehensive analysis of any modifications in this proportion over the designated timeframe.

Finally, an assessment of the breakdown of the overall intangible assets with regards to the share attributed to Goodwill and the share attributed to other intangible assets for the years 2015 and 2019 was conducted, followed by a comprehensive examination of any changes in these shares during the specified time-frame.

### **5.5.2 Total Intangible Assets (including other intangible assets and goodwill)**

Intangible assets, encompassing goodwill and other intangible assets, play a crucial role in contemporary business valuation and financial reporting, as emphasised by Barth et al. (2001a). These assets, which lack physical presence, constitute a significant portion of a company's overall value and often act as primary drivers of competitive advantage and future profitability. Recognising the importance of total intangible assets in relation to total assets and total non-current assets is essential for various stakeholders, including investors and analysts, to grasp a comprehensive understanding of a company's financial position, growth prospects, and overall valuation, as highlighted by Lev (2003).

The total assets of a company represent the cumulative value of all assets it possesses, encompassing both tangible assets like property and equipment and intangible assets such as intellectual property and goodwill, in addition to current and non-current assets, as discussed by Barth, Kasznik, and McNichols (2001b). In contrast, Lev et al. (2004) stated that total non-current assets consist of assets that are expected to provide economic benefits over multiple accounting periods, excluding current assets.

Examining the total intangible assets (including goodwill and other intangible assets) concerning the total assets and total non-current assets provides valuable insights into the composition and significance of intangible assets within a company's asset portfolio. This examination eases the assessment of the proportion of intangible assets compared to total assets, thereby highlighting the role of intangible assets in the overall value of the company's assets, a point noted by Barth et al. (2001b). Moreover, comparing total intangible assets to total non-current assets offers insights into the significance of intangible assets in driving long-term value creation and maintaining a sustainable competitive advantage, according to Lev (2003).

Through such in-depth analysis, stakeholders can develop a profound comprehension of the role played by intangible assets in molding a company's financial standing, operational performance, and strategic trajectory. Lev et al. (2016) underscores the critical nature of efficiently managing and leveraging intangible assets to not only enhance shareholder value and mitigate risks but also to achieve long-term business objectives.

The table below represents the total intangible assets (comprising goodwill and other intangible assets) for the selected sample in the 2015 and 2019 financial years, as well as the relevant change over time for the representation as a percentage of total assets and total non-current assets.

**Table 8: Total Intangible Assets in relation to Total Assets and Total Non-current Assets**

Company	Industry	2015		2019		Change	
		% of IA over total assets	% of IA over total non-current assets	% of IA over total assets	% of IA over total non-current assets	% of IA over total assets	% of IA over total non-current assets
1	Banking	0,22%	0,32%	0,76%	1,02%	0,55%	0,70%
2	Mining	0,42%	0,50%	0,31%	0,39%	-0,12%	-0,11%
3	Mining	6,53%	8,88%	5,50%	7,33%	-1,03%	-1,55%
4	Mining	2,21%	2,71%	1,79%	2,52%	-0,42%	-0,19%
5	Pharmaceutical	51,51%	81,80%	58,14%	82,54%	6,63%	0,73%
6	Mining	3,45%	3,97%	0,67%	0,87%	-2,78%	-3,10%
7	General Industrials	17,43%	36,34%	14,23%	28,38%	-3,19%	-7,96%
8	Tobacco	33,11%	48,09%	84,24%	93,00%	51,13%	44,91%
9	Mining	0,11%	0,12%	0,02%	0,03%	-0,08%	-0,09%
10	Banking	0,10%	0,65%	0,63%	3,70%	0,53%	3,05%
11	Real estate	2,42%	2,50%	1,40%	1,46%	-1,03%	-1,04%
12	Logistics	10,95%	23,65%	21,49%	40,50%	10,54%	16,85%
13	Banking	0,06%	0,07%	0,12%	0,13%	0,07%	0,07%
14	Banking	0,08%	0,09%	0,12%	0,13%	0,04%	0,04%
15	Pharmaceutical	18,61%	22,54%	45,17%	53,72%	26,56%	31,18%
16	Forestry and paper	10,74%	15,36%	12,05%	16,20%	1,31%	0,85%
17	Retail	4,17%	24,05%	3,80%	15,93%	-0,37%	-8,11%
18	Technology	17,81%	25,59%	12,19%	16,31%	-5,61%	-9,27%
19	Technology	17,86%	30,48%	10,45%	18,08%	-7,41%	-12,40%
20	Technology	18,10%	22,84%	8,90%	12,96%	-9,21%	-9,89%
21	Banking	0,97%	18,42%	1,17%	22,73%	0,20%	4,32%
22	Insurance	0,04%	0,04%	0,37%	0,38%	0,33%	0,34%
23	Retail	68,21%	91,19%	63,99%	89,41%	-4,22%	-1,77%
24	Financial services	6,03%	7,79%	15,45%	20,89%	9,42%	13,10%
25	Personal Goods	3,82%	17,27%	21,79%	56,79%	17,98%	39,52%
26	Insurance	0,94%	1,05%	3,18%	3,53%	2,25%	2,48%
27	Retail	3,34%	7,84%	4,73%	10,18%	1,39%	2,34%
28	Banking	1,21%	1,32%	0,98%	1,13%	-0,23%	-0,19%
29	Food producer	17,03%	31,98%	14,53%	29,44%	-2,51%	-2,54%
30	Technology	10,66%	16,54%	7,06%	9,52%	-3,60%	-7,02%
31	Retail	37,87%	47,33%	20,27%	30,31%	-17,60%	-17,02%
<b>AVERAGE</b>		<b>11,81%</b>	<b>19,07%</b>	<b>14,05%</b>	<b>21,60%</b>		

The analysis of the proportion of intangible assets relative to total assets and total non-current assets highlights significant variations across industries on the JSE, reflecting the evolving role of intangible assets in different sectors of the South African economy. In 2015, a JSE-listed retail company recorded the highest proportion of intangible assets, representing 68.21% of its total assets and 91.19% of its total non-current assets. This finding underscores the retail sector's reliance on intangible assets, such as brand equity, customer relationships, and goodwill generated from acquisitions, to drive competitiveness and market share in a challenging and dynamic consumer market. The retail sector in South Africa, characterised by a competitive environment and slow economic growth, often sees companies prioritising intangible assets to build strong customer loyalty and expand product offerings. Similar findings in international markets suggest that retail companies globally tend to rely heavily on intangible assets to maintain their competitive edge (Wessels, 2024). While it is abnormal and surprising for a retailer to have a high investment in intangible assets (rather than inventory, which is classified as a current asset), further investigation of the data revealed that the cause for what may be considered an anomaly related to a transaction in 2015 where Steinhoff International acquired Pepkor in a transaction valued at approximately R62.8 billion (\$5.7 billion) (Young, 2016).

This acquisition aimed to bolster Steinhoff's position in the discount retail sector, leveraging Pepkor's extensive footprint. The purchase price allocation under IFRS 3 led to a significant increase in goodwill and intangible assets on Steinhoff's statement of financial position, rising from R66 billion in 2014 to R135 billion in 2015. Specifically, the goodwill attributed to the Pepkor acquisition was R45.2 billion, with an additional R8.9 billion resulting from the increase in Steinhoff's share price between the offer and recognition dates (PWC, 2017).

The financial irregularities and subsequent scandal involving Steinhoff in 2017 had profound implications for its subsidiaries, including Pepkor (Rossouw, 2021). In the aftermath, Pepkor undertook a critical reassessment of its asset valuations. In 2019, this led to the impairment of R4.76 billion in goodwill and intangible assets, affecting brands such as PepAfrica, Shoe City, and Tekkie Town (Pepkor, 2019). This impairment was a strategic move to align the book values of

these assets with their recoverable amounts, reflecting a more conservative and realistic valuation in light of the parent company's challenges (IFRS, 2023b).

Compared to other retailers, Pepkor's intangible asset ratio appears elevated due to the substantial goodwill recognised from its acquisition by Steinhoff. While many retailers report goodwill and other intangibles from acquisitions, the scale of Pepkor's figures is notably higher, a direct consequence of the high valuation during the Steinhoff transaction. Additionally, the impairments recorded post-2017 further highlight the volatility and risks associated with large intangible asset balances, especially when linked to corporate scandals or financial misstatements (Tunyi et al., 2020).

However, by 2019, a JSE-listed tobacco company emerged as the leader in intangible asset representation, with 84.24% of its total assets and 93% of its total non-current assets being intangible. This shift indicates the strategic importance of intangible assets in the South African tobacco industry, which faces stringent regulations and declining smoking rates. Intangible assets in this sector, such as brand equity and goodwill, are critical for maintaining customer loyalty and sustaining profitability amidst regulatory and societal pressures. For example, South Africa's ongoing regulation of tobacco advertising and the introduction of excise duties have compelled companies to consolidate brand portfolios and enhance brand equity to remain competitive. These trends align with research by Gierusz (2020), which highlights the importance of brand value and customer relationships in the global tobacco industry, particularly in markets facing regulatory constraints.

The shift from a retail company to a tobacco company leading in intangible asset proportions between 2015 and 2019 may be attributed to several factors extending beyond the Steinhoff scandal that impacted Pepkor. The retail sector in South Africa has faced economic challenges such as stagnant consumer spending, rising operational costs, and currency volatility, which may have reduced the proportion of intangible assets relative to total assets. Conversely, the tobacco industry has seen increased mergers and acquisitions activity during this period, driving the recognition of significant goodwill and brand-related intangible assets on the statements of

financial position of JSE-listed tobacco companies. For instance, Chernenko, Moiseienko, Korohodova, and Hlushchenko (2021) noted that M&A activities in South Africa often lead to the recognition of goodwill as companies seek to consolidate market share and realise synergies, a strategy commonly observed in the tobacco industry.

The observed trend in intangible asset proportions on the JSE reflects broader patterns in global markets while also emphasising the unique challenges faced by South African companies. Studies (Bauch, 2021; Hendlin, Le Han, & Ling, 2024; Qureshi et al., 2021; Ren et al., 2023) have shown that industries heavily reliant on intangible assets, such as technology, pharmaceuticals, and tobacco, tend to report higher proportions of intangible assets relative to total assets. In the South African context, the tobacco industry's shift toward intangible-heavy strategies may reflect the need to preserve brand value and customer loyalty in response to declining smoking rates and growing public health campaigns. Similar trends were observed by Zambon et al. (2020), who found that intangible assets play a critical role in sustaining competitive advantages in regulated and declining markets.

In contrast, South African retail companies have increasingly focused on tangible investments such as infrastructure, supply chain improvements, and logistics to remain competitive in a subdued economic environment. This focus may have diluted the relative proportion of intangible assets in their financial statements over time. Furthermore, the depreciation of the South African Rand and the volatile economic climate between 2015 and 2019 likely influenced corporate decisions regarding the valuation and measurement of intangible assets, further underscoring the shift observed between the two sectors.

The findings align with international benchmarks but also highlight the specific challenges and opportunities facing JSE-listed companies in South Africa. While retail and tobacco companies both rely on intangible assets to sustain competitive advantage, the different trends observed between 2015 and 2019 highlight the importance of sector-specific strategies and external economic factors in shaping the role of intangible assets on the JSE.

### **5.5.3 Other intangible assets (excluding goodwill)**

Intangible assets play an instrumental role in influencing the financial position and value of companies on a global scale, serving as a crucial element in their overall asset base. Within the realm of intangible assets, the category of "other intangible assets" stands out as a significant yet frequently underestimated component of a company's asset portfolio (Daum, 2003). The primary aim of this introduction is to delve into the importance of other intangible assets in relation to total assets and total non-current assets, thereby highlighting their profound impact on financial analysis and decision-making processes as well as those that would be most impacted by any potential issue relating to the relevance and reliability of intangible asset values.

The category of other intangible assets encompasses a wide array of assets that go beyond goodwill, including patents, trademarks, copyrights, and proprietary technology, as indicated by Barth et al. (2001b). In contrast to goodwill, which typically originates from acquisitions and represents the surplus paid above the fair value of identifiable assets, other intangible assets emerge from internal development initiatives or strategic investments that are geared towards fostering innovation and gaining a competitive edge, as highlighted by Lev (2003).

It is imperative for stakeholders to comprehend the relationship between other intangible assets, total assets, and total non-current assets in order to grasp the composition and driving forces behind a company's asset mix. Total assets encapsulate the cumulative value of all assets owned by a company, encompassing both tangible and intangible assets, while total non-current assets pertain to assets expected to yield economic benefits over multiple accounting periods, excluding current assets (Barth et al. (2001b).

A thorough examination of the ratio between intangible assets and total assets or total non-current assets provides a valuable understanding of the importance of these intangible assets in promoting lasting value generation and competitive advantage. It underscores the strategic investments made by companies in innovation, research and development, and brand establishment, emphasising their pivotal role in enhancing shareholder value and ensuring sustainable growth, according to

Lev (2003). The effective management and utilisation of other intangible assets have the potential to drive enhanced competitiveness, strengthen market positioning, and ultimately lead to overall business success, as outlined by Barth et al. (2001b).

The table to follow represents the other intangible assets (excluding goodwill) for the selected sample in the 2015 and 2019 financial years, as well as the relevant change over time for the representation of other intangible assets as a percentage of total assets and total non-current assets.

**Table 9: Other Intangible Assets in relation to Total Assets and Total Non-current Assets**

Company	Industry	2015		2019		Change	
		% of Other IA over total assets	% of Other IA over total non-current assets	% of Other IA over total assets	% of Other IA over total non-current assets	% of Other IA over total assets	% of Other IA over total non-current assets
1	Banking	0,20%	0,30%	0,75%	1,00%	0,55%	0,70%
2	Mining	0,42%	0,50%	0,31%	0,39%	-0,12%	-0,11%
3	Mining	2,35%	3,20%	1,97%	2,63%	-0,39%	-0,58%
4	Mining	0,48%	0,59%	0,10%	0,14%	-0,38%	-0,45%
5	Pharmaceutical	45,86%	72,82%	54,34%	77,14%	8,48%	4,32%
6	Mining	0,82%	0,94%	0,42%	0,55%	-0,39%	-0,39%
7	General Industrials	2,33%	4,86%	5,46%	10,89%	3,13%	6,04%
8	Tobacco	3,53%	5,12%	52,81%	58,30%	49,29%	53,18%
9	Mining	0,11%	0,12%	0,02%	0,03%	-0,08%	-0,09%
10	Banking	0,04%	0,27%	0,19%	1,14%	0,15%	0,88%
11	Real estate	0,67%	0,69%	0,23%	0,25%	-0,43%	-0,44%
12	Logistics	3,31%	7,15%	5,79%	10,90%	2,48%	3,75%
13	Banking	0,01%	0,01%	0,09%	0,09%	0,08%	0,09%
14	Banking	0,05%	0,06%	0,08%	0,09%	0,03%	0,03%
15	Pharmaceutical	5,50%	6,65%	10,19%	12,12%	4,70%	5,47%
16	Forestry and paper	1,62%	2,32%	0,95%	1,28%	-0,67%	-1,04%
17	Retail	3,79%	21,85%	3,58%	15,03%	-0,21%	-6,82%
18	Technology	9,13%	13,12%	7,05%	9,43%	-2,08%	-3,69%
19	Technology	1,71%	2,92%	1,88%	3,25%	0,17%	0,34%
20	Technology	3,49%	4,40%	2,60%	3,79%	-0,88%	-0,61%
21	Banking	0,41%	7,67%	0,72%	13,94%	0,31%	6,26%
22	Insurance	0,04%	0,04%	0,32%	0,34%	0,28%	0,29%
23	Retail	20,95%	28,01%	19,22%	26,86%	-1,73%	-1,15%
24	Financial services	2,80%	3,62%	8,75%	11,83%	5,95%	8,21%
25	Personal Goods	2,25%	10,19%	9,83%	25,62%	7,58%	15,43%
26	Insurance	0,84%	0,93%	1,08%	1,19%	0,24%	0,26%
27	Retail	2,73%	6,42%	4,32%	9,29%	1,58%	2,87%
28	Banking	1,00%	1,09%	0,88%	1,02%	-0,12%	-0,07%
29	Food producer	8,02%	15,06%	7,86%	15,94%	-0,16%	0,88%
30	Technology	7,43%	11,53%	5,31%	7,17%	-2,12%	-4,37%
31	Retail	12,16%	15,20%	6,61%	9,88%	-5,56%	-5,32%
<b>AVERAGE</b>		<b>4,65%</b>	<b>7,99%</b>	<b>6,89%</b>	<b>10,69%</b>		

In 2015, a JSE-listed pharmaceutical company recorded the highest proportion of other intangible assets (excluding goodwill) as a percentage of both total assets (45.86%) and total non-current assets (72.82%). This indicates the sector's reliance on intangible assets such as patents, trademarks, regulatory approvals, and research and development (R&D) expenditures, which form the cornerstone of the pharmaceutical industry's value creation. By 2019, another pharmaceutical company maintained this trend, showing the highest representation of other intangible assets among the sample, comprising 54.34% of total assets and 77.14% of total non-current assets. These findings underscore the importance of other intangible assets within the pharmaceutical sector in South Africa, with no significant shift in the dominance of this sector over the observed period. This consistency reflects the sector's long-term emphasis on intangible-intensive activities, such as innovation and product development, which are critical for sustaining competitive advantage and profitability.

The prominence of other intangible assets in the pharmaceutical sector aligns with global trends observed in studies by Zambon et al. (2020) and Ghosh (2009), which highlight that pharmaceutical firms, both in South Africa and internationally, often rely on intangible assets as primary drivers of business value. These assets are particularly significant in emerging markets, where firms seek to develop innovative healthcare solutions and navigate regulatory landscapes to secure competitive positioning. In South Africa, the pharmaceutical sector's reliance on intangibles is further shaped by a robust demand for medicines and healthcare products, which continues to grow due to the country's healthcare challenges and increasing focus on domestic production of critical drugs.

On the other hand, the tobacco sector exhibited the most significant growth in other intangible assets during the period. Between 2015 and 2019, a JSE-listed tobacco company showed a 49.29% increase in other intangible assets as a percentage of total assets and a 53.18% increase as a percentage of total non-current assets. This substantial growth reflects the sector's strategic investments in intangible assets such as brand equity, customer relationships, and intellectual property rights. Amid a backdrop of stringent regulatory pressures in South Africa, including advertising bans and rising excise taxes, tobacco companies have prioritised intangible asset

development to safeguard market share and maintain customer loyalty. Chun, Da Silva, Davies, and Roper (2005) emphasised that brand equity and customer connections are critical intangible assets in the tobacco industry, enabling companies to navigate a highly competitive and regulated market.

The observed patterns are consistent with findings from other markets. For example, research on pharmaceutical firms listed on the New York Stock Exchange (NYSE) highlights similar reliance on R&D and regulatory approvals as intangible assets, while studies on tobacco firms in Europe and the United States demonstrate how brand value is leveraged to combat declining cigarette consumption and regulatory challenges (KPMG, 2023b; PWC, 2021a). These parallels suggest that the reliance on other intangible assets is not unique to the South African market but rather reflects broader global industry trends.

In the context of South Africa, however, economic factors such as currency volatility and subdued GDP growth may have influenced corporate decisions regarding the measurement and disclosure of intangible assets. South African companies often adopt the cost model for valuing intangibles, as it provides greater stability in financial reporting amid economic uncertainty (Gierusz, 2020). The growth of intangible assets in the tobacco sector also highlights the strategic pivot towards innovation in product offerings, such as heated tobacco and e-cigarette products, as a response to evolving consumer preferences and regulatory pressures in the local market.

In conclusion, the findings demonstrate the centrality of other intangible assets in the pharmaceutical sector on the JSE, with a continued focus on innovation and regulatory-driven investments. Simultaneously, the tobacco sector's significant growth in intangible assets underscores its strategic emphasis on brand equity and customer loyalty as critical intangible drivers of value in a challenging regulatory environment. These results align with global industry trends while reflecting the unique dynamics of the South African market.

#### **5.5.4 Goodwill**

Goodwill, which serves as a critical yet intricate element within a company's asset base, carries substantial implications for financial analysis and decision-making processes. The aim of this introductory discussion is to delve into the importance of goodwill in relation to both total assets and total non-current assets, shedding light on its pivotal role in shaping the financial position and overall value of a company.

The origin of goodwill can be traced back to business mergers or acquisitions, where it signifies the excess amount paid by the acquiring entity beyond the fair value of identifiable assets and liabilities obtained (Barth et al., 2001b). This concept embodies intangible assets like brand reputation, customer relationships, and strategic positioning, which, although not individually distinguishable, collectively contribute to the overall value and prospective cash flows of the company.

For stakeholders, comprehending the relationship between goodwill, total assets, and total non-current assets holds paramount significance in evaluating the composition and driving forces of a company's asset portfolio. Total assets encapsulate the cumulative value of all assets owned by a company, encompassing both tangible and intangible assets, while total non-current assets represent assets expected to yield economic benefits over numerous accounting periods, excluding current assets (Barth et al., 2001b).

A meticulous analysis of the proportion of goodwill relative to total assets and total non-current assets offers valuable insights into the impact of acquisitions and business mergers on a company's growth trajectory and expansion endeavors. It underscores the strategic investments undertaken by companies to bolster market share, geographical footprint, and competitive standing, emphasising their influence on long-term value generation and shareholder prosperity (Barth et al., 2001a).

Through this comprehensive examination, stakeholders can cultivate a profound grasp of the function of goodwill in molding a company's financial performance, risk profile, and strategic

orientation. Proficient management and adept utilisation of goodwill have the potential to foster heightened competitiveness, market dominance, and sustainable expansion opportunities (Barth et al., 2001b).

The table to follow represents the goodwill (excluding other intangible assets) for the selected sample in the 2015 and 2019 financial years, as well as the relevant change over time for the representation of goodwill as a percentage of total assets and total non-current assets.

**Table 10: Goodwill in relation to Total Assets and Total Non-current Assets**

Company	Industry	2015		2019		Change	
		% of Goodwill over total assets	% of Goodwill over total non-current assets	% of Goodwill over total assets	% of Goodwill over total non-current assets	% of Goodwill over total assets	% of Goodwill over total non-current assets
1	Banking	0,01%	0,02%	0,01%	0,01%	0,00%	0,00%
2	Mining	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
3	Mining	4,17%	5,68%	3,53%	4,71%	-0,64%	-0,97%
4	Mining	1,73%	2,12%	1,69%	2,38%	-0,04%	0,25%
5	Pharmaceutical	5,66%	8,98%	3,80%	5,40%	-1,85%	-3,58%
6	Mining	2,63%	3,03%	0,24%	0,32%	-2,38%	-2,71%
7	General Industrials	15,10%	31,48%	8,77%	17,49%	-6,33%	-13,99%
8	Tobacco	29,59%	42,97%	31,43%	34,69%	1,84%	-8,27%
9	Mining	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
10	Banking	0,06%	0,38%	0,43%	2,55%	0,37%	2,17%
11	Real estate	1,76%	1,81%	1,16%	1,22%	-0,59%	-0,60%
12	Logistics	7,64%	16,50%	15,70%	29,60%	8,07%	13,10%
13	Banking	0,05%	0,06%	0,04%	0,04%	-0,02%	-0,02%
14	Banking	0,03%	0,03%	0,04%	0,04%	0,01%	0,01%
15	Pharmaceutical	13,12%	15,88%	34,98%	41,60%	21,86%	25,71%
16	Forestry and paper	9,12%	13,04%	11,10%	14,93%	1,98%	1,89%
17	Retail	0,38%	2,20%	0,22%	0,90%	-0,17%	-1,30%
18	Technology	8,68%	12,47%	5,14%	6,88%	-3,53%	-5,59%
19	Technology	16,15%	27,57%	8,57%	14,83%	-7,58%	-12,73%
20	Technology	14,62%	18,44%	6,29%	9,16%	-8,32%	-9,28%
21	Banking	0,57%	10,75%	0,45%	8,80%	-0,12%	-1,95%
22	Insurance	0,00%	0,00%	0,05%	0,05%	0,05%	0,05%
23	Retail	47,26%	63,18%	44,77%	62,55%	-2,49%	-0,63%
24	Financial services	3,23%	4,17%	6,70%	9,06%	3,47%	4,89%
25	Personal Goods	1,56%	7,08%	11,96%	31,17%	10,40%	24,09%
26	Insurance	0,10%	0,11%	2,11%	2,34%	2,01%	2,22%
27	Retail	0,61%	1,43%	0,42%	0,90%	-0,19%	-0,53%
28	Banking	0,21%	0,23%	0,10%	0,12%	-0,11%	-0,12%
29	Food producer	9,01%	16,92%	6,66%	13,50%	-2,35%	-3,42%
30	Technology	3,23%	5,01%	1,75%	2,36%	-1,48%	-2,66%
31	Retail	25,71%	32,13%	13,66%	20,43%	-12,05%	-11,70%
<b>AVERAGE</b>		<b>7,16%</b>	<b>11,09%</b>	<b>7,15%</b>	<b>10,90%</b>		

In 2015, a JSE-listed retail company exhibited the highest representation of goodwill among the sampled companies, accounting for 47.26% of its total assets and 63.18% of its total non-current assets. This highlights the significant role of goodwill within the retail sector, which often arises from mergers and acquisitions aimed at enhancing market presence, expanding customer bases, or acquiring distribution channels. By 2019, another retail company in the sample maintained the highest representation of goodwill, comprising 44.77% of total assets and 62.55% of total non-current assets. This consistent dominance of the retail sector indicates its sustained reliance on goodwill as a critical intangible asset, largely reflecting the industry's ongoing consolidation efforts, where acquisitions drive synergies through brand equity, customer relationships, and supply chain efficiencies.

While the retail sector remained the leader in goodwill representation during the period, the pharmaceutical sector demonstrated the most substantial growth in goodwill. Between 2015 and 2019, a pharmaceutical company from the sample reported a 21.86% increase in goodwill as a percentage of total assets and a 25.71% increase as a percentage of total non-current assets. This increase underscores the pharmaceutical sector's strategic reliance on acquisitions to gain access to intellectual property, expand R&D capabilities, and penetrate new markets. Goodwill in the pharmaceutical sector often reflects the premium paid for synergies, regulatory approvals, patents, and strong market positioning acquired through M&A activity.

These findings align with global trends observed in other studies. For instance, Zambon et al. (2020) note that goodwill is a predominant intangible asset in industries characterised by consolidation, such as retail and pharmaceuticals, as companies seek to enhance competitiveness through acquisitions. Similarly, research by Ghosh (2009) emphasises the pharmaceutical industry's reliance on goodwill as a key driver of growth, particularly in markets with high R&D costs and regulatory barriers. In the South African context, the retail sector's high representation of goodwill reflects the industry's competitive nature and the need to achieve economies of scale, which is consistent with findings by PWC (2021b) highlighting M&A as a major strategy among JSE-listed retail companies.

Economic factors in South Africa also contribute to these patterns. The country's economic environment, characterised by slow GDP growth, currency volatility, and constrained consumer spending, has incentivised firms in the retail and pharmaceutical sectors to pursue M&A activity as a means of stabilising revenue and expanding market share. The depreciation of the South African Rand over this period further amplified the premiums paid for acquisitions, increasing the relative weight of goodwill on statements of financial position. These observations are consistent with studies by KPMG (2023a), which show that goodwill tends to be higher in emerging markets due to the greater uncertainty and higher risk premiums attached to M&A transactions.

When compared to global benchmarks, the patterns observed in South Africa are consistent with those in developed markets. For example, in the United States and Europe, retail and pharmaceutical companies frequently report high levels of goodwill as a percentage of their assets, reflecting similar consolidation-driven growth strategies (Chun et al., 2005; Zambon et al., 2020). However, South African companies may face additional challenges due to the country's unique economic and regulatory landscape, which necessitates a careful approach to managing goodwill and its impairment.

In conclusion, the retail sector's dominance in goodwill representation on the JSE highlights the importance of acquisitions in driving growth and competitiveness in the industry, while the pharmaceutical sector's notable increase in goodwill emphasises its strategic focus on innovation and market expansion. These findings mirror global trends while reflecting the unique dynamics of the South African market, where economic and industry-specific factors shape the role of goodwill in financial reporting.

### **5.5.5 Composition of total intangible assets between goodwill and other intangible assets**

The primary objective of this introductory section is to break down the total intangible assets into two categories: other intangible assets (IA) and goodwill, aiming to provide clarity on their individual characteristics and enhance the analysis.

The combined value of overall intangible assets reflects the total amount of non-physical assets that lack a tangible form but are essential in determining the value and operations of a business. These assets consist of identifiable intangible assets like patents, trademarks, copyrights, and customer relationships, along with goodwill that arises from business mergers and acquisitions (Lev, 2003).

It is paramount for stakeholders to grasp the allocation of total intangible assets between other intangible assets and goodwill in order to evaluate the composition and essence of a company's intangible asset portfolio. Other intangible assets are specific identifiable assets with limited useful lives, offering distinctive competitive advantages and revenue-generating capabilities (Lev, 2003).

Conversely, goodwill signifies the surplus of the acquisition cost over the fair value of identifiable net assets obtained through a business merger. It signifies the value of unidentifiable intangible assets like brand reputation, customer loyalty, and strategic positioning, which, although not individually acknowledged, contribute to the overall value and future cash flows of a company (Barth et al., 2001b).

A thorough analysis of the breakdown of total intangible assets between other intangible assets and goodwill yields valuable insights into the factors driving a company's competitive edge, its prospects for growth, and the level of risk it faces. This analysis underscores the strategic investments made by companies to acquire tangible and intangible assets, expand their market presence, and enhance shareholder value (Barth et al., 2001b; Lev, 2003).

This investigation enables stakeholders to acquire a more profound understanding of the composition and factors influencing the value of a company's intangible asset portfolio. Effective management and utilisation of both other intangible assets and goodwill are critical for maintaining a competitive advantage, fostering innovation, and achieving sustained growth and profitability in the long run (Barth et al., 2001b; Lev, 2003).

The table to follow represents the portion of intangible assets represented by goodwill and other intangible assets for the selected sample in the 2015 and 2019 financial years, as well as the relevant change over time.

**Table 11: Split of Total IA between Other IA and Goodwill**

Split of Total IA between Other IA and Goodwill		2015		2019		Change	
Company	Industry	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA
1	Banking	94,48%	5,52%	98,74%	1,26%	4,26%	-4,26%
2	Mining	100,00%	0,00%	100,00%	0,00%	0,00%	0,00%
3	Mining	36,06%	63,94%	35,81%	64,19%	-0,26%	0,26%
4	Mining	21,74%	78,26%	5,69%	94,31%	-16,05%	16,05%
5	Pharmaceutical	89,02%	10,98%	93,46%	6,54%	4,44%	-4,44%
6	Mining	23,72%	76,28%	63,41%	36,59%	39,69%	-39,69%
7	General industrials	13,37%	86,63%	38,38%	61,62%	25,01%	-25,01%
8	Tobacco	10,66%	89,34%	62,69%	37,31%	52,04%	-52,04%
9	Mining	100,00%	0,00%	100,00%	0,00%	0,00%	0,00%
10	Banking	41,20%	58,80%	30,92%	69,08%	-10,28%	10,28%
11	Real estate	27,60%	72,40%	16,79%	83,21%	-10,80%	10,80%
12	Logistics	30,24%	69,76%	26,92%	73,08%	-3,31%	3,31%
13	Banking	10,00%	90,00%	70,97%	29,03%	60,97%	-60,97%
14	Banking	65,29%	34,71%	66,45%	33,55%	1,16%	-1,16%
15	Pharmaceutical	29,52%	70,48%	22,56%	77,44%	-6,96%	6,96%
16	Retail	15,11%	84,89%	7,87%	92,13%	-7,24%	7,24%
17	Technology	90,85%	9,15%	94,33%	5,67%	3,47%	-3,47%
18	Technology	51,27%	48,73%	57,81%	42,19%	6,54%	-6,54%
19	Technology	9,56%	90,44%	17,98%	82,02%	8,41%	-8,41%
20	Banking	19,26%	80,74%	29,26%	70,74%	10,00%	-10,00%
21	Insurance	41,65%	58,35%	61,30%	38,70%	19,64%	-19,64%
22	Retail	100,00%	0,00%	87,59%	12,41%	-12,41%	12,41%
23	Financial services	30,72%	69,28%	30,04%	69,96%	-0,67%	0,67%
24	Retail	46,48%	53,52%	56,64%	43,36%	10,16%	-10,16%
25	Insurance	59,03%	40,97%	45,12%	54,88%	-13,91%	13,91%
26	Chemicals	89,26%	10,74%	33,81%	66,19%	-55,45%	55,45%
27	Retail	81,82%	18,18%	91,19%	8,81%	9,37%	-9,37%
28	Banking	82,52%	17,48%	89,77%	10,23%	7,25%	-7,25%
29	Food producer	47,10%	52,90%	54,14%	45,86%	7,04%	-7,04%
30	Technology	69,70%	30,30%	75,25%	24,75%	5,56%	-5,56%
31	Retail	32,11%	67,89%	32,60%	67,40%	0,48%	-0,48%
<b>AVERAGE</b>		<b>50,30%</b>	<b>49,70%</b>	<b>54,76%</b>	<b>45,24%</b>	<b>4,46%</b>	<b>-4,46%</b>

In both 2015 and 2019, the analysis of selected JSE-listed companies reveals notable patterns in the composition of intangible assets across industries. Two mining companies were observed to have 100% of their intangible assets represented by other intangible assets and 0% represented by goodwill in both years. This trend is consistent with the nature of the mining sector, where intangible assets often arise from licenses, patents, or mining rights rather than acquisitions that generate goodwill. Similarly, in 2015, a retail company also reported 100% of its intangible assets as other intangible assets, with no goodwill. However, by 2019, this shifted slightly, with 12.41% of its intangible assets being represented by goodwill. This change is reflective of the retail industry's increased focus on mergers and acquisitions to expand brand presence, access distribution networks, and achieve economies of scale, as goodwill typically arises from such strategic activities (PWC, 2021b).

The banking industry consistently exhibited the highest proportion of other intangible assets as a percentage of total intangible assets in both 2015 (94.48%) and 2019 (98.74%). This aligns with the nature of the financial services sector, where intangible assets typically include customer relationships, software, and proprietary technologies rather than goodwill. These findings are consistent with international studies that show banking institutions in emerging markets rely heavily on internally generated intangible assets rather than goodwill, given their focus on enhancing digital transformation and customer retention (Егоров, 2023).

In contrast, the technology and mining sectors demonstrated a stronger reliance on goodwill as part of their intangible asset balance. In 2015, a technology company had 90.44% of its intangible assets composed of goodwill, reflecting the industry's reliance on acquisitions to secure innovative technologies, intellectual property, and client bases. By 2019, a mining company reported 94.31% of its intangible assets as goodwill, likely resulting from acquisition-driven strategies to secure growth in an otherwise capital-intensive and competitive industry. However, not all companies within the mining sector followed this pattern. Two other mining companies maintained 0% goodwill as part of their intangible asset balances, with all intangible assets classified as other intangible assets, such as mineral rights. This divergence highlights the variability within the

mining sector and underscores the impact of company-specific strategies and acquisition history on intangible asset composition (KPMG, 2023c).

The most significant shift in the composition of intangible assets was observed within the banking sector. A banking company experienced a substantial 60.97% increase in other intangible assets, accompanied by a corresponding 60.97% decrease in goodwill. This shift indicates a strategic revaluation of intangible assets, possibly driven by enhanced investment in internally generated assets such as software, customer databases, and technological platforms, rather than goodwill arising from acquisitions. This trend aligns with broader shifts in the financial services industry, where companies are increasingly prioritising digital transformation and customer-centric innovations to remain competitive in evolving markets (Deloitte, 2020a).

When compared to international studies, these patterns resonate with findings in global markets. Zambon et al. (2020) note that goodwill tends to dominate intangible asset composition in acquisition-heavy industries such as technology and mining, while sectors like banking and retail often report higher proportions of other intangible assets, reflecting their focus on proprietary technologies and customer relationships. However, the South African market presents unique characteristics, including economic volatility, regulatory constraints, and exchange rate fluctuations, which can significantly influence M&A activities and the recognition of intangible assets. For instance, the depreciation of the South African Rand during the study period may have impacted the valuation of international acquisitions, leading to variations in goodwill representation (PWC, 2021b).

In conclusion, the composition of intangible assets among JSE-listed companies varies significantly across industries, with mining and technology firms demonstrating a higher reliance on goodwill, while banking and retail companies prioritise other intangible assets. These findings are consistent with empirical literature and reflect both global trends and South Africa-specific economic and regulatory factors that shape the reporting of intangible assets.

### 5.5.6 Descriptive Statistics

The table below outlines the summary of statistics that reveal key insights into the composition and variability of asset values within this dataset.

**Table 12: Summary Statistics**

	Total Non-Current Asset Value (Rands)	Total Asset Value (Rands)	Intangible Asset Value	% of Intangible Asset Over Total Non-Current Asset	% of Intangible Asset Over Total Asset
Mean	1.98E+11	2.99E+11	1.21E+10	0.190378	0.123676
Median	4.96E+10	7.99E+10	3.51E+09	0.098844	0.040658
Maximum	1.97E+12	2.28E+12	1.24E+11	0.929978	0.847419
Minimum	1.36E+09	6.47E+09	4000000.	0.000280	0.000231
Std.Dev	3.60E+11	4.69E+11	2.19E+10	0.247957	0.189558
Skewness	3.170509	2.254052	3.041393	1.733308	2.174638
Kurtosis	14.01631	7.943641	13.16817	5.237740	7.140725
Jarque- Bera	1104.045	305.8777	959.3452	116.3369	246.4223
Probability	0.000000	0.000000	0.000000	0.000000	0.000000

Firstly, the average total value of non-current assets is quantified at R198 billion, signifying a considerable foundation of long-term assets among the organisations examined. Nevertheless, the extensive standard deviation of 360 billion indicates considerable variability in the assessment of these non-current assets, reflecting the heterogeneous nature of asset portfolios across different entities. Furthermore, the average total asset value exceeds that of non-current assets, with a mean of 299 billion, suggesting a significant presence of current assets within the overall composition. The elevated standard deviation of 469 billion emphasises the wide dispersion of total asset values among the entities surveyed, indicating a broad spectrum of financial strengths and structural compositions.

Secondly, intangible assets represent a smaller yet noteworthy segment of the overall asset composition. At 12.1 billion, the average for intangible assets is noted, accompanied by a standard deviation of 21.9 billion, reflecting a substantial range of valuation differences among the entities. Considering averages, intangible assets hold a share of 19.04% in total non-current assets and 12.37% in the total assets. These figures, along with their corresponding standard deviations of 24.80% and 18.96%, underscore the differing levels of dependence on intangible assets within the

asset portfolios of the surveyed organisations. In summary, the descriptive statistics furnish a thorough overview of asset values, elucidating both the importance of non-current and intangible assets within the dataset, as well as the notable variability in their assessments across different entities.

### 5.5.7 Multicollinearity Test

Multicollinearity testing for the model was conducted with the results provided in the table below.

**Table 13: Multicollinearity Test**

Variable	Variance inflation factor (VIF)
% of IA over total assets	1.090
% of IA over total non-current assets	1.283
Intangible asset value	1.001
Total asset value	1.337
Total non-current asset value	1.928

Source: Self-generated

Table 13 illustrates the variance inflation factor (VIF) utilised to evaluate multicollinearity amongst predictor variables within a regression model, where values exceeding 1 are indicative of potential correlation issues. Specifically, the % of IA over total assets displays a VIF of 1.090 in the examination of various variables related to asset composition, hinting at a mild inflation in coefficient variance. Similarly, the % of IA over total non-current assets exhibits a VIF of 1.283, suggesting a moderate level of multicollinearity with other predictors present in the model. Despite showcasing some correlation with the model's other components, the extent of inflation is deemed manageable, thereby implying a restricted impact on coefficient estimates.

In contrast, the VIF for the intangible asset value just slightly exceeds 1, registering at 1.001. This minimal inflation near zero implies minimal multicollinearity, highlighting the variable's independence from other predictors encompassed in the model. Conversely, the total asset value

demonstrates a VIF of 1.337, indicating a moderate degree of correlation with the other variables. While the inflation rate is marginally higher compared to the % of IA over total assets and % of IA over total non-current assets, it remains within acceptable limits, suggesting a moderate influence on coefficient estimates.

Noteworthy is the total non-current asset value showing the highest VIF amongst the variables, reaching 1.928. This high value signifies a notable correlation with other predictors, potentially resulting in inflated coefficient variances and exerting a more substantial impact on the outcomes of the regression model. Despite the presence of multicollinearity across the variables, the collective VIF values suggest a manageable influence on the regression analysis, with certain variables displaying stronger correlations than others.

### **5.5.8 Multiple Regression Output**

The purpose of performing this multiple regression output test, where cross-sectional coefficients are estimated annually, is to analyse the relationship between intangible asset valuations and firm value (or other dependent variables) over multiple years while accounting for variations in economic conditions, regulatory changes, and market dynamics.

By running separate cross-sectional regressions for each year, the study determined whether the relationship between intangible assets and firm value (or another dependent variable) remains stable, strengthens, or weakens over time. Significant variations across years could indicate changing investor perceptions, shifts in accounting policies, or macroeconomic influences.

The t-statistics and probability (p-values) allow for an assessment of whether the independent variables significantly impact the dependent variable in each specific year. If the p-values are below a chosen significance level (e.g., 0.05), the findings suggest a statistically significant relationship. Comparing the coefficients over different years helps in understanding whether intangible assets have gained or lost relevance in explaining firm value. This could provide insights into the evolving role of intangible assets in financial reporting and investment decisions.

If the coefficients and significance levels fluctuate significantly across years, it may indicate anomalies or structural breaks in the data, such as the impact of new IFRS standards, major economic events, or corporate scandals (e.g., Steinhoff's case affecting Pepkor's intangible asset valuations).

Performing annual cross-sectional multiple regression tests provides a robust method for examining intangible assets over time. It enhances the study's empirical rigor by validating the relevance and reliability of intangible asset valuations, offering insights into how these assets contribute to firm valuation in the South African market.

The cross-sectional coefficients estimated annually are compiled in the table below, representing distinct cross-sectional regressions conducted for each of the five years.

**Table 14: Multiple Regression Output**

Year	TAV	$\delta_0$	$\delta_1$	$\delta_2$	$\delta_3$	F-test	R <sup>2</sup>
2015	Total asset value	3.50E+11**	19.664 *	-5.86E+11	-1.40E+12	4.453 *	E
		[4.0700]	[3.03837]	[-0.5083]	[-0.8327]		
2016	Total asset value	3.57E+11 *	23.454 *	-2.75E+11	-2.25E+12	5.185 *	0.3491
		[4.2654]	[3.3464]	[-0.2020]	[-1.1585]		
2017	Total asset value	3.75E+11 *	17.849 *	1.01E+11	-2.51E+12	3.879 *	0.2864
		[4.0667]	[2.9235]	[0.0794]	[-1.4235]		
2018	Total asset value	3.60E+11 *	22.191 *	3.86E+11	-3.86E+12 *	5.046 *	0.3509
		[3.6606]	[3.5087]	[0.3679]	[-2.1824]		
2019	Total asset value	4.06E+11 *	24.189 *	8.24E+11	-4.35E+12 *	5.932 *	0.3886
		[3.8345]	[3.6454]	[0.7328]	[-2.3973]		
<b>TNCAV</b>							
2015	Total non-current asset value	3.11E+11 *	14.126 *	-5.71E+11	-1.26E+12	4.361 *	0.3184
		[3.7445]	[2.7204]	[-0.6486]	[-0.8903]		
2016	Total non-current asset value	2.72E+11 *	18.559 *	-1.96E+12	7.48E+12	5.743 *	0.3727
		[4.2302]	[3.4461]	[-1.8730]	[0.5009]		
2017	Total non-current asset value	2.92E+11 *	12.262 *	-1.33E+09	-1.80E+11	3.791 *	0.2817
		[4.0591]	[2.5704]	[-1.3345]	[-0.0013]		
2018	Total non-current asset value	2.78E+11 *	13.839 *	-8.24E+11	-9.29E+11	4.209 *	0.3108
		[3.6610]	[2.8359]	[-1.0185]	[-0.7353]		
2019	Total non-current asset value	3.11E+11 *	14.126 *	-5.71E+11	-1.26E+12	4.361 *	0.3184
		[3.7445]	[2.7204]	[-0.6487]	[-0.8903]		

(\*) represent significance at a 5% level while [ ] represent the t-statistic.

Source: Self-generated

An examination of the t-statistics and probability values is summarised in the table below.

**Table 15: Multiple Regression Summary**

Coefficient	Significant	Not Significant
Total Asset Value		
$\delta_0$	5	0
$\delta_1$	5	0
$\delta_2$	0	5
$\delta_3$	2	3
Total non-current asset value		
$\delta_0$	5	0
$\delta_1$	5	0
$\delta_2$	0	5
$\delta_3$	0	5

Source: Self-generated

The values utilised in the analysis served as a crucial tool to determine the statistical significance of the model, yielding a robust outcome that underscored the importance of the constant term in relation to both outcome variables across all models. In statistical analysis, significance is typically ascertained through the examination of p-values, where a predetermined threshold of  $p < 0.05$  is used to establish statistical significance. This particular discovery suggests that the constant term within the regression models holds a statistical distinction from zero, indicating a fundamental level of the dependent variable that remains unaffected by the independent variables employed.

Furthermore, it is noteworthy that not all variables exhibited significance concurrently within a given year. This occurrence can be attributed to the dynamic nature of economic and industry-specific factors that impact both intangible assets and total assets. Variables that demonstrate significance in one year may lose their relevance in another due to shifts in the economic landscape, regulatory frameworks, or company-specific conditions. This variability accentuates the necessity for longitudinal studies within the realm of accounting research to capture the temporal aspect of these intricate relationships, as emphasised by Kothari (2001).

Similarly, the independent variables showcased the ability to elucidate up to 37.27% of the variation in the total non-current asset value. The relatively strong explanatory power of the model concerning both total asset value and total non-current asset value underscores the significance of the selected variables in capturing the intricacies of asset valuation. This finding aligns with earlier research that accentuates the importance of intangible assets in the valuation of firms, as emphasised by Lev et al. (2004).

Remarkably, between 2015 and 2019, there existed a substantial correlation between the probability value for the ratio of intangible assets to total non-current assets within both the total asset value and total non-current asset value models. This observation indicates a consistent association between intangible assets and overall asset valuation across diverse time periods, highlighting the increasing significance of intangible assets in today's economy, as noted by Corrado et al. (2022); Corrado et al. (2009).

### 5.5.9 Endogeneity Test

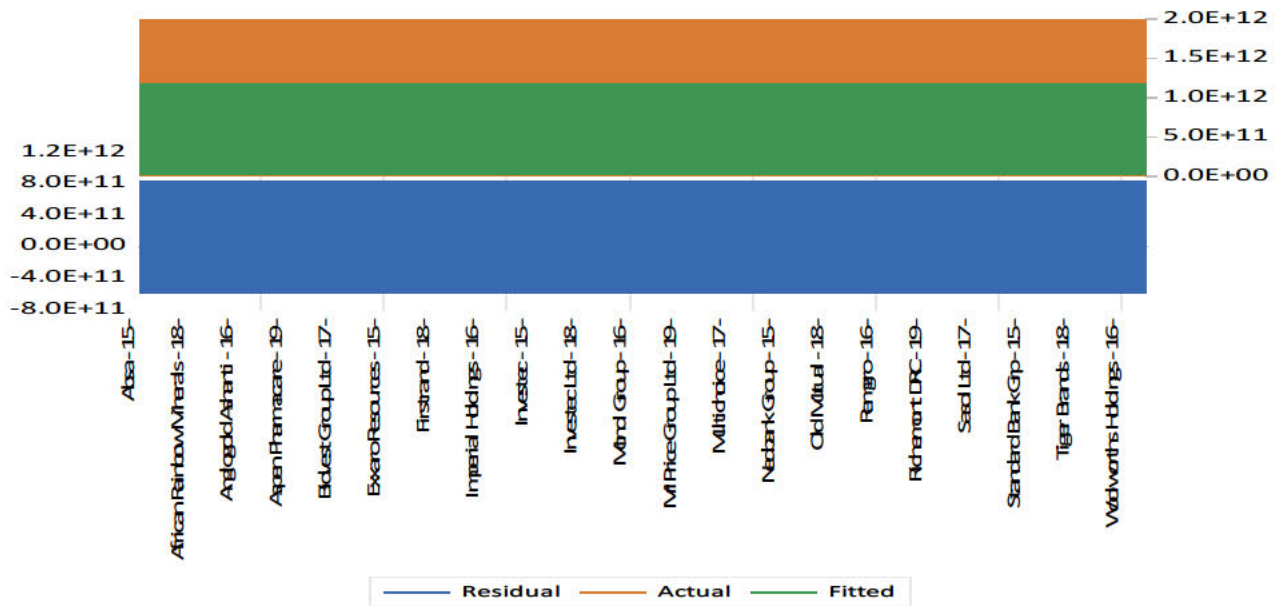
Endogeneity testing for the model was conducted, and the results are provided in the table below.

**Table 16: Test of endogeneity table**

Variable	Coefficient	Std. Error	t-Statistic	Probability value [Wald test (t-statistic)]	Comment
Residual %IAOTA	0.048868	0.013007	0.756972	0.0002	Endogeneity not present
Residual %IAOTNCA	-0.035970	0.016289	-1.208286	0.0278	Endogeneity not present
Residual_IVA	-0.188066	0.075154	-1.502406	0.0127	Endogeneity not present
Residual_TAV	0.018077	0.012985	1.495841	0.1355	Endogeneity not present
Residual_TNCAV	0.047311	0.018751	0.523175	0.0120	Endogeneity not present

Source: Self-generated

Table 16 presents the endogeneity test, with results indicating that the exogenous assumption is not breached. Therefore, the outcomes for both fixed and random effect models are considered efficient for estimation purposes in this particular study.



**Figure 6: Plot of residual, Actual, and Fitted values**

Source: Self-generated

Figure 6 depicts residuals, actual and fitted values in regression analysis, typically showing the observed data points ("actual") juxtaposed with the predictions generated by the regression model ("fitted"). The residuals, representing the variances between observed and predicted values, are visually depicted as the vertical deviations between each data point and the regression line. This graphical representation aids in visualising how effectively the model captures the relationship between independent and dependent variables, ideally showcasing random scatter around zero for the residuals, signifying the model's ability to adequately account for data variance.

### 5.5.10 Diagnostic Testing

Diagnostic testing for the model was conducted using a cross-sectional dependence test, as provided in the table below.

**Table 17: Cross-sectional dependence test**

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Residual Cross-Section Dependence Test  
Null hypothesis: No cross-section dependence (correlation) in residuals  
Equation: Untitled  
Periods included: 5  
Cross-sections included: 33  
Total panel (unbalanced) observations: 164  
Note: non-zero cross-section means detected in data  
Test employs centered correlations computed from pairwise samples

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Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	0.781301	528	0.0888
Pesaran scaled LM	0.054392		0.9432
Pesaran CD	0.093881		0.3442

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Source: Self-generated

The Breusch-Pagan Lagrange Multiplier (LM) test, depicted in Table 17, was applied to the regression model, yielding a test statistic of 0.781301 with a p-value of 0.0888. This result is crucial as it strongly indicates the lack of heteroscedasticity within the model, where the residual variance remains consistent across the range of independent variable values. A non-significant LM statistic supports the null hypothesis that heteroscedasticity is not present, indicating that the fluctuations in residuals do not vary with the levels of independent variables. Furthermore, the Pesaran scaled LM test yielded a coefficient of 0.054392 with a notably high p-value of 0.9432, suggesting a lack of statistically significant evidence for cross-sectional dependence in the panel data model. This implies that the relationship amongst error terms across various entities in the dataset lacks substantial strength to raise concerns about cross-sectional dependence. Hence, the assumptions of cross-sectional independence appear to be valid, enhancing the reliability of the model's standard errors and confirming the statistical conclusions drawn from the regression analysis.

### **5.5.11 Discussion**

A detailed analysis of intangible assets and their contribution to the total assets of JSE-listed companies underscores their pivotal role in determining the financial standing and valuation of these entities. The findings highlight that intangible assets—comprising goodwill and other intangible assets—form a significant portion of the total asset composition across various sectors, underscoring their relevance in financial reporting. This reinforces the critical importance of recognising and accurately valuing intangible assets to ensure the reliability of financial statements and provide a clear reflection of a company's financial position and growth potential.

The study reveals distinct sectoral variations in the composition of intangible assets, with knowledge-intensive and innovation-driven industries such as pharmaceuticals and technology demonstrating a significantly higher proportion of intangible assets relative to total assets. These sectors inherently rely on intellectual property, research and development, and technological innovation, making intangible assets key drivers of value creation and competitive advantage (Zambon et al., 2020). In contrast, more traditional, resource-based industries, such as mining and forestry, display lower proportions of intangible assets, reflecting their reliance on tangible, physical assets like equipment and natural resources. Within the South African market, this trend aligns with the broader economic composition, where resource-based industries have historically dominated, although emerging sectors such as technology are increasingly gaining prominence. This is consistent with empirical studies in other markets, where intangible assets have proven more prevalent and impactful in sectors focused on innovation and intellectual capital (Barker et al., 2022; Wyatt, 2005).

The analysis also demonstrates a positive correlation between intangible asset levels and the market valuation of JSE-listed firms, highlighting their relevance as a critical factor influencing investor perceptions and corporate valuation. Investors appear to place considerable value on intangible assets as they represent future economic benefits and potential growth, particularly in industries where such assets form the foundation of operational and financial success. These findings align with previous empirical studies that suggest intangible assets play a vital role in firm

valuation globally, particularly in sectors with significant R&D expenditures or strong brand equity (Castro, Ramírez, & Escobar, 2021; Smith & Parr, 2000). In the South African context, this correlation reflects the evolving nature of the JSE, as companies in technology, pharmaceuticals, and retail increasingly leverage intangible assets to enhance their competitive positioning.

The findings align with the Resource-Based View of the firm, which asserts that unique and non-imitable resources, such as intangible assets, serve as key drivers of sustained competitive advantage. Knowledge-intensive sectors, such as pharmaceuticals and technology, exemplify this theory, as their intangible assets (e.g., patents, R&D) are critical for value creation and differentiation. The findings also resonate with stakeholder theory, as robust reporting of intangible assets enhances transparency and provides decision-useful information to stakeholders, particularly investors. Accurate valuations help build trust and confidence in sectors reliant on intangible assets.

The findings emphasise the necessity for robust reporting and measurement practices to address both the relevance and reliability of intangible asset values. Industries such as technology and pharmaceuticals, which rely heavily on intangible assets, demonstrate the importance of these assets in both total asset composition and market valuation. At the same time, traditional industries, such as mining, must contend with the challenges of limited intangible asset contributions, highlighting the sectoral disparities in how intangible assets are accounted for and valued. This is consistent with trends observed in other global markets, where sectors with high R&D or brand reliance face greater pressures to accurately reflect intangible asset values (Godfrey & Koh, 2001; KPMG, 2023a).

### **5.5.12 Conclusion**

The analysis of intangible assets within JSE-listed companies highlights their critical role in corporate valuation, financial reporting, and investor decision-making. The study finds that intangible assets, including goodwill and other identifiable intangibles, constitute a substantial portion of total assets, particularly in knowledge-intensive sectors such as pharmaceuticals and

technology. These findings underscore the growing importance of intellectual capital, brand value, and R&D investments in driving firm competitiveness and market valuation. In contrast, traditional resource-based industries exhibit lower reliance on intangible assets, reflecting their dependence on physical and natural resources. This sectoral disparity aligns with both international trends and the economic structure of South Africa, where the rise of technology-driven industries is gradually reshaping the corporate landscape.

The positive correlation between intangible asset levels and firm valuation suggests that investors perceive intangible assets as key contributors to future growth and profitability. This supports the Resource-Based View, which posits that unique, non-imitable assets serve as the foundation of sustained competitive advantage. Furthermore, the findings align with stakeholder theory, emphasising that transparent and reliable reporting of intangible assets enhances investor confidence and market efficiency. Given the complexities associated with intangible asset valuation—such as impairment assessments, fair value estimates, and regulatory compliance—the study reinforces the need for enhanced financial reporting practices to ensure both the relevance and reliability of intangible asset disclosures.

#### **5.6 Objective 4: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies**

The purpose of Objective 4 is to compare industry results to determine whether one holds a higher degree of disparity in terms of the value of intangible assets over other industries for JSE-listed companies in South Africa. This will aid in understanding whether specific industries would be more impacted by any misstatement in achieving intangible asset values that are both relevant and reliable. The objective provides additional insight to further deepen the understanding of results achieved by other objectives in an effort to obtain a holistic review relating to the relevance and reliability of intangible asset values. The objective will be achieved by segregating the results per industry using Appendix 1 and establishing whether there are differences between industries.

### **5.6.1 Introduction**

A holistic analysis was performed, stratifying information derived in Objective 3 by industry to determine any potential patterns or trends in the results. In relation to the title of the study, it is important to understand the significance/materiality of the investment in intangible assets in relation to other assets to supplement the understanding of the reliability of the information provided and the necessity to avoid any misstatements in the values. The analysis included total intangible assets in relation to total assets and total non-current assets; other intangible assets in relation to total assets and total non-current assets; goodwill in relation to total assets and total non-current assets; and finally, analysing the composition of total intangible assets between goodwill and other intangible assets.

### **5.6.2 Total Intangible Assets (including other intangible assets and goodwill) stratified by industry**

The following table provides the results of the total intangible assets in relation to total assets and total non-current assets for the identified industries.

**Table 18: Total Intangible Assets in relation to Total Assets and Total Non-current Assets Stratified by Industry**

Company	Industry	2015		2019		Change	
		% of IA over total assets	% of IA over total non-current assets	% of IA over total assets	% of IA over total non-current assets	% of IA over total assets	% of IA over total non-current assets
1	Banking	0,65%	1,12%	0,78%	1,37%	0,12%	0,25%
2	Mining	2,96%	3,52%	1,49%	1,91%	-1,48%	-1,62%
3	Pharmaceutical	46,49%	70,48%	55,09%	74,81%	8,60%	4,33%
4	General industrials	17,43%	36,34%	14,23%	28,38%	-3,19%	-7,96%
5	Tobacco	33,11%	48,09%	84,24%	93,00%	51,13%	44,91%
6	Logistics	10,95%	23,65%	21,49%	40,50%	10,54%	16,85%
7	Real estate	2,42%	2,50%	1,40%	1,46%	-1,03%	-1,04%
8	Forestry and paper	10,74%	15,36%	12,05%	16,20%	1,31%	0,85%
9	Retail	42,13%	64,35%	34,35%	57,04%	-7,78%	-7,31%
10	Technology	16,99%	23,85%	10,36%	14,22%	-6,62%	-9,63%
11	Insurance	0,48%	0,53%	1,85%	2,00%	1,38%	1,47%
12	Financial services	6,03%	7,79%	15,45%	20,89%	9,42%	13,10%
13	Personal goods	3,82%	17,27%	21,79%	56,79%	17,98%	39,52%
14	Food producer	17,03%	31,98%	14,53%	29,44%	-2,51%	-2,54%
<b>AVERAGE</b>		<b>15,09%</b>	<b>24,77%</b>	<b>20,65%</b>	<b>31,29%</b>	<b>5,56%</b>	<b>6,51%</b>

Source: Self-generated

In 2015, it was observed that the pharmaceutical industry within the chosen sample exhibited the highest level of representation in relation to total intangible assets, accounting for 46.49% of the total assets and a significant 70.48% of the total non-current assets. This particular data point sheds light on the fact that during 2015, a substantial proportion of the assets owned by the pharmaceutical sector were comprised of intangible assets, encompassing goodwill along with other intangible assets. These findings stand in stark contrast to the outcomes pertaining to individual companies, as depicted in the preceding section, which indicated that a retail enterprise had recorded the most significant figures in terms of total intangible assets for the year 2015. Therefore, it can be inferred that the results obtained from individual companies could be considered as an outlier rather than a typical representation of the industry as a whole, ultimately leading to the determination that the pharmaceutical industry was more reliant on intangible assets during the year 2015.

Transitioning to the year 2019, it was noted that the tobacco industry within the selected sample displayed the highest proportion of total intangible assets, constituting 84.24% of the total assets and a notable 93% of the total non-current assets. This particular revelation highlights the fact that by 2019, a considerable portion of the tobacco sector's assets were categorised as intangible assets, including goodwill and other intangible assets. Evidently, there seemed to have been a shift in trends from the year 2015 to 2019, as the pharmaceutical industry, which previously held the top position in this regard, was now overtaken by the tobacco industry in terms of intangible asset representation. Notably, the tobacco industry witnessed the most significant changes in total intangible assets concerning both total assets and total non-current assets, with a notable surge of 51.13% in total intangible assets as a proportion of total assets and a substantial increase of 44.91% in total intangible assets as a portion of total non-current assets.

Both the pharmaceutical and tobacco industries are considered to be intangible asset-intensive sectors. The tobacco industry is widely acknowledged for its substantial reliance on intangible assets, which encompass a diverse array of components that are essential for its functioning and competitive positioning within the market. This considerable dependency on intangible assets within the sector can be traced back to various causes, like stringent industry regulations, deep-

rooted customer brand loyalty, and the advanced product differentiation strategies that companies implement to distinguish themselves from rivals.

An example of a highly significant intangible asset prevalent in the tobacco industry is brand equity, which serves as a crucial driver of consumer preferences and loyalty towards specific tobacco products. Brands operating within the tobacco sector often boast of extensive histories and possess strong associations with notions of quality and prestige, thereby cultivating a dedicated and loyal customer base, as highlighted by Harjadi, Fatmasari, and Hidayat (2023). These brands represent invaluable intangible assets that significantly contribute to a company's market share and influence over pricing strategies.

Intellectual property rights such as patents and trademarks hold significant importance as intangible assets within the tobacco industry. Companies within this sector allocate substantial resources toward research and development efforts aimed at fostering innovation in product offerings and technologies while simultaneously safeguarding their intellectual property from potential infringements, as emphasised by Harjadi et al. (2023). These intellectual property assets serve as a critical competitive differentiator, empowering companies to introduce novel products and diverse flavor profiles to meet evolving consumer demands.

Additionally, the establishment and maintenance of robust distribution networks and strong supply chain relationships emerge as pivotal intangible assets crucial for success within the tobacco industry. The efficient management of distribution channels and the cultivation of strong partnerships with retailers play a vital role in ensuring product availability and expanding market penetration opportunities, as noted by Anderson, Hastings, and MacFadyen (2002). These distribution networks embody intangible assets that significantly bolster a company's competitive edge and its overall dominance within the market landscape.

Furthermore, adherence to regulatory standards and the implementation of social responsibility initiatives have emerged as increasingly crucial intangible assets for tobacco companies in recent years. In light of escalating public health concerns and heightened regulatory scrutiny, companies

operating within the tobacco industry must allocate resources towards compliance programs, product safety measures, and corporate social responsibility endeavors to safeguard their reputation and mitigate risks, which was highlighted by Gilmore, Gallagher, and Rowell (2019). These concerted efforts serve to augment a company's intangible assets by cultivating trust and credibility among various stakeholders.

In conclusion, the tobacco industry's heavy dependence on intangible assets highlights the crucial significance of proficient management and strategic utilisation of these assets to uphold a competitive edge and guarantee long-term prosperity in the market. Gilmore et al. (2019) state that by acknowledging and leveraging the inherent value of intangible assets, tobacco companies can bolster their market positioning, foster innovation, and generate enduring value for their shareholders.

The pharmaceutical industry is widely acknowledged for its substantial reliance on intangible assets. This factor plays a pivotal role in stimulating innovation, enhancing competitive edge, and fostering value generation within the sector. It is extensively recorded that research and development expenses constitute a significant share of the funds allocated by pharmaceutical companies, indicating the industry's keen attention to intangible assets like intellectual property rights, patents, and proprietary technology (Ravenscraft & Scherer, 2011). These intangible assets serve as indispensable tools in the advancement of new drugs, biotechnological breakthroughs, and therapeutic innovations, thereby making substantial contributions to the industry's expansion and long-term viability.

Furthermore, the pharmaceutical industry's substantial investments in research and development activities underscore the critical significance of intellectual capital and human capital as fundamental intangible assets. Intellectual capital encompasses the wealth of scientific knowledge, expertise, and exclusive information possessed by pharmaceutical firms, empowering them to generate value through the exploration, development, and commercialisation of groundbreaking drugs and treatments (Edvinsson & Malone, 1997). Human capital, which is embodied by proficient researchers, scientists, and professionals, plays a pivotal role in propelling the R&D

process forward, translating scientific breakthroughs into marketable products, and maintaining the industry's competitive stance (Bontis, 1998).

Moreover, the pharmaceutical industry's reliance on brand value and reputation as intangible assets is clearly evident in its marketing approaches, endeavours in product differentiation, and initiatives to foster customer loyalty. The idea of brand equity, which is established on the reputation of pharmaceutical companies and the perceived value of their products, exerts a notable impact on consumer preferences, prescribing patterns, and market share (Kapferer, 2008). Pharmaceutical brands are frequently associated with attributes like quality, effectiveness, and therapeutic outcomes, which drive demand, cultivate patient confidence, and enable premium pricing strategies ((Grabowski & Vernon, 1992).

The pharmaceutical industry's emphasis on intangible assets highlights the instrumental role of intellectual property, research capabilities, human expertise, and brand equity in stimulating innovation, enhancing competitive advantage, and driving market performance within the sector. These intangible assets not only shape the growth trajectory of the industry but also make substantial contributions to its enduring value creation and sustainability.

### **5.6.3 Other intangible assets (excluding goodwill) stratified by industry**

The following table provides the results of the other intangible assets in relation to total assets and total non-current assets for the identified industries.

**Table 19: Other Intangible Assets in relation to Total Assets and Total Non-current Assets Stratified by Industry**

Company	Industry	2015		2019		Change	
		% of Other IA over total assets	% of Other IA over total non-current assets	% of Other IA over total assets	% of Other IA over total non-current assets	% of Other IA over total assets	% of Other IA over total non-current assets
1	Banking	0,47%	0,80%	0,57%	1,00%	0,10%	0,20%
2	Mining	0,91%	1,09%	0,62%	0,79%	-0,29%	-0,29%
3	Pharmaceutical	39,70%	60,18%	43,97%	59,70%	4,27%	-0,48%
4	General industrials	2,33%	4,86%	5,46%	10,89%	3,13%	6,04%
5	Tobacco	3,53%	5,12%	52,81%	58,30%	49,29%	53,18%
6	Logistics	3,31%	7,15%	5,79%	10,90%	2,48%	3,75%
7	Real estate	0,67%	0,69%	0,23%	0,25%	-0,43%	-0,44%
8	Forestry and paper	1,62%	2,32%	0,95%	1,28%	-0,67%	-1,04%
9	Retail	13,60%	20,77%	11,46%	19,02%	-2,14%	-1,75%
10	Technology	7,06%	9,92%	5,86%	8,05%	-1,20%	-1,87%
11	Insurance	0,43%	0,47%	0,72%	0,78%	0,29%	0,30%
12	Financial services	2,80%	3,62%	8,75%	11,83%	5,95%	8,21%
13	Personal goods	2,25%	10,19%	9,83%	25,62%	7,58%	15,43%
14	Food producer	8,02%	15,06%	7,86%	15,94%	-0,16%	0,88%
<b>AVERAGE</b>		<b>6,19%</b>	<b>10,16%</b>	<b>11,06%</b>	<b>16,03%</b>	<b>4,87%</b>	<b>5,86%</b>

Source: Self-generated

The results demonstrate that in 2015, the pharmaceutical industry in the selected sample demonstrated the highest proportion of other intangible assets (excluding goodwill) relative to both total assets (39.7%) and total non-current assets (60.18%). This indicates that a significant portion of the pharmaceutical industry's asset base was attributable to other intangible assets, such as patents, licenses, and research and development expenditures. These findings align with the individual company results from the same year, where a pharmaceutical company exhibited the highest proportion of other intangible assets. This congruence suggests that the pharmaceutical industry, as a whole, was more intangible asset-intensive in 2015 compared to other industries. Such a trend is consistent with empirical studies that highlight the pharmaceutical sector's reliance on intangible assets as core drivers of value creation, particularly in markets where innovation and intellectual property are critical components of competitive advantage (Hunter et al., 2005; Lev et al., 2004).

By 2019, the tobacco industry from the selected sample demonstrated the highest representation of other intangible assets as a percentage of total assets (52.81%), while the pharmaceutical industry maintained the highest representation of other intangible assets as a percentage of total non-current assets (59.7%). This shift highlights that by 2019, two key industries—tobacco and pharmaceuticals—held substantial portions of their assets in the form of other intangible assets. The increase in the tobacco industry's reliance on other intangible assets is particularly noteworthy, reflecting the sector's shift towards leveraging intangible assets such as brand equity, proprietary blends, and intellectual property amidst evolving consumer preferences and increasing regulatory pressures. This is corroborated by research that identifies brand equity and intellectual property as critical contributors to the tobacco industry's asset base, particularly in markets with heightened scrutiny and restrictions on advertising (Aaker, 2009; Hendlin et al., 2024).

From 2015 to 2019, the data reveals a significant shift, with the tobacco industry experiencing the largest increase in the proportion of other intangible assets relative to both total assets and total non-current assets. Specifically, other intangible assets as a portion of total assets grew by 49.29%, while as a portion of total non-current assets, they increased by 53.18%. This dramatic rise suggests a strategic pivot by the tobacco industry to focus on intangible asset development, potentially in

response to declining reliance on traditional revenue streams and the need to innovate in product development, such as reduced-risk products and nicotine alternatives. These findings are consistent with global trends in the tobacco industry, where companies increasingly prioritise intellectual property, patents, and brand management as integral to their business strategies (KPMG, 2023b; Yang, Xu, Allen, & Yang, 2023)

For the South African market, these findings underline the broader relevance of intangible assets to industries listed on the JSE. The pharmaceutical industry, known for its R&D expenditures and patents, consistently demonstrates a high reliance on other intangible assets, reflecting trends observed in developed markets such as the United States and Europe (Deloitte, 2020b). Similarly, the tobacco industry's growing dependence on intangible assets aligns with global shifts toward leveraging brand equity and innovation. This transformation highlights the increasing importance of recognising and accurately measuring other intangible assets within financial statements, particularly in industries undergoing significant regulatory and consumer-driven changes.

These results affirm the integral role of intangible assets in shaping the financial and operational strategies of JSE-listed companies. The pharmaceutical and tobacco industries' reliance on these assets underscores the necessity for transparent and reliable valuation methods, particularly under the framework of IFRS. As observed globally, the challenges of valuing intangible assets, especially in sectors with high innovation intensity, require continuous refinement in reporting standards to enhance the relevance and reliability of financial statements (Zambon et al., 2020).

#### **5.6.4 Goodwill stratified by industry**

The following table provides the results of the total goodwill in relation to total assets and total non-current assets for the identified industries.

**Table 20: Goodwill in Relation to Total Assets and Total Non-current Assets Stratified by Industry**

Company	Industry	2015		2019		Change	
		% of Goodwill over total assets	% of Goodwill over total non-current assets	% of Goodwill over total assets	% of Goodwill over total non-current assets	% of Goodwill over total assets	% of Goodwill over total non-current assets
1	Banking	0,19%	0,32%	0,21%	0,37%	0,02%	0,05%
2	Mining	2,05%	2,44%	0,87%	1,11%	-1,18%	-1,33%
3	Pharmaceutical	6,79%	10,30%	11,13%	15,11%	4,33%	4,81%
4	General industrials	15,10%	31,48%	8,77%	17,49%	-6,33%	-13,99%
5	Tobacco	29,59%	42,97%	31,43%	34,69%	1,84%	-8,27%
6	Logistics	7,64%	16,50%	15,70%	29,60%	8,07%	13,10%
7	Real estate	1,76%	1,81%	1,16%	1,22%	-0,59%	-0,60%
8	Forestry and paper	9,12%	13,04%	11,10%	14,93%	1,98%	1,89%
9	Retail	28,53%	43,58%	22,89%	38,01%	-5,64%	-5,56%
10	Technology	9,92%	13,93%	4,50%	6,17%	-5,42%	-7,76%
11	Insurance	0,05%	0,05%	1,13%	1,22%	1,08%	1,17%
12	Financial services	3,23%	4,17%	6,70%	9,06%	3,47%	4,89%
13	Personal goods	1,56%	7,08%	11,96%	31,17%	10,40%	24,09%
14	Food producer	9,01%	16,92%	6,66%	13,50%	-2,35%	-3,42%
<b>AVERAGE</b>		<b>8,90%</b>	<b>14,61%</b>	<b>9,59%</b>	<b>15,26%</b>	<b>0,69%</b>	<b>0,65%</b>

Source: Self-generated

In 2015, the tobacco industry from the selected sample had the highest representation of goodwill as a percentage of total assets (29.59%), and the retail industry had the highest representation of goodwill as a percentage of total non-current assets (43.58%). This reveals that in 2015, a smaller portion of the assets held by the tobacco industry were represented by goodwill, as opposed to other intangible assets. These results are in contrast with the individual company results from the previous section, which revealed that a retail company had the highest individual results for goodwill in 2015, thus seeming to be an outlier in terms of other companies within the retail industry. In 2019, the tobacco industry from the selected sample had the highest representation of goodwill as a percentage of both total assets (31.43%), while the retail industry had the highest representation of goodwill as a percentage of total non-current assets (38.01%). This reveals that in 2019, two industries (tobacco and retail) held a high portion of goodwill. It appears that, despite the time period from 2015 to 2019, the tobacco industry remained the highest representation of goodwill in relation to total assets, whereas the retail industry remained the highest representation of goodwill in relation to non-current assets. Surprisingly, the personal goods industry represented the highest change in goodwill in relation to total assets and total non-current assets, with an increase of 10.4% for goodwill as a portion of total assets and an increase of 24.09% for goodwill as a portion of total non-current assets.

The tobacco industry has a wealthy past characterised by a tendency to engage in strategic acquisitions as a means of expanding its market presence, diversifying product offerings, and ultimately enhancing its competitive advantage. These strategic acquisitions often lead to the identification of goodwill on the statement of financial position of the acquiring company, symbolising the additional value paid to obtain established brands, market share, and other valuable assets. Noteworthy is the fact that major tobacco corporations have actively pursued acquisitions of both domestic and international tobacco firms with the goal of accessing new markets, distribution channels, and a wider array of product lines to strengthen their market positions ((Seidenberg, Jo, & Ribisl, 2016).

An exemplary instance of acquisition activity within the tobacco sector is the acquisition of Reynolds American Inc. by British American Tobacco (BAT) in 2017. BAT, distinguished as one

of the preeminent tobacco businesses globally, concluded the acquisition of the remaining 57.8% stake in Reynolds American Inc. that was not previously held, thereby strengthening its position in the U.S. tobacco market and improving its global presence ((Campá García, 2019). This acquisition led to the acknowledgment of substantial goodwill on BAT's financial statements, symbolising the premium paid to obtain Reynolds American's valuable brands, such as Newport and Camel, in addition to its extensive distribution network and market share.

Similarly, Philip Morris International (PMI), another prominent player in the tobacco industry, has actively engaged in acquisitions to broaden its range of tobacco and alternative products. In 2008, PMI successfully acquired Swedish Match South Africa, a leading tobacco company in the South African market, as part of the company's strategy to reinforce its presence in Africa and expand its product offerings (Welch, 2014). This acquisition empowered PMI to capitalise on Swedish Match South Africa's brands, manufacturing capabilities, and distribution channels, leading to the identification of goodwill in its financial records.

These instances vividly demonstrate the pivotal role that acquisitions play in shaping the growth strategy and value-creation efforts within the tobacco industry. Through the acquisition of well-established brands, market share, and distribution networks, tobacco companies seek to fortify their competitive positions, drive revenue expansion, and optimise shareholder value. The recognition of goodwill stemming from these acquisitions underscores the strategic importance of the acquired assets and their contribution to the long-term prosperity of the acquiring entities.

The retail industry in South Africa has witnessed a substantial surge in merger and acquisition activities, driven by companies' aspirations to broaden their market presence, diversify their product portfolio, and establish a competitive edge within a rapidly evolving market landscape. These acquisitions frequently lead to the identification of goodwill on the acquiring firm's financial statements, symbolising the premium paid to obtain well-established brands, customer bases, and other valuable resources. Major players in the South African retail sector have actively engaged in both domestic and international acquisitions to fortify their market standing and propel expansion efforts, as highlighted by White and Van Dongen (2017).

An exemplary instance of such acquisition endeavours within the South African retail realm transpired with the purchase of Massmart Holdings Limited by Walmart Inc. in 2011. Walmart, renowned as one of the globe's largest retail entities, secured a controlling interest in Massmart, a prominent South African retailer, with the strategic intent of establishing a firm foothold in the African market and extending its influence across the continent (Makhoba, 2021). This transaction empowered Walmart to harness Massmart's extensive network of retail outlets and distribution infrastructure to cater to a broader customer base throughout Africa. Consequently, the goodwill stemming from this acquisition found its place on Walmart's financial records, embodying the intrinsic value of Massmart's brand equity and market positioning.

Likewise, various other South African retailers have embarked on acquisition pursuits to fortify their market presence and bolster their competitive prowess. For instance, The Foschini Group (TFG), a prominent retail conglomerate in South Africa, has strategically pursued acquisitions to enrich its product spectrum and broaden its customer outreach. In a notable move in 2020, TFG completed the acquisition of the Jet retail chain from Edcon, a significant retail conglomerate, to reinforce its market share in the value segment (Anda, Poee, & Munyanyi, 2022). The incorporation of Jet into TFG's operations led to the acknowledgement of goodwill on the company's financial statements, reflecting the strategic significance of the acquired brand and customer affiliations.

These instances vividly demonstrate the pivotal role that acquisitions have played in sculpting the competitive dynamics of the retail landscape in South Africa. Through the integration of complementary businesses and assets, South African retailers aspire to fortify their market positioning, propel revenue expansion, and deliver value to their stakeholders. The identification of goodwill resulting from these acquisitions underscores the strategic importance of the acquired resources and their instrumental contribution to the long-term prosperity of the acquirer.

### **5.6.5 Composition of total intangible assets between goodwill and other intangible assets stratified by industry**

The following table provides the results of the composition of total intangible assets between goodwill and other intangible assets for the identified industries.

**Table 21: Split of Total IA between Other IA and Goodwill Stratified by Industry**

Split of Total IA between Other IA and Goodwill		2015		2019		Change	
Company	Industry	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA	% of Other IA as a portion of total IA	% of Goodwill as a portion of total IA
1	Banking	71,41%	28,59%	72,99%	27,01%	1,58%	-1,58%
2	Mining	30,82%	69,18%	41,60%	58,40%	10,78%	-10,78%
3	Pharmaceutical	85,39%	14,61%	79,80%	20,20%	-5,58%	5,58%
4	General industrials	13,37%	86,63%	38,38%	61,62%	25,01%	-25,01%
5	Tobacco	10,66%	89,34%	62,69%	37,31%	52,04%	-52,04%
6	Logistics	30,24%	69,76%	26,92%	73,08%	-3,31%	3,31%
7	Real estate	27,60%	72,40%	16,79%	83,21%	-10,80%	10,80%
8	Forestry and paper	15,11%	84,89%	7,87%	92,13%	-7,24%	7,24%
9	Retail	32,28%	67,72%	33,36%	66,64%	1,07%	-1,07%
10	Technology	41,58%	58,42%	56,59%	43,41%	15,01%	-15,01%
11	Insurance	89,71%	10,29%	38,84%	61,16%	-50,86%	50,86%
12	Financial services	46,48%	53,52%	56,64%	43,36%	10,16%	-10,16%
13	Personal goods	59,03%	40,97%	45,12%	54,88%	-13,91%	13,91%
14	Food producer	47,10%	52,90%	54,14%	45,86%	7,04%	-7,04%
<b>AVERAGE</b>		<b>42,91%</b>	<b>57,09%</b>	<b>45,13%</b>	<b>54,87%</b>	<b>2,21%</b>	<b>-2,21%</b>

In the year 2015, the insurance sector demonstrated the highest proportion of Other Intangible Assets (IA) in relation to total IA, amounting to 89.71%, thereby underscoring its dependence on intangible assets such as licenses, customer relationships, and proprietary technologies. In juxtaposition, the tobacco sector exhibited the lowest proportion of Other IA at 10.66%, indicative of a substantial dependence on goodwill, presumably attributable to the acquisitions of brands or companies.

By the year 2019, the pharmaceutical sector presented the highest proportion of Other IA at 79.8%. This finding reflects considerable investments in patents, trademarks, and other research-oriented intangibles that are vital to the sector. Conversely, the forestry and paper sector recorded the lowest proportion of Other IA at 7.87%, suggesting that the majority of the industry's intangible assets are concentrated in goodwill, likely signifying past mergers and acquisitions rather than identifiable intangibles.

In 2015, the tobacco sector held the highest percentage of goodwill in relation to total IA at 89.34%, indicating that a significant portion of its intangible value is derived from the acquisitions of established brands and enterprises. In contrast, the insurance sector recorded the lowest percentage of goodwill at 10.29%, reflecting a lesser emphasis on growth driven by goodwill and a greater reliance on identifiable intangible assets. In 2019, the forestry and paper sector exhibited the highest percentage of goodwill at 92.13%, further reinforcing the notion of growth in intangible assets being predominantly acquisition-based. The pharmaceutical sector, on the other hand, had the lowest percentage of goodwill at 20.2%, underscoring its emphasis on internally developed intangible assets such as patents and research and development outputs.

The data reveals pronounced disparities in the manner in which various industries allocate their intangible assets between goodwill and Other IA. For instance, research-intensive sectors such as pharmaceuticals allocate a greater share of their IA to identifiable assets, whereas sectors like tobacco and forestry and paper exhibit a more pronounced reliance on goodwill stemming from acquisitions. The substantial dependence on goodwill observed in sectors such as tobacco may

elicit inquiries regarding the sustainability and reliability of intangible asset valuation, given that goodwill is subject to impairment testing and may fluctuate in accordance with market conditions.

From a holistic point of view, there was no substantial shift between the intangible assets, with only a 2.21% increase in other intangible assets and the resultant decrease in goodwill. Surprisingly, the largest overall proportion of intangible assets is represented by goodwill (although that has decreased from 2015 to 2019), with a percentage of 54.87% and other intangible assets representing 45.13%. It is important to note that goodwill cannot be recognised if it is internally generated. The only method in which goodwill can be recognised as an intangible asset is through the acquisition of another company, which is represented by the excess paid over and above the net asset value (as at fair value) of the acquired entity.

#### **5.6.6 Discussion**

In the realm of South Africa, enterprises spanning diverse sectors acknowledge goodwill as a substantial intangible asset showcased on their financial statements. This goodwill predominantly emerges from acquisitions, wherein the acquisition cost of a company surpasses the fair value of its discernible net assets. Companies within the South African landscape actively partake in mergers and acquisitions (M&A) endeavours aimed at broadening their market footprint, gaining access to novel technologies, or venturing into untapped geographical territories, consequently leading to the acknowledgment of goodwill (Deloitte, 2020b).

Within the domain of the Financial Services Sector, South African banking and insurance entities frequently engage in acquiring other financial institutions with the objective of fortifying their product spectrum, augmenting market share, and diversifying revenue streams. The aftermath of these acquisitions is the identification of substantial quantities of goodwill on the acquirer's financial records, mirroring the premium disbursed for the gained entity's clientele base, brand recognition, and prospective growth prospects (PWC, 2021b).

Turning the spotlight towards the Retail and Consumer Goods Industry, retailers and consumer goods corporations within South Africa amass notable goodwill through the procurement of rival entities, suppliers, or distribution channels. These procurement activities enable organisations to broaden their array of products, penetrate fresh markets, or attain economies of scale. Goodwill encapsulates the valuation of the acquired brands, customer connections, and distribution networks, thereby enhancing the company's general market positioning and competitive edge (Pechlivanidis, Ginoglou, & Barmpoutis, 2022b).

In the arena of the Technology and Telecommunications Sector, South African firms embark on acquisition journeys to harness innovative technologies, expand their clientele base, or enrich their service propositions. These calculated acquisitions culminate in the identification of goodwill on the financial records, underscoring the worth of the acquired firm's intellectual property, research and development proficiencies, and market reputation (KPMG, 2023a).

To encapsulate, goodwill assumes a pivotal role in the financial declarations of South African enterprises spanning various sectors, epitomising the value emanating from strategic acquisitions and corporate amalgamations. Acknowledged goodwill epitomises the premium paid for synergies, growth prospects, and strategic assets procured through acquisitions, underscoring the significance of M&A undertakings in propelling the expansion of businesses and value establishment within the South African market.

In the context of South Africa, it is noteworthy to highlight the distinctiveness of the pharmaceutical, tobacco, and retail sectors due to their notable reliance on intangible assets as pivotal drivers of business value and competitive edge. Within these industries, a strategic focus is placed on investing in a diverse range of intangible assets with the aim of bolstering their market positioning, fostering innovation in product offerings, and cultivating enduring customer loyalty.

Within the pharmaceutical industry in South Africa, there is an emphasis on the investments relating to research and development (R&D) in the creation of various innovative drugs, medical equipment, and healthcare solutions. Consequently, enterprises operating within this sphere amass

valuable intangible assets like patents, trademarks, and regulatory endorsements. These assets not only signify substantial investments in groundbreaking innovation but also function as critical strategic resources that propel revenue expansion and market outreach, according to insights by Ghosh (2009).

Analogously, the **tobacco industry** in South Africa heavily relies on intangible assets to sustain its dominance in the market and uphold brand allegiance. Notably, tobacco corporations allocate significant resources toward the cultivation of robust brands through strategic marketing endeavours, product distinctiveness, and initiatives aimed at fostering customer engagement. The intrinsic value of brand equity and customer connections emerge as indispensable intangible assets that underpin market share and profitability within the fiercely competitive tobacco sector, as indicated by Chun et al. (2005).

Turning attention to the retail landscape, companies in South Africa operating within this sector exhibit a distinct focus on nurturing and overseeing intangible assets such as brand equity, customer associations, and distribution networks. **Retail** entities prioritise the establishment of recognisable and trusted brands, implementation of customer loyalty schemes, and optimisation of supply chain logistics to enrich the consumer experience and propel sales figures. These intangible assets assume a pivotal role in attracting clientele, fostering brand loyalty, and upholding a competitive advantage amidst the dynamic retail environment.

The tobacco sector in South Africa exhibits a profound dependence on goodwill (89.34% of total intangible assets in 2015), thereby underscoring the significance of brand equity and consumer loyalty. As a leading entity within the South African tobacco market, BATSA has made substantial investments aimed at fostering brand equity and consumer loyalty through meticulously crafted marketing strategies and product differentiation. Throughout the years, BATSA's well-established brands, such as Peter Stuyvesant and Lucky Strike, have served as pivotal contributors to its market dominance. Despite the industry's stringent regulatory environment and the escalating anti-smoking sentiment, BATSA has successfully preserved its market share predominantly attributable to its robust brand identity and the goodwill associated with its time-honoured brands.

In their study, Chun et al. (2005) explain the ways in which companies like BATSA foster brand loyalty through comprehensive marketing strategies and nurturing consumer confidence, evident in their strong goodwill values. The enduring supremacy of BATSA in the South African marketplace can be attributed to brand equity as a fundamental intangible asset that bolsters its market valuation, thereby illustrating the substantial reliance on goodwill prevalent within the tobacco industry.

In contrast, the pharmaceutical sector in South Africa demonstrates a pronounced dependency on various intangible assets (e.g., patents, trademarks, and research and development) rather than on goodwill. This trend reflects the considerable investments made in research and development and innovation. Aspen stands as one of the foremost pharmaceutical companies in South Africa, and its reliance on patents and trademarks constitutes a critical element of its business framework. The acquisition of the international rights to numerous brand-name pharmaceuticals (e.g., Heparin and Adcetris) alongside the advancement of its generic formulations have been instrumental in shaping its market strategy. Furthermore, Aspen has channeled meaningful financial resources into research and development, particularly in the areas of oncology and thrombosis, resulting in the acknowledgment of intangible assets like patents and intellectual property. These intangible assets not only offer competitive protection but also serve as catalysts for revenue generation and sustained growth. Ghosh (2009) underscores the manner in which pharmaceutical enterprises, exemplified by Aspen, exploit intellectual property to secure exclusivity and safeguard market share, thereby resulting in elevated corporate valuations. Aspen's prioritisation of patents and research and development exemplifies the utilisation of intangible assets to stimulate growth and confer competitive advantages, aligning with the overarching trends observed within the pharmaceutical sector.

Retail enterprises allocate resources toward goodwill and other intangible assets such as brand equity, consumer loyalty, and distribution networks to enhance their competitive positioning within the marketplace. Shoprite emerges as one of the largest retail conglomerates in Africa and serves as a quintessential example of a South African firm that derives considerable value from brand equity and customer relations. The Shoprite Checkers brand boasts a longstanding legacy of

consumer loyalty, which constitutes a significant intangible asset for the organisation. In addition, the company has persistently broadened its market presence through strategic acquisitions, including the procurement of Checkers and more recently, the acquisition of the Freshmark brand, which has further reinforced its distribution network. As posited by Pechlivanidis et al. (2022a), brand equity and consumer loyalty constitute fundamental determinants within the retail sector, wherein acquisitions serve to augment these intangible assets. Shoprite's strategic method highlights how essential goodwill and intangible resources, such as brand strength, are for upholding a competitive advantage in the retail field. The company's dependence on goodwill as an integral component of its acquisition strategy is indicative of a broader trend highlighted in the analysis.

The technology sector in South Africa places considerable emphasis on the procurement of intellectual property (IP) and technological innovations through methodical acquisitions, which is manifested in the substantial percentage of goodwill and other intangible assets reflected in financial disclosures. MTN, a prominent telecommunications entity in South Africa, has engaged in multiple acquisitions to broaden its market presence and enhance its service portfolio. For instance, MTN's acquisition of Visafone in Nigeria, alongside its investment in fibre-optic networks, serves as notable illustrations of how the organisation secures intangible assets such as intellectual property and network technology. MTN's goodwill is predominantly associated with the market value derived from its technological infrastructure, customer base, and brand reputation. As competition intensifies within the telecommunications sector, MTN persistently relies on intellectual property and technological innovations to sustain its competitive advantage. KPMG (2018) observed that organisations such as MTN utilise acquisitions to obtain technology-oriented intellectual property and brand equity, which represent critical intangible assets. MTN's emphasis on the acquisition and investment in technological innovations highlights the significance of intangible assets like intellectual property and goodwill within the technology and telecommunications domains.

The tobacco sector has encountered escalating regulatory challenges in both national and international contexts in recent years. In the South African context, the Tobacco Products Control

Act (TPCA), alongside global initiatives advocating for plain packaging and stringent advertising regulations, has profoundly influenced the marketing and distribution paradigms of tobacco products. Notwithstanding these impediments, tobacco corporations have successfully preserved significant brand equity, which constitutes a pivotal intangible asset within this industry.

A fundamental aspect that illustrates the escalating proportion of intangible assets in the tobacco sector by 2019 is the extensive branding and customer loyalty cultivated over numerous decades. Even amidst regulatory constraints, entities such as British American Tobacco (BAT) and Imperial Brands persist in extracting considerable value from their brand identity and customer demographics, which are categorised as goodwill within financial disclosures. These intangible assets—propelled by years of marketing endeavours, consumer engagement, and product differentiation—may have engendered an augmentation in the ratio of intangible assets relative to total assets. The robust brand portfolio of BAT, encompassing brands like Lucky Strike and Peter Stuyvesant, offers insight into the ascending trend of intangible assets despite regulatory challenges. As articulated by Chun et al. (2005), tobacco corporations are significantly reliant on their brand equity and customer allegiance, which attain heightened significance as the industry encounters increasingly rigorous regulations.

A further critical determinant contributing to the escalation of intangible assets within the tobacco sector is the prevalence of mergers and acquisitions activity. The tobacco industry has witnessed significant mergers and acquisitions, enabling firms to acquire invaluable intangible assets, including brands, intellectual property, and distribution networks. These strategic acquisitions frequently result in a marked increase in goodwill, as companies tend to pay premiums for the reputation, consumer base, and market standing of the firms they acquire. For example, the merger between Imperial Tobacco and Reynolds American in 2017 yielded considerable growth in intangible assets, particularly goodwill. The enhancement of brand recognition and market presence resulting from such mergers amplifies the valuation of intangible assets, thereby increasing their proportion relative to total assets. Consequently, the trend of acquiring firms with robust customer bases and well-established brands has substantively contributed to the rising proportion of intangible assets in the tobacco industry. According to PWC (2024), the tobacco

sector has experienced substantial M&A activity in recent years, with firms pursuing acquisitions aimed at market expansion, product diversification, and the enhancement of brand equity.

The transition towards premium products and the declining smoking rates in developed markets have also exerted influence on the intangible asset valuation within the tobacco sector. Tobacco corporations are progressively channeling investments into new product lines, such as vaping and e-cigarettes, to align with evolving consumer preferences. Although these products are relatively new, they similarly depend heavily on brand value and market positioning to secure their success. Tobacco firms continue to leverage their brand equity to diversify their product offerings, which is manifested in elevated values of intangible assets. KPMG (2018) indicates that the shift in product offerings within the tobacco sector towards non-cigarette alternatives, such as vaping and electronic cigarettes, also impacts the overall appraisal of intangible assets, encompassing brand equity and consumer loyalty.

On the contrary, the diminishing share of intangible assets within the pharmaceutical sector can be ascribed to a multitude of external influences. Numerous patents associated with blockbuster pharmaceuticals started to expire around the period coinciding with the noted decline, resulting in a diminished valuation of intangible assets linked to patents and intellectual property. For instance, the expiration of the patent for Lipitor (Atorvastatin), recognised as one of the highest-grossing pharmaceuticals globally, markedly diminished the value of intangible assets within pharmaceutical firms dependent on such products. The proliferation of generic medications has similarly undermined the market valuation of intangible assets within the pharmaceutical domain. Firms that previously depended on patented medications for considerable revenue now contend with competition posed by lower-cost generic options, consequently devaluing intellectual property and other intangible assets like patents. Furthermore, the pharmaceutical industry has encountered heightened regulatory oversight concerning drug approval protocols, which has extended the duration required for novel pharmaceuticals to reach the market. This phenomenon may impact the overall assessment of the industry's intangible assets, encompassing R&D investments and patents. According to Ghosh (2009), the depletion of pivotal patents alongside

the emergence of generic medications substantially diminishes the value of intangible assets within the pharmaceutical sector.

The findings align with the RBV, which posits that unique and inimitable resources—such as brand equity, patents, and R&D investments—are central to achieving sustained competitive advantage. The tobacco sector's reliance on goodwill and the pharmaceutical sector's focus on intellectual property exemplify the strategic role of intangible assets as key resources driving value creation. Goodwill and intangible assets serve as signals of future economic benefits and growth potential to investors. For instance, the tobacco industry's investment in M&A to strengthen brand equity and the pharmaceutical sector's focus on R&D signal long-term profitability and innovation capacity, aligning with signaling theory. The dynamic capabilities framework highlights a firm's ability to adapt to external changes through strategic investments. The tobacco industry's shift towards premium products and the pharmaceutical sector's focus on acquiring intellectual property reflect their efforts to respond to regulatory and market dynamics, ensuring sustained competitive positioning. The institutional theory notes that the regulatory environment shapes the valuation and reporting of intangible assets. For example, the Tobacco Products Control Act (TPCA) and global plain packaging initiatives have pushed tobacco firms to rely on goodwill and brand loyalty, while pharmaceutical firms must navigate patent regulations and approval timelines, demonstrating the influence of institutional frameworks.

In conclusion, the escalation of intangible assets within the tobacco industry in relation to total assets by 2019 can be ascribed to various external determinants, including regulatory pressures, mergers and acquisitions activity, and market dynamics oriented towards brand equity and consumer loyalty. Conversely, the reduction in the proportion of intangible assets within the pharmaceutical sector may be linked to patent expirations, the competition posed by generics, and augmented regulatory scrutiny.

By elucidating these external determinants along with practical illustrations from both the tobacco and pharmaceutical industries, the analysis gains a more holistic perspective, providing insights

into the underlying causal factors contributing to the variation in the proportion of intangible assets between the two sectors.

These conclusions are corroborated by existing literature pertaining to goodwill and the valuation of intangible assets within these industries, as underscored in numerous studies and industry reports (Chun et al., 2005; Ghosh, 2009; PWC, 2024).

### **5.6.7 Conclusion**

The analysis underscores the critical role of goodwill and other intangible assets across various sectors in South Africa, particularly in industries such as tobacco, pharmaceuticals, retail, and technology. Goodwill emerges as a dominant intangible asset in the tobacco and retail industries, reflecting significant investments in brand equity and customer loyalty, while the pharmaceutical sector prioritises patents, trademarks, and R&D as key drivers of value. Sectoral differences in intangible asset composition highlight the impact of regulatory environments, market dynamics, and strategic investments on asset valuation. The rising share of intangible assets in the tobacco industry is attributed to brand equity preservation and M&A activity, whereas the pharmaceutical sector's decline in intangible asset proportion is linked to patent expirations and increased competition from generics. These findings align with theoretical frameworks such as the Resource-Based View, signaling theory, and institutional theory, reinforcing the importance of intangible assets in shaping corporate valuation and competitive advantage.

### **5.7 Chapter Summary**

In numerous corporate settings, goodwill commonly constitutes a substantial portion of the intangible assets held. The origin of goodwill can be traced to instances of acquisitions wherein the amount paid for the acquired entity surpasses the fair value of its identifiable net assets. This surplus payment signifies the additional amount paid for the acquired company's esteemed reputation, customer relationships, and potential for future earnings. As a result, within mergers and acquisitions transactions, goodwill frequently emerges as a significant element within the

overall intangible assets disclosed on the acquiring company's statement of financial position. Conversely, the category of other intangible assets encompasses a broad spectrum of items, ranging from patents to trademarks, copyrights, and licenses to customer lists. While these assets also hold value and contribute to a firm's competitive edge, they may not consistently account for as substantial a proportion of intangible assets as goodwill does. The distribution between goodwill and other intangible assets can fluctuate based on various factors, such as industry dynamics, approaches to acquisitions, and corporate goals. For example, within industries characterised by recurrent M&A undertakings and strategic acquisitions, like the technology and pharmaceutical sectors, goodwill tends to represent a noteworthy segment of intangible assets (Carvalho, Rodrigues, & Ferreira, 2016). Conversely, in sectors where internally developed intellectual property and brand recognition hold paramount importance, other intangible assets might take precedence. The equilibrium between goodwill and other intangible assets mirrors the distinctive features of a company's asset portfolio and its strategic imperatives. Furthermore, it emphasises the significance of comprehending the industry context and acquisition tactics when evaluating the composition of intangible assets in financial disclosures and investment evaluations.

In a nutshell, the pharmaceutical, tobacco, and retail sectors in South Africa collectively acknowledge intangible assets as indispensable catalysts for value generation and sustainable expansion. Companies operating within these domains adeptly harness their intangible assets to differentiate their product offerings, fortify their market standing, and amplify shareholder worth. Through the adept management and optimisation of their intangible asset portfolios, enterprises in these sectors are aptly positioned to navigate competitive hurdles, capitalise on growth prospects, and flourish within the perpetually evolving business sphere. The findings of the literature are supportive and congruent with the findings of this study, noting the intangible asset-intensive industries, including the pharmaceutical, tobacco, technological, and, in some instances, the retail sector.

## **CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

This study sought to investigate the relevance and reliability of intangible asset values for listed companies on the JSE. Ratios were used to ascertain the most common method for measuring intangible assets for JSE-listed firms in South Africa, which was used as important foundational knowledge when interpreting data derived from the other objectives. The application of the Ohlson model enabled the examination of the value relevance of intangible asset values determined with reference to IFRS and the reliability of intangible asset values as perceived by users of the financial statements. A holistic analysis was performed to investigate the significance of intangible assets within the context of total assets and total non-current assets disclosed in the annual financial statements, as well as a further stratification of the data by industries in order to identify any trends or patterns which enabled further enrichment relating to the topic by understanding which industries are more susceptible to issues relating to the relevant and reliable valuation of intangible assets.

### **6.2 Summary of the Study**

An overview and summary of each chapter is provided below.

## **CHAPTER ONE: INTRODUCTION**

Chapter One provided an introduction to the study, identification of the research problem, and details of the research aims, objectives, and questions. The introduction contained the rationale and motivation, and the significance of the contributions of the study. The results of the study contribute to the existing knowledge surrounding the valuation of intangible assets, particularly since there is a lack of research conducted within South Africa regarding the valuation of intangible assets, especially on data since the last changes that were made to IAS 38. The contributions from this study aid in better understanding the valuation of intangible assets within South Africa and the significance of intangible assets in the Statement of Financial Position, particularly for certain

industries. The novel approach encompassing holistic information on a single dataset, including understanding the measurement models applied by the companies, the results relating to relevance and reliability from the Ohlson model, and the further investigation relating to the significance of intangible asset investment by certain industries in South Africa provided a uniquely extensive investigation adding a new viewpoint and set of information as well as a methodology for potential future studies on other stock exchanges.

## **CHAPTER TWO: LITERATURE REVIEW**

This chapter addressed empirical literature reviews on the relevance and reliability of intangible asset values for JSE-listed companies. In order to identify the research gaps, an outline of the body of research and literature that already exists on the relevance and reliability of intangible asset values were examined as well as documented. As part of the research, a conceptual model describing its link among variables was created, which was then supplemented by the study objectives.

## **CHAPTER THREE: THEORETICAL AND CONCEPTUAL LITERATURE REVIEW**

Chapter Three offered an overview of the relevant theoretical and conceptual literature for the research. The existing models and theories, acting as a framework and grounding upon which the study was guided, were presented. In addition, this chapter covered the following theories: resource-based view, positive accounting theory, stakeholder theory, conceptual framework, signaling theory, dynamic capabilities framework, and institutional theory. Each theory was appropriately described (with supporting studies) in terms of the objectives for which they are applicable.

## **CHAPTER FOUR: RESEARCH METHODOLOGY**

Chapter Four considered the methodology and research approach. The research design and paradigm were illustrated, as well as the population and sampling parameters. Data collection sources and procedures are detailed in this chapter. The validity and reliability of data were interrogated, and ethical considerations were sufficiently outlined.

## **CHAPTER FIVE: DATA ANALYSIS, RESULTS AND FINDINGS**

This chapter provided the presentation and analysis of data collected during the study. The study's findings were presented and discussed according to the study objectives. Additionally, the results of the tests were in line with the aim and objectives presented in this chapter. The researcher considered the findings and discussed them in terms of the existing literature and theories. The format for presenting the research findings was conducted in relation to the research objectives that had been identified.

## **CHAPTER SIX: SUMMARY AND CONCLUSION**

Chapter Six summarised the outcomes of the study, limitations relevant to the study, and areas for further research, ultimately drawing a conclusion from the research undertaken in conjunction with the relevant literature.

### **6.3 Summary of major findings and conclusion**

The summary and conclusion below are developed by first investigating each objective individually and thereafter drawing an overall conclusion based on the summary of major findings.

#### **6.3.1 Objective One: To determine how intangible assets are measured and valued by JSE-listed companies in South Africa**

The study highlighted the relevance and reliability of intangible asset valuation by JSE-listed companies, underscoring the pivotal role of intangible assets—specifically goodwill and other intangible assets—in shaping financial disclosures. The findings reveal that South African firms predominantly utilise the cost model for valuing intangible assets. While goodwill is typically measured using the cost model with an indefinite useful life (subject to impairment), other intangible assets are generally appraised using the cost model with finite useful lives. This preference reflects the practical challenges of fair value estimation in the absence of active markets and the need for stability in financial reporting (Gierusz, 2020).

The study's findings resonate with empirical studies on intangible asset valuation. Glaum et al. (2018) noted the global preference for the cost model, especially for goodwill, given the difficulty in determining reliable fair values without active markets. Similarly, Li et al. (2017) found that while the revaluation model offers enhanced transparency, it is seldom used due to valuation volatility and implementation costs. This is particularly relevant in South Africa, where macroeconomic fluctuations, such as exchange rate volatility and inflation, heighten the challenges of fair value measurement. The results also align with research from Qureshi et al. (2021), which underscores the cost model's practicality for firms with significant intangible asset bases, avoiding the frequent adjustments to fair value required by the revaluation model.

The findings can be framed within the context of positive accounting theory (Watts et al., 1986) and stakeholder theory (Freeman, 1984). The positive accounting theory explains the preference for the cost model as it reduces subjectivity and provides more consistent and conservative financial reporting. In line with the positive accounting theory, JSE-listed companies aim to minimise the volatility in reported earnings caused by fluctuating intangible asset valuations, particularly in a macroeconomically unstable environment. The stakeholder theory emphasises the transparent and stable reporting of intangible assets through the cost model, which enhances stakeholder confidence. Investors, creditors, and regulators rely on financial reports to make decisions, and the emphasis on historical costs aligns with their need for reliable and conservative reporting.

The research concludes that JSE-listed companies prioritise the cost model for intangible asset valuation due to its practicality, stability, and compliance with IFRS, particularly in the absence of active markets for intangible assets. Economic factors, including currency volatility and inflation, further reinforce the model's applicability in South Africa. These findings align with global trends observed in developed and emerging markets, highlighting the universal challenges of intangible asset valuation.

The study emphasised the importance of relevance and reliability in financial reporting, advocating for continued use of the cost model to ensure transparency and consistency, especially in

economies like South Africa's. The insights underscore the need for robust valuation frameworks and suggest that improving disclosure practices for intangible assets could further enhance the decision-making process for investors and other stakeholders.

### **6.3.2 Objective Two: To evaluate the relevance and reliability of intangible asset valuation using the standard valuation techniques for JSE-listed companies**

The application of the Ohlson model in this study provided critical insights into the relevance and reliability of intangible asset valuations for companies listed on the JSE. The results demonstrated that both other intangible assets (such as trademarks, patents, and software) and goodwill are positively and significantly associated with the market value of equity, as evidenced by their standardised coefficients (0.637 for other intangible assets and 0.577 for goodwill). This suggests that market participants assign significant value to intangible assets when evaluating a company's market performance and potential.

T-statistics (3.074 for other intangible assets; 2.784 for goodwill) and p-values (0.002 for other intangible assets; 0.004 for goodwill) confirm statistical significance at conventional confidence thresholds ( $p < 0.05$ ). Low collinearity statistics (tolerance values of 0.815 for other intangible assets and 0.783 for goodwill) strengthen the reliability of these regression results.

The study concluded that intangible assets—both goodwill and other identifiable intangibles—are relevant and reliable to investors. However, other intangible assets demonstrate a slightly stronger association with market valuation compared to goodwill, potentially due to their direct connection to innovation and operational efficiency.

The findings align with the Conceptual Framework for Financial Reporting, which emphasises relevance and reliability as critical qualitative characteristics of useful financial information. The significant association between intangible assets and market value validates their relevance in aiding investors to assess a firm's financial standing and future growth prospects. Furthermore, the robustness of the statistical results and the lack of multicollinearity highlight the reliability of intangible asset valuations on the JSE. The Resource-Based View (RBV) posits that firms gain

sustainable competitive advantages through unique resources, such as intangible assets. The study supports this theory by showing that other intangible assets (e.g., patents, trademarks) have a slightly stronger impact on market value compared to goodwill. This aligns with Brynjolfsson et al. (2000), who argue that identifiable intangible assets tied to innovation and intellectual property are critical drivers of firm performance and competitive advantage. The positive association of goodwill with market valuation is consistent with signaling theory, which suggests that goodwill signals future synergies and growth opportunities to investors, particularly in sectors with high merger and acquisition activity. This finding echoes Barth et al. (2023), who noted that goodwill plays a vital role in industries reliant on acquisitions, as it reflects market confidence in a company's ability to generate future benefits.

The study's findings align with international evidence from advanced markets like the United States and Europe, where intangible assets increasingly drive corporate valuation. Zambon et al. (2020) emphasise the pivotal role of intangible assets in creating long-term value, particularly in innovation-driven industries. Glaum et al. (2018) highlight the importance of goodwill in equity valuation, particularly in M&A-intensive sectors. However, the reliance on the cost model for intangible asset valuation in South Africa, as noted in the study, may constrain the ability to reflect fair value in real-time market conditions. This is particularly challenging in South Africa's economic environment, characterised by currency volatility and inflationary pressures, which can obscure the true value of intangible assets (Kumaravel, 2022). This limitation aligns with broader global concerns about the absence of active markets for intangible assets and the practical difficulties of implementing the revaluation model.

The study underscores the dual importance of other intangible assets and goodwill in driving the market valuation of JSE-listed companies, with identifiable intangibles showing a marginally stronger impact. Innovation-focused industries, such as technology and pharmaceuticals, benefit more directly from identifiable intangible assets like patents and trademarks due to their link to operational performance and competitive positioning. Goodwill, while significant, is more indirectly related to firm value and influenced by merger and acquisition activity. From a South African perspective, the reliance on the cost model reflects a conservative approach to asset

valuation, driven by macroeconomic uncertainties and the absence of active markets. However, this practice may limit transparency and the capacity to reflect real-time market conditions, reducing the relevance of financial information in some instances.

The findings validate the relevance and reliability of intangible asset valuations in explaining market value for JSE-listed companies. Both goodwill and other intangible assets are significant predictors of market valuation, with identifiable intangible assets exerting a slightly stronger influence. These results align with global research and theoretical frameworks, particularly the resource-based view and signaling theory, which emphasise the strategic importance of intangible assets in creating competitive advantages and signaling future potential.

To enhance financial reporting practices, South African firms could benefit from exploring ways to incorporate fair value adjustments for intangible assets, particularly in innovation-driven sectors. Improving the transparency and measurement of intangible assets would not only bolster investor confidence but also align South Africa with global trends in financial reporting and valuation practices.

### **6.3.3 Objective Three: To assess the significance of intangible assets in relation to the Total Assets of South African JSE-listed companies**

Intangible assets (goodwill and other intangible assets) form a substantial portion of the total asset base of companies listed on the JSE. Their importance lies in their role as key contributors to a firm's financial position, valuation, and future growth potential. The study highlighted the necessity of robust and transparent measurement and reporting practices for intangible assets. Knowledge-driven industries face a greater need for precision in valuing these assets to reflect their true contribution to financial performance.

The findings align with the Resource-Based View, which asserts that unique resources, such as intangible assets, serve as key drivers of sustained competitive advantage. Knowledge-intensive sectors, such as pharmaceuticals and technology, exemplify this theory, as their intangible assets (e.g., patents, R&D) are critical for value creation and differentiation. The findings also resonate

with stakeholder theory, as robust reporting of intangible assets enhances transparency and provides useful information to stakeholders, particularly investors. Accurate valuations help build trust and confidence in sectors reliant on intangible assets.

The study emphasises that intangible assets play a critical role in investor decision-making, especially for JSE-listed firms. Firms with significant intangible assets should prioritise accurate valuation and transparent reporting to enhance market confidence. Robust reporting practices are essential to address the relevance and reliability of intangible asset values in South Africa.

The study underscores the pivotal role of intangible assets in the financial standing and valuation of JSE-listed firms, particularly in innovation-driven sectors. The results align with key theoretical frameworks, including the Resource-Based View and Stakeholder Theory, by demonstrating how intangible assets drive competitive advantage and influence investor perceptions. As South Africa's economic composition evolves, sectors such as technology and pharmaceuticals are becoming increasingly reliant on intangible assets, highlighting the need for accurate valuation and robust reporting practices.

#### **6.3.4 Objective Four: To examine the extent to which differing industries hold a diverse value disparity in terms of intangible asset values in South African JSE-listed companies**

The tobacco sector in South Africa exhibited a significant reliance on goodwill, constituting 89.34% of total intangible assets in 2015, reflecting the sector's emphasis on brand equity and customer loyalty. Companies like British American Tobacco South Africa (BATSA) leverage longstanding brands such as Peter Stuyvesant and Lucky Strike to sustain their competitive position amidst stringent regulations. The continued market presence of these brands underscores the role of goodwill as a critical intangible asset in the industry (Chun et al., 2005).

By 2019, the tobacco sector had experienced further growth in intangible assets, driven by mergers and acquisitions, which increased goodwill and contributed to a rising proportion of intangible assets relative to total assets. Notably, merger and acquisition activity, such as the merger between

Imperial Tobacco and Reynolds American, bolstered the sector's valuation of intangible assets by enhancing brand equity and market positioning (PWC, 2024).

In contrast to tobacco, the pharmaceutical sector displayed a pronounced reliance on intangible assets such as patents, trademarks, and R&D investments. For instance, Aspen Pharmacare, a major South African pharmaceutical company, has built its competitive advantage on intellectual property and innovation, as evidenced by investments in oncology and thrombosis treatments. This focus aligns with the global pharmaceutical industry's emphasis on using intangible assets to drive innovation and market exclusivity (Ghosh, 2009). However, the sector's decline in intangible assets as a proportion of total assets by 2019 can be attributed to patent expirations (e.g., Lipitor) and the proliferation of generic alternatives, which devalue intellectual property. Additionally, regulatory scrutiny and delays in drug approvals have adversely impacted the valuation of R&D and patents, reducing the sector's intangible asset contributions (Ghosh, 2009).

The retail sector, exemplified by companies like Shoprite, depends on goodwill, brand equity, and consumer loyalty to maintain a competitive edge. Strategic acquisitions, such as the purchase of Freshmark by Shoprite, have further strengthened the retail sector's distribution networks and brand value (Pechlivanidis et al., 2022a).

Similarly, the technology sector, represented by firms like MTN, relies heavily on intellectual property and technological innovations acquired through merger and acquisitions activity. Investments in fiber-optic networks and acquisitions like Visafone in Nigeria highlight the sector's strategy of leveraging intangible assets to expand service offerings and customer bases (KPMG, 2018).

The escalation of intangible assets within the tobacco industry reflects the impact of branding and customer loyalty, merger and acquisition activity, and a shift towards premium product offerings, such as vaping and e-cigarettes, which depend on brand equity for success. On the other hand, the pharmaceutical sector's reduction in intangible assets stems from patent expirations, the rise of

generic competition, and increased regulatory scrutiny, which have devalued patents and R&D investments.

The findings align with the RBV, which posits that unique resources—such as brand equity, patents, and R&D investments—are central to achieving sustained competitive advantage. The tobacco sector's reliance on goodwill and the pharmaceutical sector's focus on intellectual property exemplify the strategic role of intangible assets as key resources driving value creation. Goodwill and intangible assets serve as signals of future economic benefits and growth potential to investors. For instance, the tobacco industry's investment in merger and acquisitions to strengthen brand equity and the pharmaceutical sector's focus on R&D signal long-term profitability and innovation capacity, aligning with signaling theory. The dynamic capabilities framework highlights a firm's ability to adapt to external changes through strategic investments. The tobacco industry's shift towards premium products and the pharmaceutical sector's focus on acquiring intellectual property reflect their efforts to respond to regulatory and market dynamics, ensuring sustained competitive positioning. The institutional theory notes that the regulatory environment shapes the valuation and reporting of intangible assets. For example, the Tobacco Products Control Act (TPCA) and global plain packaging initiatives have pushed tobacco firms to rely on goodwill and brand loyalty, while pharmaceutical firms must navigate patent regulations and approval timelines, demonstrating the influence of institutional frameworks.

Similar trends are observed globally, where tobacco companies maintain high levels of goodwill due to their focus on brand equity and customer loyalty. Chun et al. (2005) emphasise that tobacco firms rely on established brands to counteract regulatory pressures and shifting consumer preferences. The South African tobacco sector mirrors this global trend, with firms like BAT leveraging strong brand portfolios to sustain market valuation. The South African pharmaceutical sector reflects global patterns of relying on patents and R&D to drive growth and innovation. Ghosh (2009) highlights that intellectual property forms the backbone of the pharmaceutical industry's competitive advantage, aligning with the practices of South African firms like Aspen. However, the decline in intangible assets due to patent expirations and generics mirrors challenges faced by global pharmaceutical companies, as noted by Castro et al. (2021). The South African

retail sector, exemplified by Shoprite, aligns with global trends of leveraging goodwill and brand equity to enhance market positioning, as posited by Pechlivanidis et al. (2022a). Similarly, the technology sector's emphasis on intellectual property and merger and acquisition activity mirrors practices observed in international markets, where acquisitions drive growth and innovation (KPMG, 2018).

The study underscores the pivotal role of intangible assets, including goodwill and intellectual property, in shaping the valuation and competitive positioning of JSE-listed companies. The findings emphasise the sectoral differences in intangible asset reliance, with the tobacco sector leveraging brand equity and goodwill, while the pharmaceutical sector relies on patents and R&D investments. These trends align with theoretical frameworks such as the resource-based view, signaling theory, and dynamic capabilities, and they reflect broader global patterns observed in intangible asset valuation. Recognising these dynamics and addressing the challenges posed by regulatory environments and market conditions will be critical for enhancing the relevance and reliability of intangible asset reporting in South Africa.

#### **6.4 Recommendations of the study**

A number of recommendations are suggested based on the outcome of this study, as detailed in the sections below. In order to achieve optimal efficacy, the proposed recommendations necessitate a balance between standardisation and flexibility, considerations of resources, and the feasibility of phased implementation across various industries. While the enhancement of transparency remains imperative, the advancement of reporting standards across sectors may result in escalated compliance expenses and administrative costs, particularly for smaller enterprises that may be constrained in terms of these types of resources to adopt additional reporting obligations. Moreover, the augmentation of disclosures may not adequately resolve the intricate challenges associated with the valuation of intangible assets, potentially culminating in an overload of information without necessarily facilitating improved understanding or comparability.

#### **6.4.1 Recommendation 1: Enhanced reporting and disclosure**

From the data collection and extensive analysis relating to intangible assets disclosed in the financial statements of JSE-listed companies that are required to comply with IFRS, there was a distinct lack of information about the intangible asset balance and the types of items that were included within this value. More detailed and standardised reporting practices should be implemented in relation to intangible assets to ensure an increased level of transparency, consistency, and comparability across a vast array of sectors. There appeared to be some areas that were very vague with regard to intangible assets, including the composition of the intangible assets as well as the methods used to measure the differing intangible assets and pertinent issues such as whether a finite or indefinite useful life was applicable or how the fair value was determined. This is in contrast to the often detailed information provided for property, plant, and equipment in terms of IAS 16. The accounting standards should be refined to promote a greater level of detail with regard to the disclosure of intangible assets, in particular around the nature, valuation, and amortisation of the relevant transactions. Given the fast and ever-changing commercial environment, and particularly the reliance on more intangible assets over time, a regular review of the accounting standards is required, especially for intangible assets, to ensure that the accounting standards keep up with the changing environment. A regular review of the accounting standards for intangible assets is necessary to ensure that the application of the standard maintains the expected outcome as engrained in the conceptual framework.

#### **6.4.2 Recommendation 2: Develop a Circular to IAS 38 for specific industries**

The study noted that there are certain industries with a heavier reliance on intangible assets, thereby comprising a significant component of their total assets, and thus, any misstatement would have a potentially significant and material impact on the accurate reporting thereof. Some of the notable industries that may be impacted include the pharmaceutical, tobacco, and technological industries, which have a more significant investment in intangible assets as opposed to some of the other industries. Thus, these industries may warrant more specific requirements and guidelines from IFRS to result in a set of annual financial statements that comply more closely with the qualitative characteristics as enshrined in the conceptual framework. The pharmaceutical industry may benefit

from more robust direction and guidelines in relation to clinical trials and the development of medicinal solutions and when these expenses should be capitalised or expensed. The technological industry may be more accurately reflected by a detailed circular around various software systems as well as subscription-based models and when the relevant costs should be capitalised or expensed. The tobacco industry may benefit from more detailed guidelines relating to the recognition and valuation of brands and trademarks, which seem to have a higher sense of value for this industry, particularly given the importance of brand loyalty and market presence. It should be noted that formulating guidelines tailored to specific industries has the potential to enhance the precision of reporting; however, it carries the risk of inducing fragmentation within the IFRS framework. Standards that are specific to particular industries may result in discrepancies, thereby diminishing the comparability of financial statements across various sectors. Furthermore, the undertaking of developing and executing these industry-centric guidelines would necessitate considerable regulatory effort and cooperation, which could potentially postpone implementation and introduce additional complexity into the reporting framework.

While the creation of industry-specific guidelines can improve the accuracy of intangible asset reporting, it is essential to recognise the risk of fragmentation within the broader IFRS framework. To mitigate this risk, the industry-specific guidelines should be designed in a way that complements rather than contradicts the core principles of IFRS. The goal is to maintain the consistency of financial statements across industries while allowing flexibility for industries with unique characteristics to provide more relevant and reliable disclosures.

Rather than developing completely separate standards for each industry, the guidelines should adhere to the core principles of IFRS, particularly regarding reliability, and comparability. Industry-specific guidelines can supplement the general IFRS requirements by offering additional clarity on how to apply these principles to specific types of intangible assets (e.g., R&D costs in the pharmaceutical industry or brand equity in the retail sector), without overriding the IFRS framework. IFRS-based disclosures would still require consistency in the overall presentation and structure of intangible asset information (e.g., recognition, measurement, and impairment), but with an added emphasis on the types of intangible assets most relevant to each industry.

To reduce the risk of fragmentation and to manage the complexity of developing and implementing industry-specific guidelines, a phased approach can be adopted. Phase 1 would entail the general framework review starting by reviewing the general IFRS framework to identify existing gaps in the reporting of intangible assets, especially in industries that heavily rely on intangible assets. This initial phase can provide foundational insights into where industry-specific guidelines may be needed. Phase 2 would include conducting pilot programs within select industries (e.g., pharmaceuticals, technology, tobacco) to test industry-specific guidelines. This will allow regulators to gather feedback and refine the guidelines before they are rolled out more widely. Phase 3 would require gradually expanding the industry-specific guidelines to other sectors based on the lessons learned from the pilot programs. This will help manage the regulatory effort and reduce the potential for fragmentation.

Given the complexity of developing industry-specific guidelines, it is essential to foster collaboration between regulatory bodies, industry experts, and companies to ensure that the guidelines are practical, feasible, and consistent with IFRS. Collaboration can involve regular consultations with industry representatives to identify the unique characteristics of intangible assets within each sector. The involvement of auditors and financial analysts can be employed to assess the impact of the proposed guidelines on financial reporting and market comparability. An ongoing review and revision of the guidelines based on market and regulatory changes should be performed.

To minimise the risk of implementation delays and to reduce the regulatory burden, the development of industry-specific guidelines should be structured by establishing clear timelines for the development, consultation, and adoption of these guidelines. This will help manage expectations and ensure that the process remains on track. IFRS standard setters should ensure that the guidelines can be scaled to fit both large multinational corporations and smaller companies. For smaller firms, the guidelines could provide simpler, less resource-intensive reporting requirements that still capture the essence of intangible assets.

Once implemented, the effectiveness of industry-specific guidelines should be regularly evaluated to ensure they are achieving the intended outcomes, such as periodically assessing whether the guidelines have improved the relevance and reliability of intangible asset reporting without reducing comparability through gathering feedback from users of financial statements (e.g., investors, analysts) to understand whether the guidelines have improved their ability to assess the value of companies with significant intangible assets.

### **6.4.3 Recommendation 3: Intangible asset specialists/experts**

Given the difficulty with regard to the valuation associated with intangible assets, it may be worthwhile to develop specialists/experts in intangible assets, similar to actuaries who value employee benefits. Such experts would be beneficial during the audit process to provide some form of assurance in relation to the intangible asset values disclosed in the annual financial statements. Intangible assets have proven to be highly unique and specialised, which would warrant the use of an expert within the field who is dedicated to the understanding and valuation of intangible assets. The use of experts/specialists would ensure that there is some form of consistency and comparability.

Constraints to this recommendation include the limited availability of skilled professionals in the niche field of intangible asset valuation, the high costs and lengthy training periods required to establish such experts, and the potential financial strain this could impose on companies, particularly smaller firms. Furthermore, reliance on specialists may increase audit fees and may not necessarily guarantee consistency or objectivity in valuations, which is a significant concern in maintaining the credibility of financial reporting. A more realistic and sustainable approach could involve, rather than creating entirely new roles for intangible asset valuation specialists, existing accountants, auditors, and financial analysts could be provided with additional training and tools to better assess intangible assets. This would allow companies to leverage existing human resources while avoiding the high costs associated with developing new specialised positions.

Offering specialised certification programs in intangible asset valuation could be a more cost-effective and scalable solution. These programs could be developed in collaboration with

professional accounting and auditing bodies, universities, and regulatory authorities. They would focus on the key skills required to value intangible assets, such as intellectual property valuation, brand equity assessments, and goodwill analysis. By certifying professionals already in the field, the costs and barriers to entry for specialists would be significantly reduced.

To mitigate the potential financial strain on smaller companies, the various strategies that could be implemented by smaller companies could be that they are given a grace period or phased approach to adopting the valuation techniques for intangible assets. This would allow them to gradually adjust to the requirements without facing immediate cost burdens. There could be the implementation of a tiered approach where the complexity and depth of intangible asset valuations required from smaller firms are less demanding than those required from larger companies. For example, smaller firms could provide simplified disclosures that capture the essence of their intangible asset values without the need for expensive, detailed appraisals. The development of publicly available guidelines or tools that smaller companies can use to conduct basic intangible asset valuations without the need for costly specialists could be adopted.

In the long term, the development of a specialised workforce in intangible asset valuation could be pursued in parallel with other initiatives aimed at improving the transparency and reliability of intangible asset reporting. The encouragement of partnerships between industry bodies, universities, and professional organisations should be harnessed to develop dedicated programs for intangible asset valuation, creating a pipeline of skilled professionals. Governments and regulatory bodies could incentivise the development of expertise in this area through grants, tax incentives, or research and development funding. This would help alleviate some of the financial barriers associated with creating a specialised workforce.

While the development of specialists in intangible asset valuation faces practical constraints such as cost, availability of skilled professionals, and financial strain on smaller companies, alternative approaches such as integrating valuation skills into existing roles, providing professional certifications, and collaborating with external firms could provide more feasible and sustainable solutions. Additionally, the use of independent reviews would ensure consistency and objectivity

in intangible asset valuations, even without a large workforce of specialists. These strategies allow for a more flexible, cost-effective approach to improving intangible asset reporting without compromising the accuracy or comparability of financial statements.

#### **6.4.4 Recommendation 4: Establishment of an intangible assets exchange**

An increased comparability in terms of the fair values attributed to intangible assets can be generated through the establishment of an intangible assets exchange platform. The potential intangible assets exchange platform would provide a centralised digital space where intangible assets can be bought, sold, and traded, thereby establishing a database of relevant, fair values associated with a wide variety of intangible assets that can be used as a benchmark for the purposes of valuing other intangible assets. Individuals should be able to obtain relevant values for intangible assets that are similar to their own based on their industry, thereby ensuring that unique sector characteristics and valuation methodologies are adequately addressed, resulting in a more consistent and robust valuation of intangible assets as a whole.

The exchange platform does not need to offer uniform or standardised valuation for all intangible assets. Instead, it could serve as a marketplace for facilitating transparency and exchange of intangible assets while incorporating flexible valuation frameworks that account for the inherent complexity of these assets. Rather than a rigid fair value reference, the exchange could facilitate dynamic valuation benchmarks, adjusted over time based on market trends, demand, and industry-specific factors. This would allow intangible assets to be valued contextually, reflecting their value within the marketplace while still providing insights into their relative worth. To further enhance reliability, the platform could incorporate independent expert valuations and offer third-party validation services for intangible assets. This could help mitigate concerns about the subjective nature of intangible asset valuations and provide an additional layer of credibility to the platform.

The feasibility of creating an exchange platform for intangible assets is a challenge, particularly given the lack of standardised valuation methods and the complexity of these assets. However, this challenge can be mitigated by adopting a gradual and phased approach to establishing the exchange, allowing for incremental development. Initially, a pilot program could be implemented

within a specific industry or asset class (e.g., technology patents or brand equity) where intangible assets are more likely to be standardised or have clearer valuation metrics. This would help build credibility and prove the concept before expanding into more complex or diverse asset classes. The success of such an initiative would benefit from collaboration with industry experts, valuation firms, and regulatory bodies to develop valuation methodologies tailored to specific intangible assets. The platform could begin by offering non-financial transactions (e.g., intellectual property licensing agreements, joint ventures, or brand collaborations) as a way to demonstrate the market potential for intangible assets without immediately requiring buying and selling. Once market demand and liquidity are established, the platform could expand to a broader set of intangible assets and more complex transactions.

It is likely that some industries, especially those involved in high levels of innovation, technology, or brand development, may resist the idea of sharing information about their intangible assets on a public or semi-public exchange due to proprietary concerns. The platform could implement robust confidentiality and intellectual property protection mechanisms. Initially, instead of requiring full disclosure, companies could participate in the exchange voluntarily and choose what to disclose. For instance, a company might choose to list a non-core patent for potential collaboration or royalty agreements without fully disclosing its strategic patents or trade secrets. This would reduce the perceived risk while still allowing companies to access market benchmarks for their intangible assets. The platform could offer confidential listing options, allowing businesses to seek valuation or initiate transactions without disclosing detailed information to the broader market. This could help alleviate concerns about competitive exposure while still promoting the platform's potential. To build confidence and promote adoption, initial participants could include large industry players or government-backed institutions that help set industry standards and demonstrate the credibility of the exchange.

The establishment of an exchange platform for intangible assets would also require careful consideration of regulatory frameworks, particularly given the wide range of industries involved and the unique characteristics of intangible assets. The platform could seek alignment with existing regulatory standards (e.g., IFRS, IASB) while promoting the development of specific guidelines

for intangible asset disclosure and trading. This would ensure that the platform does not conflict with established accounting and financial reporting standards while allowing for innovative approaches tailored to intangible asset classes. The exchange could be introduced initially as a voluntary platform with minimal regulatory burden, allowing companies to explore the potential benefits of intangible asset trading before moving towards more mandatory or standardised frameworks.

While the creation of an intangible asset exchange platform presents several challenges, it remains a potentially transformative idea. The approach can be refined by adopting a phased rollout, focusing initially on pilot programs within certain industries, and ensuring that confidentiality measures are in place to protect intellectual property. A collaboration between industry experts, regulatory bodies, and market participants would help establish the platform's credibility and scalability. By addressing concerns regarding valuation benchmarks, market liquidity, and competitive confidentiality, the platform could ultimately provide a functional and reliable market for intangible assets, fostering greater transparency and liquidity in this growing sector.

## **6.5 Limitations of the Study**

The following limitations are relevant to this study:

- The study is restricted to entities listed on the JSE, ensuring that the financial information is readily available. By focusing solely on entities listed on the JSE, the study was restricted to companies operating under a specific regulatory and economic environment. This limitation means that the results are not fully generalisable to companies operating in other stock exchanges or countries. The financial data available for these firms may not represent global market trends or account for economic conditions or regulatory environments. Therefore, the findings may not be applicable to companies operating in different markets with different accounting frameworks or economic conditions. However, the decision to focus on JSE-listed companies provided a consistent data set and allowed for a clear comparison within South Africa, despite the limited generalisability internationally.

- The study is restricted to JSE-listed entities with a financial year-end during the 2019 year. Restricting the sample to companies with a financial year-end during the 2019 year introduced temporal constraints, potentially affecting the study's relevance to other periods. Given that 2019 represents a pre-pandemic period, the findings might not accurately reflect how intangible assets are valued or reported during more volatile periods like the COVID-19 pandemic or during periods of economic downturn. This limitation could lead to the exclusion of any potential shifts in valuation practices that occurred due to unforeseen external shocks, meaning the findings may not account for more dynamic trends in intangible asset reporting and valuation.
- The study is restricted to JSE-listed companies within South Africa. Thus, all entities within the sample operated under the same economic climate, making comparison on a global scale difficult. The focus on South African firms limits the ability to draw comparisons with companies from other countries, particularly those in regions with more developed markets or different regulatory frameworks. South Africa's unique economic environment (such as its development stage, political landscape, and regulatory context) could influence how intangible assets are valued and reported. This limitation may have skewed the study's conclusions, making it difficult to generalise the findings across global markets or to account for global variations in intangible asset valuation practices.
- Some of the selected entities may not have been in existence for five years and impact/reduce the usable sample size. The exclusion of companies that have not been in existence for at least five years potentially reduced the sample size, which in turn could affect the robustness of the study's findings. A smaller sample size reduces the statistical power of the analysis, potentially leading to less reliable conclusions. The loss of entities with fewer than five years of data may have excluded newer companies that are particularly relevant in industries that rely heavily on intangible assets, such as technology or start-ups. This could have introduced a selection bias by omitting emerging companies that might value intangible assets differently or have different patterns of intangible asset reporting.
- Some entities may not have any intangible assets in their annual financial statements. The absence of intangible assets in some companies' financial statements limited the scope of the analysis, as these companies could not be included in the valuation models for

intangible assets. This limitation could have impacted the overall findings by potentially excluding firms that do not prioritise or report intangible assets, thus reducing the generalisability of the findings to the entire population of JSE-listed companies.

- There are some limitations attributable to the Ohlson model, namely:
  - Simplified Assumptions: The model is dependent on simplifying assumptions, such as assuming a linear correlation between accounting metrics and equity value, a premise that may not always be valid in practical settings. The assumption of linearity between accounting metrics (such as book value and earnings) and equity value may not hold in every case, especially for firms in industries with non-linear relationships or firms with volatile earnings. This limitation could have impacted the accuracy of the valuation outputs, particularly for companies with complex business models or varying profitability patterns. As a result, the Ohlson model might have underestimated or overestimated the true value of some intangible assets.
  - Reliance on Accounting Data: The Ohlson model predominantly relies on accounting-related metrics like profits and book value of equity, potentially disregarding other factors impacting value, such as non-accounting data or market sentiment. The model's reliance on traditional accounting metrics, which may not fully capture the value of intangible assets like intellectual property, brand equity, or human capital, could have led to an undervaluation or misrepresentation of the companies' true market value. This limitation is particularly relevant in industries where intangible assets form a significant portion of the company's overall value.
  - Lack of Consideration for Intangible Assets: Intangible assets, like brand recognition or intellectual property, are frequently not completely accounted for in the Ohlson model, resulting in possible underestimation or distortion of a company's genuine value. The model's failure to directly account for intangible assets, such as intellectual property or customer loyalty, means that the model may not fully capture the value of companies where these assets play a significant role. This would lead to an underestimation of the company's total value, particularly in sectors where intangible assets are crucial.

- Sensitivity to Model Inputs: Minimal alterations in input metrics, such as growth projections or discount rates, can result in substantial variations in the model's estimations of worth, rendering it susceptible to assumptions and inputs. Small changes in key inputs, such as growth projections or discount rates, can lead to significant variations in the model's output. This sensitivity means that the results could have been influenced by subjective assumptions, leading to potentially unreliable or varying valuations for the same firm depending on the selected inputs.
- Market Efficiency Assumption: The Ohlson model presupposes market efficiency, suggesting that market prices wholly embody all accessible information. Nevertheless, if markets are inefficient, the model's forecasts may deviate from actual market prices. The assumption that markets are efficient may not hold in all circumstances, particularly in markets where there is information asymmetry or where investor sentiment plays a major role. This could mean that the Ohlson model's predictions diverge from actual market prices if market inefficiencies exist, thereby limiting the model's accuracy in real-world applications.
- Limited Applicability to Certain Industries: The model might be less appropriate for sectors with distinct attributes or intricate business structures where conventional accounting indicators may not adequately encompass value determinants. The Ohlson model may not be equally effective in industries with unique characteristics, such as technology, where intangible assets like patents or intellectual property play a central role. This could lead to less reliable results when applied to these industries, as the model might not capture the value of intangible assets in these sectors accurately.
- Inherent Uncertainty: The Ohlson model is vulnerable to inherent uncertainty, particularly concerning forthcoming cash flows and growth rates, factors that can influence the precision of valuation approximations. The Ohlson model's reliance on projections for future growth and cash flows introduces significant uncertainty. Small changes in growth assumptions or discount rates can cause large variations in the estimated value of a company. This means that the valuation outputs from the model may not always reflect the true value of intangible assets in practice.

- Lack of Consideration for Market Dynamics: The model does not explicitly incorporate market dynamics, such as investor sentiment or market bubbles, which are elements that can impact equity value independently of accounting metrics. The absence of market sentiment, investor behaviour, or market trends in the model means that it may not fully capture shifts in market dynamics that could influence asset values. This could lead to discrepancies between the model's predictions and actual market valuations.

Given the above limitations relating to the Ohlson model, caution must be exercised when extrapolating the data over the population or concluding on the various outcomes. Generalisation of outputs may be limited given the shortcomings of the Ohlson model. Despite the limitations associated with the Ohlson model, the model is still considered to be the most appropriate method for the purposes of achieving the objectives of the study, as supported by Penman (2013), advocating for the usefulness of the information derived through the application of the Ohlson model despite its limitations.

## **6.6 Recommendations for Further Research**

Further analysis could be conducted by drilling down into the variety of intangible assets identified and further analysing them within the spectrum of the relevant industries. The industries identified with a higher proportion of intangible assets in relation to total assets and total non-current assets could be further explored to determine the underlying reasons for this anomaly. The methodology could be applied to other companies that are either listed with other stock exchanges or have other geographical locations. A quantitative approach would include conducting a comparative analysis using cross-sectional data from multiple stock exchanges, such as the London Stock Exchange (LSE), New York Stock Exchange (NYSE), and Tokyo Stock Exchange (TSE), using econometric models (e.g., panel regression or multivariate analysis) to account for variations in regulatory environments and reporting standards. Variables such as accounting frameworks (e.g., IFRS vs. GAAP), industry composition, and investor sentiment could be quantitatively measured and included in the analysis. The researcher could supplement the quantitative analysis with a review

of regulatory documents, interviews with financial analysts, and case studies on intangible asset reporting practices in specific regions. This would provide insights into cultural and contextual factors influencing intangible asset valuation. The use of indices such as Hofstede's cultural dimensions or the World Bank's Doing Business index can be employed to capture variations in corporate governance, transparency, and reporting norms that may impact intangible asset valuation.

A more detailed investigation with regard to specific sectors could be explored with a focus on those industries where intangible assets are more prevalent. The sector examination could include the implementation of valuation methods and the impact of the intangible assets on long-term profitability as a result of the competitive advantages. The researcher could use regression models with interaction terms to explore how sectoral characteristics influence the relationship between intangible asset values and market valuation. The inclusion of variables like R&D intensity, brand equity expenditures, and reliance on natural resources could be utilised. The researcher could conduct detailed case studies of leading firms in each sector (e.g., Aspen for pharmaceuticals, BATSA for tobacco, and Shoprite for retail) to understand sector-specific factors driving intangible asset valuation.

A temporal analysis can be conducted to extend the time frame of the analysis to obtain insights regarding economic cycles and industry shifts that may impact intangible assets. The researcher may employ time-series analysis techniques, such as vector autoregression (VAR) or generalised method of moments (GMM), to capture dynamic relationships between intangible asset values and economic indicators (e.g., GDP growth, interest rates, or inflation). The study could include sector-specific analyses to identify how industries such as technology, pharmaceuticals, and retail respond differently to economic cycles, using structural break tests to pinpoint key turning points.

An interesting exercise may be to investigate and compare the changes (or lack thereof) in the accounting standards with the changes that have taken place in the commercial environment over the same period. A comparative analysis across geographic regions may yield interesting results with regard to understanding how cultural, economic, and regulatory differences influence the

importance and valuation of intangible assets. The researcher may map and compare the treatment of intangible assets under different accounting frameworks, such as IFRS, GAAP, and local standards used in emerging markets. The study could also include semi-structured interviews with accountants, regulators, and auditors to gain insights into challenges and practices related to intangible asset valuation in different regulatory environments. The collected data may be used by employing a difference-in-differences (DiD) approach to analyse the impact of regulatory changes (e.g., IFRS adoption) on intangible asset values and their relevance for market valuation.

While the Ohlson model was chosen for this study due to its well-established theoretical foundation and relevance for equity valuation based on accounting metrics, it is important to acknowledge its limitations and consider alternative or complementary models. The Ohlson model's reliance on specific accounting metrics, such as book value and earnings, may pose challenges in industries where intangible assets—such as goodwill, intellectual property, or brand equity—are significant contributors to value, yet are not fully reflected in financial statements. This limitation is particularly relevant to sectors with high innovation and intellectual capital, such as technology and pharmaceuticals.

The discounted cash flow (DCF) model is a forward-looking approach that values a firm based on the present value of its expected future cash flows. Unlike the Ohlson model, which is grounded in historical accounting data, the DCF model incorporates projections and assumptions about a company's future performance. This could address the Ohlson model's limitation in capturing the potential value of intangible assets, particularly in sectors where future earnings rely heavily on intellectual property or innovation. However, the DCF model introduces its own challenges, such as the subjectivity of assumptions related to growth rates and discount rates, which could impact reliability.

The real options valuation (ROV) model is particularly suited for industries where uncertainty and flexibility play a significant role in value creation, such as technology and pharmaceuticals. This model allows for the valuation of opportunities associated with research and development, product innovation, or strategic investments. By incorporating the value of intangible assets that may not

yet be realised in financial statements, the ROV model complements the Ohlson model's more static accounting-based approach. However, its complexity and reliance on subjective inputs may limit its practical applicability for broader analyses.

Similar to the Ohlson model, the residual income valuation (RIV) model focuses on residual income (income above the cost of capital) but provides greater flexibility in incorporating adjustments for intangible asset contributions. This model could be used as a complementary approach to address cases where goodwill, patents, or brand equity significantly influence a firm's valuation.

Market-based multiples, such as price-to-earnings (P/E) or price-to-sales (P/S) ratios, can be used to benchmark a company's valuation against industry peers. These multiples often capture market perceptions of intangible asset value more effectively than traditional accounting metrics. While less theoretically grounded than the Ohlson model, market-based multiples could serve as a useful supplement, particularly for comparative analysis across sectors.

## **6.7 Conclusion**

The examination of the relevance and reliability of values attributed to intangible assets (encompassing both goodwill and other intangible assets) has been thoroughly explored through the outcomes of this study, backed by evidence from previous studies, pointing towards the substantial value relevance held by intangible assets.

The findings highlight the significant contribution of intangible assets—such as goodwill, intellectual property, patents, and R&D investments—to the total asset composition of JSE-listed companies, with substantial variations across sectors. Knowledge-intensive industries, such as technology and pharmaceuticals, demonstrate a high reliance on intangible assets, driven by innovation, intellectual capital, and research and development. Conversely, traditional, resource-based sectors like mining exhibit lower proportions of intangible assets due to their dependency on tangible resources. These findings emphasise the relevance of intangible assets in reflecting the

economic value and competitive capacity in innovation-driven sectors, highlighting the need for accurate and sector-specific valuation approaches to ensure reliable financial reporting.

The study identifies distinct sectoral differences in the relevance and reliance on intangible assets. For the tobacco industry, the analysis demonstrates a heavy dependence on goodwill, accounting for over 89% of intangible assets in 2015. Companies like BATSA leverage brand equity and consumer loyalty to sustain market dominance, even amidst stringent regulatory environments. In the pharmaceutical sector, companies such as Aspen rely on patents, R&D investments, and intellectual property, underscoring the sector's dependency on innovation. However, patent expirations and the rise of generic alternatives present challenges to the reliability of intangible asset values in this sector, diminishing the valuation of critical assets. In the retail sector, firms like Shoprite derive value from goodwill, brand equity, and customer loyalty. The sector's reliance on strategic acquisitions highlights the importance of intangible assets in sustaining competitive positioning and market expansion. In the technology sector, companies such as MTN focus on intellectual property and technological innovations, often acquired through mergers and acquisitions. These intangible assets, including customer bases and network infrastructure, are critical to sustaining competitive advantages in a rapidly evolving market. These sector-specific insights illustrate the varied relevance of intangible assets across industries and highlight the need for tailored reporting and valuation practices to ensure their reliability.

The study establishes a clear positive correlation between the value of intangible assets and the market valuation of JSE-listed firms. This relationship is particularly pronounced in innovation-driven and consumer-focused sectors such as technology, pharmaceuticals, and retail, where intangible assets—such as patents, R&D, and brand equity—are pivotal to operational and financial success. Investors value these intangible assets as key indicators of future economic benefits, growth potential, and competitive capacity. These findings underscore the relevance of intangible assets as critical determinants of investor perceptions and corporate valuation in the South African context, mirroring global trends.

Despite their relevance, the study identifies several challenges related to the reliability of intangible asset values. Goodwill, which constitutes a dominant component of intangible assets in certain sectors, is often privy to subjective valuation practices that can reduce the reliability of reported values. Patent expirations, competition from generics, and regulatory pressures in industries like pharmaceuticals introduce variability in the valuation of intellectual property and R&D investments. The findings highlight the urgent need for robust frameworks for intangible asset measurement and reporting to enhance the reliability of financial statements and investor confidence.

Bringing together the insights from the study's research objectives, the findings reaffirm that intangible assets—such as goodwill, patents, intellectual property, and brand equity—are highly relevant to the financial valuation of JSE-listed companies and serve as critical drivers of investor confidence, market perception, and competitive advantage. However, the reliability of these valuations is challenged by sectoral disparities, subjective valuation methods, and external pressures, such as regulatory changes and market dynamics.

In conclusion, the empirical analysis demonstrates that intangible asset values are both relevant and reliable for JSE-listed companies, particularly in sectors that leverage innovation, intellectual capital, and customer loyalty. However, challenges in standardised reporting and valuation frameworks impede the full realisation of their potential in financial reporting. To ensure the reliability of intangible asset values and improve their decision-usefulness, South African companies should adopt sector-aligned valuation models and enhance transparency in reporting practices. By addressing these challenges, firms can strengthen investor confidence and position themselves for long-term success in an increasingly intangible-driven economy.

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## Appendices

### Appendix 1: Top 40 JSE Listed Companies at 31 December 2019

Number	Company Name	Industry	Ticker
1	ABSA	Banking	ABGJ
2	African Rainbow Minerals	Mining	ARIJ
3	Anglo American	Mining	AGLI
4	Anglogold Ashanti	Mining	ANGJ
5	Aspen Pharmacare Holdings	Pharmaceutical	APNJ
6	BHP Group	Mining	BHPJ
7	Bidvest Group Ltd	General Industrials	BVTJ
8	British American Tobacco	Tobacco	BTIJ
9	Capital&Counties	Real Estate	CCOJ
10	Discovery Holdings	Insurance	DSYJ
11	Exxaro Resources	Mining	EXXJ
12	Firststrand	Banking	FSRJ
13	Growthpoint Properties	Real Estate	GRTJ
14	Impala Platinum Holdings	Mining	IMPJ
15	Imperial Holdings	Logistics	IPLI
16	Intu Properties	Real Estate	ITUJ
17	Investec	Banking	INPJ
18	Investec Ltd	Banking	INLJ
19	Kumba Iron Ore	Mining	KIOJ
20	Life Healthcare	Pharmaceutical	LHCJ
21	Mondi	Forestry and Paper	MNPJ
22	Mondi Ltd	Forestry and Paper	MNDJ
23	Mr Price Group Ltd	Retail	MRPJ
24	MTN Group	Technology	MTNJ
25	Multichoice	Technology	MCGJ
26	Naspers	Technology	NPNJ
27	Nedbank Group	Banking	NENJ
28	Old Mutual	Insurance	OMUJ
29	Pepkor Holdings Ltd	Retail	PPHJ
30	Reinet Invest	Financial Services	RNIJ
31	Remgro	Financial Services	REMJ
32	Richemont DRC	Personal Goods	CFRJ
33	RMB Holdings	Financial Services	RMHJ
34	Sanlam Ltd	Insurance	SLMJ
35	Sasol Ltd	Chemicals	SOLI
36	Shoprite Holdings	Retail	SHPJ
37	Standard Bank Grp	Banking	SNKJ
38	Tiger Brands	Food Producer	TBSJ
39	Vodacom Group	Technology	VODJ
40	Woolworths Holdings	Retail	WHLJ

Source: (Bloomberg, 2019)

**Appendix 2: Data Collection Template**

<b>Year (2015 – 2019)</b>	<b>Are intangible assets present?</b>	<b>Intangible asset policy for valuation</b>	<b>Intangible asset note valuation variables</b>	<b>Intangible asset value</b>	<b>Total Asset Value</b>	<b>Total Non- current asset value</b>
Company 1	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	<ul style="list-style-type: none"> <li>• Cost model</li> <li>• Revaluation model</li> </ul>	<ul style="list-style-type: none"> <li>• Amortised (finite useful life)</li> <li>• Not amortised (indefinite useful life)</li> </ul>	Rand value from SOFP	Rand value from SOFP	Rand value from SOFP

Source: Self-generated

### Appendix 3: Evaluation Matrix

Year (2015 – 2019)	% of intangible assets over total assets	% of intangible assets over total non- current assets	Primary sources of intangible assets	How are the intangible assets measured/valued?	A reliable estimate
Company 1	Financial ratio  Intangible assets (R) / Total assets (R)	Financial ratio  Intangible assets (R) / Total non-current assets (R)	Content analysis  Intangible asset note from the notes to the annual financial statements	Content analysis  Accounting policies note and intangible assets note from the notes to the annual financial statements.	Ohlson Model
			Types of intangible assets such as goodwill, licenses, software, etc.	<ul style="list-style-type: none"> <li>• Finite (number of years) or indefinite useful life</li> <li>• Cost or revaluation model</li> </ul>	

Source: Self-generated

#### Appendix 4: Ohlson Model Data Collection (Equation 3)

Variable	Description	Calculation	Source of data
MVE	Market Value of Equity	= Market capitalisation (3 months after the reporting date)	Bloomberg
BVE	Book value of net assets at the reporting date	<p>= Operating assets – Operating liabilities</p> <p>Operating assets = Currents assets – Cash – Short term investments + (Property, plant and equipment – Accumulated depreciation) + Long term investments + Intangible assets + Future income tax benefits</p> <p>Operating liabilities = Total liabilities + Preference shares – Financial liabilities</p> <p>Financial liabilities = Long-term debt + Debt in current liabilities + Preference shares</p>	Bloomberg and published annual financial statements.
NI	Net income for the year	= Net income as per statement profit or loss and other comprehensive income	Annual financial statements
$\varepsilon_t$	Book to-market residual		
GW	Goodwill	= Reported goodwill (net of any accumulated amortisation and impairment)	Bloomberg and published annual financial statements
ID	Identifiable Intangibles	= Reported other (identifiable) intangible assets (net of any accumulated amortisation)	Bloomberg and published annual financial statements

Source: (Dahmash et al., 2009, p. 126; Zahra et al., 2017)

**Appendix 5: Summary statistics**

<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
MVE – share price three months after year-end					
BE – net value of assets					
NI – net income					
Eit – book to market residual					
GW – goodwill					
ID – identifiable intangible assets					
TIA – total intangible assets, including goodwill					
BVExIA – book value of equity less total intangible assets					

Source: (Zahra et al., 2017, p. 607)

**Appendix 6: Classical regression results**

Model	Unstandardised coefficients		Standardised coefficients	T	Sig.	Collinearity statistics tolerance
	B	Beta				
(Constant)						
BVExIA_book value of equity less recognised intangible assets						
NI_net income						
ID_identifiable intangible assets						
GW_net goodwill						
A dependent variable: MVE_share price three months after the reporting date.						

Source: (Zahra et al., 2017, p. 608)

## Appendix 7: Sample Criteria Tables

Source: Dahmash et al. (2009, p. 128)	Source: Eloff et al. (2015, p. 10)
	Description
Starting number of firm years	Listed companies reporting positive goodwill balance
Less: Financial, resources, and mining firms	
Less: Firms with missing market and book values	Less: Company-years with missing data
Less: Firms with other than 30 June year ends and suspended, delisted, or unmatched firms	
	Less: Company-years with mixed goodwill policy
Less: Firms with a negative book value of equity	Less: Company-years reporting negative NI or book value of equity
Less: Firms not applying Australian GAAP	Less: Company-years reporting goodwill in pre- and post- IFRS 13 periods
Less: Top and bottom 2.5% of observations	Less: Company-years regarded as outliers

## Appendix 8: Language Editing Certificate

### EDITOR'S LETTER

Researchers Beyond-Borders (PTY) LTD  
Umhlanga, Durban  
South Africa  
6 September 2024

To whom it may concern

**Editing of Doctoral Thesis:** KERRY-LEE GURR (Student number -206 500 203)

**Title of thesis:** The relevance and reliability of intangible asset values for JSE listed companies: An empirical analysis

This letter serves as confirmation that the aforementioned thesis has been language edited. Any queries may be directed to the author of this letter.



Regards



Maleni Pillay  
Researchers Beyond-Borders  
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## Appendix 9: Ethical Clearance Letter



19 Jan 2022

Miss Kerry-Lee Gurr (206500203)  
School Of Acc Economics&Fin  
Westville

Dear Miss Kerry-Lee Gurr,

Original application number: 00015953  
Project title: The relevance and reliability of intangible asset values for JSE listed companies: An empirical analysis

### Exemption from Ethics Review

In response to your application received on 10 Jan 2022, your school has indicated that the protocol has been granted EXEMPTION FROM ETHICS REVIEW.

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

#### PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



Prof Josue Mbonigaba  
Academic Leader Research  
School Of Acc Economics&Fin

UKZN Research Ethics Office  
Westville Campus, Govan Mbeki Building  
Postal Address: Private Bag X54001, Durban 4000  
Website: <http://research.ukzn.ac.za/Research-Ethics/>

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

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