The Influence of Institutional Factors on the Levels of Unaccounted for Intangible Assets in Firms

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Abstract

This research explores the influence of institutional factors on the ratio of unaccounted intangible assets to total intangibles. From an analysis of the top global firms by intangible asset value, the results indicate that a firm's sector, size, financial leverage, profitability, board size, and organisational complexity are all significant factors affecting the amount of intangible assets that remain unaccounted for in a firm's financial statements. Further, the most widely used accounting standards worldwide (IFRS and US GAAP) severely limit the types of intangibles that can be recognised in the balance sheet. Hence, differences in the levels of unaccounted intangibles depend less on a firm's accounting and reporting policies and more on the activities a firm chooses to invest in and its propensity to innovate. In practical terms, our findings alert financial statement users to the sorts of conditions where intangibles are more likely to be underestimated. For standard setters, we reveal where reforms are urgently needed to improve accounting for intangibles. On the theoretical side, our results enrich the literature with the institutional factors that influence how much of a firm's intangibles are accounted for.

Keywords: Accounting standards, Institutional factors, Intangible assets, Financial statements, Investment decisions, Institutional theory

1. Introduction

Intangibles are non-monetary assets that manifest through their economic properties. They do not have physical substance, but they do grant rights and economic benefits to their owners (Moro-Visconti, 2020).

Since the turn of the century, intangible resources have become an increasingly fundamental part of the value-creation process for many firms, with most of these assets acting as catalysts

for a firm's growth (Baldi & Bodmer, 2017). Alongside traditional investments, new vehicles for value, such as research and development, patents, trademarks, licenses, customer lists, media files and other intangible assets, are becoming increasingly important. What these intangible resources typically have in common is that they tend to originate from developing knowledge, new technologies, and/or relational capital. Moreover, the growing relevance of many intangible assets to a firm's productivity and competitiveness is more and more frequently stemming from its complementarity with digital technologies. Today, digital technologies often provide the most basic tools with which to develop and use intangible resources in simple, flexible, integrated, and multifunctional ways (Sudewa & Amberd, 2023). And, enticingly, as the composition of corporate wealth has evolved to more heavily favour intangible assets, many new and more innovative business models have emerged, which could present an opportunity to reverse the slowdown in productivity growth that has been observed for some years in many advanced economies (Demmou & Franco, 2021).

In 1975, tangible assets in the balance sheets of the firms included in the S&P 500 index explained 83% of their market value. However, by 2009, this figure had reduced to 19% (Ocean Tomo, 2015). Similarly, several recent studies demonstrate that, in the current era, the market value of firms tends to be increasingly conditioned on their stock of intangible assets rather than by some form of financial capital or tangible asset (e.g., Dancaková et al., 2022; Gamayuni, 2015). Haskel and Westlake (2017) define this phenomenon as 'capitalism without capital'. Although financial and tangible resources remain necessary, intangible resources have laid the foundation for a new way of generating value and growth.

From an accounting perspective, the increasing significance of intangibles to the value of modern firms (Dancaková et al., 2022) is fuelling the challenge for how to accurately represent these assets in financial statements. Current accounting standards tend to prioritise prudence over substance, relying on markets, income, or other cost-related measures to assess value (Moro-Visconti, 2020). Consequently, many innovative intangibles that do not fit these traditional parameters are often under-represented. As such, many academics and practitioners continue to point out the limits of current accounting for intangibles, resulting in widespread calls for reform (e.g., Barker et al., 2022; Lev, 2019). In the meantime, the International Accounting Standard Board (IASB) is actively cooperating with several national standard setters (e.g., the Australian Accounting Standards Board, EFRAG, and the UK Endorsement Board) for a comprehensive review of the accounting requirements for intangible assets globally (IASB, 2024).

This study aims to contribute to the current debate on accounting for intangible assets by investigating what institutional factors most significantly influence the ratio of unaccounted for intangibles to a firm's total intangibles. We argue that examining this underexplored theme is critical to advancing the debate and finding a reporting solution that accurately reflects these assets.

The existing literature mostly deals with the impact of unaccounted intangibles on the value relevance of financial reporting. Alternatively, studies examine the effects of some specific unaccounted for intangible on a firm's performance and market value. Further, the intangible

is usually internally generated, such as the firm's business model, human capital, organisational capital, or reputation (Zambon et al., 2020). Conversely, contributions investigating which institutional factors influence accounting for intangibles are limited and mainly related to goodwill accounting (D'Arcy & Tarca, 2018) or the quantity and quality of voluntary disclosures on unaccounted for intangibles (e.g., Cerbioni & Parbonetti, 2007; Oliveira et al., 2006).

Generally, the accounting literature has widely demonstrated that institutional factors significantly influence accounting and reporting practices (e.g., Potter, 2005; Wysocki, 2011). Hence, we can only assume that the poor existing evidence regarding unaccounted for intangibles is due to a lack of available data (D'Arcy & Tarca, 2018; Zambon et al., 2020). After all, unaccounted for intangibles are often completely undisclosed, making research very difficult. However, although no amount of feasible research can fill this information void, exploring factors that prevent intangibles from being accounted for could provide some insights into the conditions that lead to incomplete financial statements. This is the specific objective of this study. Its contribution is both theoretical and practical. On the theoretical side, our results enrich the literature on the institutional factors that influence accounting for intangibles or, more precisely, their non-accounting. From a practical point of view, our findings alert financial statement users to the kinds of factors that result in underestimated intangibles. For standard setters, our analysis also reveals the institutional conditions under which the representation of intangibles in the balance sheets is particularly inadequate in reflecting a firm's real intangible value. These are areas where reforms to accounting standards for intangible assets appear more urgent.

The rest of the paper is structured as follows. In Section 2, we present our theoretical framework and hypothesis development. Section 3 outlines the data sources and the research method used. The findings are reported and interpreted in Section 4. Finally, the paper concludes in Section 5 with a discussion of this study's contributions, limitations, and our intentions for future research.

2. Theoretical Framework and Hypothesis Development

This research investigates the institutional factors that influence the ratio of intangibles that are unaccounted for to a firm's total intangibles. In line with this objective, in this section, we review the salient literature, explore new institutional theory as a suitable framework for our analysis, and develop our research hypotheses. In researching the factors that might influence how much of a firm's intangible assets are unaccounted for, we were often directed toward agency theory, the theory of resources and capabilities, resource dependency theory, and board capital theory. Hence, these theories are also briefly mentioned in this section.

2.1 The Institutional Theory

Over the few last decades, institutional theory (Scott, 2001) has underpinned numerous studies on accounting and reporting policy (e.g., Chariri, 2011; Guerreiro et al., 2021; Teruki, 2020) as well as other organisational practices, like investing (Sahin & Mert, 2021). Institutions are humanly devised constraints that organise political, economic, and social

relations (North, 2009). According to Scott (2001), on a scale from more to less formal mechanisms, institutions rely on three main pillars: law and rules (the regulative pillar), norms (the normative pillar), and common beliefs and widely shared logics of action (the cultural-cognitive pillar). From this perspective, the reporting systems within accounting are institutions since they consist of a set of laws, norms, and practices that induce organisations to account for their activities and results, thus facilitating business relationships. The theoretical concepts within institutional theory that most closely relate to this research are the determinants and structure of institutions (be they formal or informal), the levels at which institutions act and interact (macro or micro), and the interdependencies and complementarities between different institutions.

Formal and informal institutions interact in different ways and at various levels. For example, the legitimacy of regulations and norms improves when they reflect a community's values and points of view (North, 1994). Further, informal institutions can fill a hole when formal institutions ignore a contingency (North, 2009). A good example is when corporate reporting relies on voluntary disclosures and non-GAAP measures since no generally accepted accounting standard deals with specific accounting issues.

Based on institutional theory and moving from a macro to a micro perspective, Dillard et al. (2004) identify three primary institutional levels impacting accounting reporting systems: the political and economic level, the organisation field, and the organisational level. Here, North (1990) and Daude and Stein (2007) all highlight that different factors at different institutional levels can influence a firm's investment decisions.

Political and socio-economic contexts, with their regulations, norms, and values, can define the background in which reporting systems develop. Other institutions rooted in the same background, such as legal and financial systems, can affect accounting and reporting regulations and practices (Ball, 2006). In turn, the accounting/reporting systems may influence other laws, norms, and practices concerning businesses, such as financial contracting (Wysocki, 2011).

Institutional quality is another factor that can influence a firm's investments into research and development and innovation (Waarden, 2001). More precisely, strong institutional settings encourage these kinds of investments by firms, favouring knowledge accumulation and knowledge spillover (Priem & Butler, 2001). For example, Wang et al. (2015) report that institutions influence the innovation activities of firms through laws, regulations, and policies, while Varsakelis (2006) and Krammer (2009) find that investments into education, solid legal protection, and stable political and economic conditions positively affect a firm's technological performance. Laeven (2003) argues that efficient financial markets encourage research and development investments by reducing the firm's financial constraints.

The organisation's field comprises all organisations involved in manufacturing or delivering a specific product or service, including the related associations and industry experts. Empirical evidence confirms that the nature of activities and other peculiarities characterising different sectors influence both corporate accounting and reporting policies (e.g., Cooke,

1992; Nobes, 2013) and investment decisions (e.g., Bajgar et al., 2021; Calvino et al., 2018; Demmou et al., 2019).

Finally, the organisational level focuses on a firm's specific characteristics. Extant research proves that some of these characteristics, such as size or ownership concentration, may significantly affect both a firm's accounting and disclosure practices (e.g., ElKelish, 2017; Glaum et al., 2013) and its investment decisions (e.g., Bajgar et al., 2021; Minetti et al., 2015).

These numerous mechanisms for interaction between institutions imply that the various organisations operating in the same context are interdependent and/or complementary (Walker, 2010). Hence, a common reporting system or a common political, social, or economic context does not automatically mean that institutions will invest, account, or report in a similar way, especially when it comes to intangibles. In support of this argument, several empirical studies prove that accounting and disclosure policies significantly differ across countries and firms even when those firms are following the same set of accounting standards (e.g., Rahman et al., 2002; Tarca, 2020). Other studies show that investments into research and development and other intangible assets are not homogeneous even among firms playing in the same competitive arena (e.g., Arrighetti et al., 2014; Teece, 2014). Hence, a firm's levels of unaccounted intangibles might be better explained through the lens of institutionalism and, more specifically, by analysing a large number of institutional factors that with the potential to influence the level of intangibles reported.

2.2 Literature Review and Hypothesis Development

To the best of our knowledge, no study has yet investigated what institutional factors significantly influence the proportion of unaccounted intangibles to total intangibles. That said, many studies have explored the institutional factors that affect organisational accounting practices, financial reporting, and investment decisions, all of which can impact the level of intangibles that are unaccounted for in a company's financial statements.

The accounting literature identifies two main reasons why financial accounting and reporting practices can differ significantly across countries and firms. The first reason is following two different sets of accounting standards, particularly standards that are not aligned in terms of evaluating and representing a specific accounting item (Gray, 1988). The second reason is that choosing different accounting options can lead to differences in financial reports even across countries and firms that adopt the same set of accounting standards (Nobes, 2013). IAS 16 offers one example – here, property, plant, and equipment can either be evaluated at cost or by fair value.

The IFRS and the US GAAP are the most widely used accounting standards worldwide; they are also the most relevant to this research (see Table 4). Interestingly, in terms of intangibles, they are almost aligned with neither set of standards allowing many intangibles on the balance sheet. Hence, the proportion of unaccounted intangibles to total intangibles is expected to mostly depend on the investment decisions made by the firm along with the institutional factors affecting them.

Based on the theory of new institutional accounting and our literature review, we identified 13 different institutional factors that could reasonably influence a firm's investment decisions and accounting and reporting practices, and, in turn, the level of intangibles unaccounted for. These are the factors that have shaped our research hypotheses.

At a macro-level, the extant research suggests that nationality is the most significant explanatory variable for a firm's accounting and disclosure policies (e.g., Meek et al., 1995; Tsakumis, 2007). However, this variable involves other relevant and more detailed sub-variables (e.g., Glaum et al., 2013; Nobes, 2013), such as the country's culture and the characteristics of its legal and financial systems. Further, country factors also typically influence firms' decision-making processes regarding both the amounts and typologies of investments (e.g., Shao et al., 2013). This is particularly so for investments into research and development (e.g., Iturriaga & López-Millán, 2016; Lai et al., 2015). Hence, our first hypothesis is that:

H1: Nationality influences the ratio of unaccounted for intangibles to total intangibles.

The set of accounting standards in force is a specific and critical factor related to nationality that usually deserves a detailed analysis when studying accounting and reporting practices (Nobes, 2011). Nevertheless, we do not expect this to be a significant variable in this study. The reason is that 96% of firms in the research sample follow the IFRS or the US GAAP, and both the IASB's and FASB's definitions of identifiable intangible assets meeting the requirements to be accounted for have been aligned since 2008 (IASB, 2008). According to both the IFRS and US GAAP, an intangible asset is a non-monetary asset without physical substance that meets three main requisites: identifiability, control, and future economic benefits. Identifiability means that the asset can be distinguished from goodwill and can either be separated from the entity and sold, transferred, licensed, rented, or exchanged. Alternatively, an intangible can arise from contracts or other legal rights. Control implies that the entity has the power to obtain future economic benefits from using the specific resource and can restrict others from accessing those benefits. Finally, future economic benefits consist of revenues from the sale of products or services, cost savings, or other benefits from using the resource. IFRS 3, which substantially aligns with FAS 141, defines a list of intangibles that must be capitalised following an acquisition and must be separately disclosed on the acquiring the balance of the firm (see Table 1). Conversely, the current IAS 38 and FAS 142 state that internally generated intangibles, such as internally generated goodwill, brands, or customer lists, cannot be recognised on the balance sheet. Therefore, according to this premise, our second hypothesis is as follows:

H2: The set of accounting standards (IFRS or US GAAP) a firm adopts does not influence the ratio of its unaccounted for intangibles to total intangibles.

This hypothesis might be rejected if a firm's development expenses are exceptionally high. Development expenses represent the main element of discord between IFRS 38 and FAS 141. More specifically, IAS 38 allows the capitalisation of certain internally generated intangibles when they are in the 'development' phase (as opposed to the 'research' phase) as long as they

meet some specific conditions, such as technical feasibility and the intention and ability to complete and use the asset. FAS 141 does not.

Table 1. Categories of intangible assets under IFRS 3

Marketing-related intangible assets

- Trademarks, trade names
- Service marks, collective marks, certification marks
- Trade dress (unique colour, shape, or package design)
- Newspaper mastheads
- Internet domain names
- Mastheads
- Non-competition agreements

Customer-related intangible assets

- Customer lists
- Order or production backlog
- Customer contracts and the related customer relationships
- Non‑contractual customer relationships

Artistic-related intangible assets

- Plays, operas, and ballets
- Books, magazines, newspapers, and other literary works
- Musical works such as compositions, song lyrics, and advertising jingles
- Pictures and photographs
- Video and audiovisual material, including films, music, videos, etc.

Contract-based intangible assets

- Licensing, royalty, and standstill agreements
- Advertising, construction management, service or supply contracts
- Construction permits
- Franchise agreements
- Operating and broadcast rights
- Use rights (drilling, water, air, mineral, timber cutting, etc.)
- Servicing contracts, such as mortgage servicing contracts
- Employment contracts

Technology-based intangible assets

- Patented technology

- Computer software and mask works

- Unpatented technology

- Databases

- Trade secrets, such as secret formulas, processes, and recipes

At the meso-level, prior studies suggest that the sector is one of the most impactful factors in the quality and quantity of a firm's investments into intangibles. The nature of a business's activities across different industries, along with their different inherent needs, is a crucial driver of accounting for intangibles. For instance, firms in IT and the pharmaceutical sector usually invest more in intangibles than firms in basic metal and mining industries (e.g., Demmou et al., 2019). Similarly, firms in digitally-intensive sectors typically make higher investments into information and communication technology than firms in other sectors (e.g., Calvino et al., 2018).

Industry concentration is also a discriminant variable. This is because investments into intangibles play a crucial role in driving competitive dynamics between firms in industries with a higher concentration (e.g., Bajgar et al., 2021). Further, firms in the same industry could choose to follow the same accounting and reporting policies as an informal 'industry standard' or 'industry best practice' (e.g., Stadler & Nobes, 2014). Indeed, deviating from the generally accepted accounting and reporting practices in a sector may be negatively perceived by the market (Inchausti, 1997). Hence, our third hypothesis is that:

H3:   Sector influences the ratio of unaccounted intangibles to total intangibles.

Shifting attention to the micro-level, prior studies suggest that several firm-specific characteristics should be considered. Among these, firm size is one of the most impactful explanations for the different levels of unaccounted intangibles. Large firms are more likely to operate in different markets or sectors (e.g., Depoers, 2000) and typically deal with a great variety of activities (García-Meca et al., 2005). Further, extant research demonstrates that intangibles, particularly innovation and research and development, play a key role in enabling large firms to scale up and increase their market share (Bajgar et al., 2021). These conditions are expected to help large firms develop internal resources connected to the organisational, human, social and relationship capitals, such as know-how or a widely renowned reputation (IFRS Foundation, 2021). However, contemporary accounting standards do not reflect these assets in the balance sheet. Consequently, we hypothesise that:

H4:   Large firms will have a higher level of unaccounted for intangibles to total intangibles.

The literature also discusses the association between financial constraints and a firm's investments. Several empirical contributions demonstrate that investments in intangibles are more likely to be subject to financial constraints and that they are more sensitive to internal

capital (e.g., Morikawa, 2015). This evidence mainly refers to intangible resources that do not meet the requisites to be accounted for in financial statements, such as research and development or organisation and business process improvements, due to their higher risk and more extended gestation period (e.g., Montresor & Vezzani, 2022; Yang et al., 2014). Therefore, those investments are expected to be higher for firms with higher internal capital and lower indebtedness, where the greater availability of internal capital may also reflect higher profitability. Two research hypotheses follow:

H5: The level of unaccounted for intangibles to total intangibles is lower for firms with higher financial leverage.

H6: The level of unaccounted for intangibles to total intangibles is higher for more profitable firms.

Another crucial issue is the firm's ownership structure. There is a growing consensus among scholars that a firm's propensity to invest in innovation, particularly in research and development and other highly volatile intangible resources, depends on the firm's ownership structure (Minetti et al., 2015). However, how the ownership structure affects these investments is still being debated. On the one hand, some state that firms with dispersed ownership have more of an incentive to engage in innovation because they can diversify the risk across many investors (e.g., Aghion et al., 2013). In line with this reasoning, several studies demonstrate that firms with a high ownership concentration are more reluctant to reallocate resources from traditional to more innovative investments (e.g., Minetti et al., 2015; Nguyen et al., 2022). On the other hand, it is also claimed that concentrated and stable ownership leads to better control of the firm's activities and a longer-term view, both of which are essential requisites to pushing investments that need an exceptionally long time to yield results (Onida, 2004). Based on these contrasting arguments, our seventh hypothesis states that:

H7: Ownership concentration influences the ratio of unaccounted intangibles to total intangibles.

Keeping our attention on corporate governance, the literature highlights another key element influencing a firm's propensity for innovation: board characteristics. Board size and composition, alongside gender and the tenure of directors, emerge as among the most investigated factors. However, as noted for ownership concentration, empirical findings on how board characteristics influence investments into innovation are inconclusive and often conflicting (Sierra-Morán et al., 2024).

According to the theory of resources and capabilities and resource dependency theory, the larger the board, the more probable it is that a firm will have broader access to some of the resources that encourage innovation, such as knowledge, sources of information, and relationships with scientists and experts (Chouaibi et al., 2012; Wang, 2011). In line with this argument, some empirical contributions report that board size positively influences a firm's investments into innovation (e.g., Chen et al., 2015; Wincent et al., 2012). Conversely, proponents of agency theory state that a large board implies a more divided position, which

can give rise to more complex and lengthy decision-making processes. Thus, a large board discourages more challenging and risky decisions, such as investing into intangibles (Goodstein et al., 1994; Jensen, 1993). Consistent with this reasoning, several empirical studies show a negative association between board size and investments into innovation (e.g., Rossi & Cebula, 2015; Sharma et al., 2018). However, other empirical evidence suggests that board size does not significantly affect a firm's propensity to innovate (e.g., Bianchi et al., 2012; Valencia, 2018). Summarising the above different positions, we hypothesise that:

H8:   Board size influences the ratio of unaccounted intangibles to total intangibles.

A central issue concerning board composition is the presence of independent directors, i.e., directors that have no contractual relationship with the firm apart from their place on the board (Williamson, 1983). Such directors are not employed nor otherwise affiliated with the firm or other companies of the same group (Blibech & Berraies, 2018). Three main arguments support the idea that having independent directors encourages investments into innovations. First, in line with the agency theory, these directors are independent of the CEO and are therefore freer to propose challenging questions and innovative projects (Kor, 2006). Further, since they come from an environment outside the business, they can provide different and broader points of view (e.g., Shapiro et al., 2015; Wincent et al., 2012). This second argument is mainly grounded on board capital theory (Hillman & Dalziel, 2003) and the theory of resources and capabilities (Mahoney & Pandian, 1992). Finally, consistent with resource dependence theory, the presence of bankers, politicians, scientists, and other professionals with various different fields of expertise and networks of relationships on the board can help the firm access financial and non-financial resources that are fundamental to engaging with innovation (Shapiro et al., 2015). Coherent with the above reasonings, several studies have demonstrated a positive association between the presence of independent directors and a firm's propensity to innovate (e.g., Sena et al., 2018; Sharma et al., 2018). Conversely, Blibech and Berraies (2018) found the opposite correlation. In their opinion, and consistent with the resource dependence theory, independent directors lack knowledge of the firm's specific needs, which should discourage innovation. Finally, just as is the case for the board size, some studies report no association between independent directors and intangibles at all (e.g., Takahiro, 2015; Valencia, 2018). Based on these contrasting insights, our ninth hypothesis is that:

H9:   The presence of independent directors influences the ratio of unaccounted intangibles to total intangibles.

A further controversial argument refers to the presence of women on boards. Some empirical studies find that gender diversity positively affects a firm's propensity to innovate (e.g., Miller & Triana, 2009; Mukarram et al., 2018), possibly due to the stereotypical sensitivity women have toward consumer behaviours (Galia et al., 2015). Yet other studies report a negative (Rossi & Cebula, 2015) or no association (e.g., Bianchi et al., 2012; Whitler et al., 2018), suggesting that the typically more risk-averse mindset of women can discourage investments in innovation (Mueller, 2004) or that the number of women on boards is still

often insufficient to really affect the decision-making processes (Torchia et al., 2011). Aware of this conflicting evidence, we hypothesise that:

H10: Gender diversity influences the ratio of unaccounted intangibles to total intangibles.

The last critical factor concerning corporate governance is director tenure. The theory of resources and capabilities and resource dependence theory both suggest that a firm's prosperity can depend on the specific knowledge held by its directors, accumulated over the years they have spent on the board (Patro et al., 2018). In line with this argument, Wincent et al. (2009) demonstrate that long board tenure encourages investments into research and development. However, agency theory suggests the opposite view. When directors spend a long time in a firm, they typically establish close relationships with the CEO and other managers, leading them to lose their independence (Lu et al., 2017). Generally, a long tenure may mean the directors stick to established norms and lose their propensity for innovation (Bravo & Reguera-Alvarado, 2017). Based on these opposing arguments, our eleventh hypothesis is that:

H11: Director tenure influences the ratio of unaccounted intangibles to total intangibles.

Another issue in which the literature offers mixed findings is the relationship between a firm's propensity to innovate and organisational complexity. On the one hand, some studies demonstrate that complex firms invest more in research and development and other radical innovations since they can count on ample organisational capabilities, human capital, and financial resources to manage long and contradictory knowledge-creation processes (e.g., Nohria & Gulati, 1996; O'Connor & DeMartino, 2006). Conversely, other scholars find that simple firms invest relatively more in research and development and other radical innovations since they do not have enough organisational or human resources to deal with internal and incremental innovation processes (e.g., Coad et al., 2016; Henkel et al., 2015). Hence, we hypothesise that:

H12: Organisational complexity influences the ratio of unaccounted intangibles to total intangibles.

Finally, auditing could be another discriminant factor. Extant research provides evidence that auditing improves the quality of financial statements (Fallatah et al., 2021). Further, firms with a Big-4 auditor (Deloitte, KPMG, PwC, and EY) have proven to publish higher quality disclosures than firms with non-Big-4 auditors (e.g., Cascino & Gassen, 2015; Demir & Bahadir, 2014; Glaum et al., 2013). Additionally, auditing the processes used to estimate intangibles is a crucial aspect of accurate disclosures, particularly when assessing whether and how an intangible asset can or should be accounted for. Therefore, our last hypothesis is that:

H13: The type of auditor influences the ratio of unaccounted intangibles to total intangibles.

3. Methodology

We drew our research sample from the 2023 Brand Finance report, which ranks the 100 top global firms by intangible value (Brand Finance, 2023). The rankings were based on data

disclosed in the firms' 2022 consolidated annual financial statements and on the market capitalisation of these firms as at the end date of their financial statement. Each firm's intangible value was computed as the difference between its market capitalisation and the sum of its tangible net assets, net accounted intangibles, and accounted goodwill.

All financial and non-financial data on the firms in the sample necessary for this research were extracted from Orbis, a Bureau van Dijk's database that contains financial information on worldwide firms (https://orbis-r1.bvdinfo.com). Six firms that included very little data on Orbis were excluded from the sample. These companies were: J.P. Morgan, Thermo Fisher, AMD and ConocoPhillips, from the USA, and Linde and BAT, from the UK. Hence, our final research sample consisted of 94 firms, as displayed in Table 2.

Table 2. Research sample

No.	Firm	Country	Rank	Statement date
1	APPLE INC.	United States	1 °	24/09/2022
2	MICROSOFT CORPORATION	United States	2 °	30/06/2022
3	SAUDI ARABIAN OIL COMPANY	Saudi Arabia	3 °	31/12/2022
4	ALPHABET INC.	United States	4 °	31/12/2022
5	AMAZON.COM INC.	United States	5 °	31/12/2022
6	TESLA INC.	United States	6 °	31/12/2022
7	META PLATFORMS INC.	United States	7 °	31/12/2022
8	ELI LILLY AND COMPANY	United States	8 °	31/12/2022
9	UNITEDHEALTH GROUP INC.	United States	9 °	31/12/2022
10	VISA INC.	United States	10 °	30/09/2022
11	NOVO NORDISK A/S	Denmark	11 °	31/12/2022
12	JOHNSON & JOHNSON	United States	12 °	31/12/2022
13	BERKSHIRE HATHAWAY INC.	United States	13 °	31/12/2022
14	LVMH MOET HENNESSY LOUIS	France	14 °	31/12/2022
15	MASTERCARD	United States	15 °	31/12/2022
16	BROADCOM INC.	United States	16 °	30/10/2022
17	WALMART INC.	United States	17 °	31/01/2022
18	PROCTER & GAMBLE CO.	United States	18 °	30/06/2022
19	ABBVIE INC.	United States	19 °	31/12/2022
20	NESTLE SA.	Switzerland	20 °	31/12/2022
21	TENCENT HOLDINGS LIMITED	China	21 °	31/12/2022
22	MERCK & CO. INC.	United States	22 °	31/12/2022
23	KWEICHOW MOUTAI CO. LTD.	China	23 °	31/12/2022

24	COMCAST CORPORATION	United States	24 °	31/12/2022
25	EXXON MOBIL CORP	United States	25 °	31/12/2022
26	COCA-COLA COMPANY (THE)	United States	26 °	31/12/2022
27	PEPSICO INC.	United States	27 °	31/12/2022
28	ADOBE INC.	United States	28 °	02/12/2022
29	ASML HOLDING NV.	Netherlands	29 °	31/12/2022
30	VERIZON COMMUNICATIONS INC.	United States	30 °	31/12/2022
31	ASTRAZENECA PLC	United Kingdom	31 °	31/12/2022
32	COSTCO WHOLESALE CORP.	United States	33 °	28/08/2022
33	ROCHE HOLDING AG	Switzerland	34 °	31/12/2022
34	L'OREAL	France	35 °	31/12/2022
35	T-MOBILE US INC.	United States	37 °	31/12/2022
36	AT&T INC.	United States	39 °	31/12/2022
37	DEUTSCHE TELEKOM AG	Germany	40 °	31/12/2022
38	CISCO SYSTEMS INC.	United States	41 °	30/07/2022
39	NOVARTIS AG	Switzerland	42 °	31/12/2022
40	SALESFORCE INC.	United States	43 °	31/01/2022
41	ANHEUSER-BUSCH INBEV SA/NV	Belgium	44 °	31/12/2022
42	PFIZER INC.	United States	45 °	31/12/2022
43	LINDE	United Kingdom	46 °	31/12/2022
44	ACCENTURE PUBLIC LIMITED	Ireland	47 °	31/08/2022
45	HERMES INTERNATIONAL	France	48 °	31/12/2022
46	IBM	United States	49 °	31/12/2022
47	DANAHER CORP.	United States	50 °	31/12/2022
48	AMGEN INCORPORATED	United States	51 °	31/12/2022
49	AMD	United States	52 °	30/12/2022
50	CHRISTIAN DIOR	France	54 °	31/12/2022
51	NETFLIX INC.	United States	55 °	31/12/2022
52	CHARTER COMMUNICATIONS	United States	56 °	31/12/2022
53	CHEVRON CORPORATION	United States	57 °	31/12/2022
54	WALT DISNEY COMPANY (THE)	United States	58 °	01/10/2022
55	SAP SE	Germany	59 °	31/12/2022
56	UNILEVER PLC	United Kingdom	60 °	31/12/2022
57	BRISTOL MYERS SQUIBB	United States	61 °	31/12/2022

58	TCS GROUP	India	62 °	31/12/2022
59	S&P GLOBAL INC.	United States	64 °	31/12/2022
60	TEXAS INSTRUMENTS INC.	United States	65 °	31/12/2022
61	CATERPILLAR INC.	United States	66 °	01/12/2022
62	HONEYWELL INTERNATIONAL	United States	67 °	31/12/2022
63	SANOFI	France	68 °	31/12/2022
64	RTX CORP.	United States	69 °	31/12/2022
65	CVS HEALTH CORPORATION	United States	70 °	31/12/2022
66	UNITED PARCEL SERVICE INC.	United States	71 °	31/12/2022
67	THE CIGNA GROUP	United States	72 °	31/12/2022
68	QUALCOMM INC.	United States	73 °	25/09/2022
69	GENERAL ELECTRIC COMPANY	United States	74 °	31/12/2022
70	LOCKHEED MARTIN CORP.	United States	75 °	31/12/2022
71	UNION PACIFIC CORP.	United States	76 °	31/12/2022
72	SIEMENS AG	Germany	77 °	30/09/2022
73	GILEAD SCIENCES INC.	United States	78 °	31/12/2022
74	BOOKING HOLDINGS INC.	United States	79 °	31/12/2022
75	APPLIED MATERIALS INS.	United States	80 °	30/10/2022
76	SERVICENOW INC.	United States	81 °	31/12/2022
77	STRYKER CORPORATION	United States	82 °	31/12/2022
78	HDFC BANK	India	83 °	31/03/2022
79	PDD HOLDINGS INC.	Ireland	84 °	31/12/2022
80	ELEVANCE HEALTH INC.	United States	85 °	31/12/2022
81	MEDTRONIC PLC.	Ireland	86 °	29/04/2022
82	RELIANCE INDUSTRIES LIMITED	India	87 °	31/03/2022
83	MARSH & MCLENNAN	United States	88 °	31/12/2022
84	AIRBUS SE	Netherlands	89 °	31/12/2022
85	AUTOMATIC DATA PROCESSING,	United States	90 °	30/06/2022
86	AMERICAN TOWER	United States	91 °	31/12/2022
87	BHP GROUP LIMITED	Australia	92 °	30/06/2022
88	SCHNEIDER ELECTRIC SE	France	93 °	31/12/2022
89	UBER TECHNOLOGIES INC.	United States	94 °	31/12/2022
90	DEERE & CO.	United States	95 °	30/10/2022
91	TJX	United States	97 °	29/01/2022

92	INDUSTRIA DE DISENO TEXTIL	Spain	98 °	31/01/2022
93	ALIBABA GROUP	China	99 °	31/03/2022
94	BLACKROCK INC.	United States	100 °	31/12/2022

Notes: This table lists the firms included in the research sample. The country indicates where the firm's headquarters is located. The ranking was taken from (Brand Finance, 2023). The statement date indicates the end date of the period covered in the firm's annual consolidated statement. To further analyse these firms, we used market capitalisation and other financial and non-financial information taken from the Orbis database.

The research variables are shown in Table 3.

The dependent variable is the magnitude of unaccounted intangibles (INT), measured as the ratio of unaccounted intangibles over total intangibles. Because of the dispersion of values (see Table 4), the magnitude of unaccounted intangibles was then classified through tertiles (INT_T), where the three categories group together the firms with the highest, intermediate, and lowest levels of unaccounted intangibles in the sample.

The explanatory variables derive from the research hypotheses.

COUNTRY indicates where each firm is located. Initially, this was defined as a categorical variable. Later, considering the prevalence of firms from the USA in the sample (see Table 4), we transformed this variable into a dichotomous variable (COUNTRY_D), where 0 represents the USA and 1 refers to any other country in the world.

STANDARDS refers to the accounting standards adopted. This was also defined as a dichotomous variable, where 0 = IFRS, and 1 = US GAAP.

SECTOR classifies the firms according to the Global Industry Classification Standards (GICS), in line with other papers (e.g., Eisenschmidt & Krasodomska, 2021; Kabir & Su, 2022).

SIZE reflects the total number of employees. Some studies use market capitalisation as a proxy for size (e.g., Jones & Finley, 2011; Nobes & Perramon, 2013). However, this proxy is inappropriate for this research since it directly correlates with our dependent variable. Additionally, all firms in the sample are very large, being the largest in the world according to the value of their intangibles. Hence, our issue was not classifying the sample firms as large, medium, small, or micro but, rather, grouping these large firms into some kind of subgroup. We therefore chose the total number of employees as our proxy. This is consistent with Arrighetti et al. (2014), who used this parameter to demonstrate the association between the size of a firm and its investment into intangible assets.

The next three variables stem from the fifth and sixth hypotheses and deal with the firm's financial performance. Here, we used the gearing ratio (GEARING) to measure financial leverage and ROE and ROA as proxies for firm profitability.

The seventh hypothesis deals with ownership concentration. For this variable, we used the number of shareholders (SHAREHOLDERS) and Bureau van Dijk's Independence Indicator (INDEPENDENCE) as proxies, noting that INDEPENDENCE is an ordinal variable. Code A s for low-ownership concentration, that is, firms where each shareholder has less than 25% of direct or total ownership of the company. Code B refers to medium-low ownership concentration where each shareholder has a total ownership of below 50%, but at least one shareholder has an ownership percentage above 25%. Code C is for firms with a shareholder ownership above 50% (accounting for both direct and indirect investments). Finally, code D indicates high ownership concentration, meaning firms with a direct shareholder ownership of above 50%.

The next set of four variables reflects the composition of the board. BOARD_SIZE represents the number of directors on the board. IND_DIRECTORS indicates the percentage of independent directors among total board members. GENDER represents the ratio of women on the board compared to the total number of members. Lastly, TENURE was measured as the average number of years the current members of the board of directors have held office.

To represent organisational complexity, we used the number of firms belonging to the company group (GROUP) as a proxy. And, finally, AUDIT traces who audited each firm's consolidated financial statement: 1 for Deloitte, 2 for KPMG, 3 for PwC, 4 for EY, and 5 for other.

All the variables of the research that were initially defined numerically (SIZE, GEARING, ROE, ROA, SHAREHOLDERS, BOARD_SIZE, IND_DIRECTORS, GENDER, TENURE, GROUP) showed a wide dispersion of results (see Table 4). Hence, to mitigate this issue, we converted these ordinal variables into tertiles (SIZE_T, GEARING_T, ROE_T, ROA_T, SHAREHOLDERS_T, BOARD_SIZE_T, IND_DIRECTORS_T, GENDER_T, TENURE_T, GROUP_T).

The research hypotheses were ultimately assessed by testing the association between the ratio of unaccounted intangibles to total intangibles measured through tertiles (INT_T) and each dependent variable. Consistent with Bryman and Bell (2015), we used Pearson's Chi-Square (χ^2) to test the associations involving a categorical or dichotomous dependent variable. We then used Spearman's rho (ρ) for the ordinal dependent variables. All the dependent variables that were initially numeric were considered in the ordinal version (obtained through tertiles) when testing the hypotheses. Spearman's correlation coefficient measures both an association's strength and direction. More specifically, ρ can take a value from -1 to +1, where a value of -1 means a perfect negative association, a value of +1 means a perfect positive association, and a value of 0 means no association exists. Hence, an association is stronger when ρ is closer to either -1 or +1.

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Table 3. Research variables

Variable's name	Type	Topic of analysis	Formula or Coding	Research hypothesis	Related transformed variable
Dependent variable:					
INT	Numeric	Magnitude of unaccounted intangible assets to total intangibles	Unaccounted intangibles/Total intangibles x 100	n/a	INT_T *(Ordinal variable, from tertiles)*
Independent variables:					
COUNTRY	Categorical	The country where a firm is located	n/a	H1	COUNTRY_D Dichotomous variable: Code 0 = U.S.A. Code 1 = other countries than the USA.
STANDARDS	Dichotomous	Accounting standards adopted by a firm	Code 0 = IFRS Code 1 = US GAAP	H2	n/a
SECTOR	Categorical	The business sector to which a firm belongs	GICS taxonomy	H3	n/a
SIZE	Numeric	Sub-grouping of large firms by size	Number of employees	H4	SIZE_T *(Ordinal variable, from tertiles)*
GEARING	Numeric	Gearing ratio (%)	Total liabilities/Equity x 100	H5	GEARING_T *(Ordinal variable, from tertiles)*
ROE	Numeric	Return on equity (%)	Net income/Equity x 100	H6	ROE_T *(Ordinal variable, from tertiles)*
ROA	Numeric	Return on assets (%)	Operating income/Total assets x 100	H6	ROA_T *(Ordinal variable, from tertiles)*
SHAREHOLDERS	Numeric	Ownership concentration	Number of shareholders	H7	SHAREHOLDERS_T *(Ordinal variable, from tertiles)*
INDEPENDENCE	Ordinal	Ownership concentration	Bureau van Dijk's Independence Indicator: Code A = low level Code B =	H7	n/a

			medium-low level Code C = medium-high level Code D = high level		
BOARD_SIZE	Numeric	Size of the BoD	Number of members in the BoD	H8	BOARD_SIZE_T *(Ordinal variable, from tertiles)*
IND_DIRECTORS	Numeric	Independence of directors	Percentage of independent directors in the BoD	H9	IND_DIRECTORS_T *(Ordinal variable, from tertiles)*
GENDER	Numeric	Gender diversity in the BoD	Percentage of women in the BoD	H10	GENDER_T *(Ordinal variable, from tertiles)*
TENURE	Numeric	Directors' tenure	Average number of years from which current members of the BoD are in office	H11	TENURE_T *(Ordinal variable, from tertiles)*
GROUP	Numeric	Organisational complexity	Number of firms belonging to the company group	H12	GROUP_T *(Ordinal variable, from tertiles)*
AUDIT	Categorical	Type of auditor	Code 1 = Deloitte Code 2 = KPMG Code 3 = PwC Code 4 = EY Code 5 = Non-Big-4 auditor	H13	n/a

Notes: This table lists the research variables. BoD stands for Board of Directors. n/a means 'not applicable'. In the case of the independent variables, n/a means that the original variable was not transformed into another type of variable (e.g., from a categorical to a dichotomous variable or from a numeric to an ordinal variable) as the research developed.

4. Results and Discussion

This section presents and discusses our research findings. Table 4 shows descriptive statistics. Table 5 displays the univariate statistics on the institutional factors influencing the ratio of unaccounted intangibles to total intangibles.

Table 4. Descriptive statistics

Panel A: Numeric variables							
Variable's name	**Obs.**	**Unit of measurement**	**Mean**	**Min**	**Max**	**StdDev**	**Tertiles: min – max**
INT	94	Percentage	77.48	4.35	100.00	23.26	First: 4.35 – 71.19 Second: 71.30 – 92.49 Third: 92.90 – 100.00
SIZE	92	Number of employees	165,654.30	114	2,300,000	296,192.70	First: 114 – 50,000 Second: 51,000 – 117,100 Third: 126,988 – 2,300,000
GEARING	83	Percentage	207.78	6.05	557.25	631.55	First: 6.05 – 53.91 Second: 53.93 – 114.26 Third: 124.76 – 557.25
ROE	88	Percentage	43.15	-124.54	178.97	111.30	First: -124.54 – 11.70 Second: 13.33 – 31.04 Third: 31.57 – 178.97
ROA	88	Percentage	17.36	-28.47	32.47	58.42	First: -28.47 – 4.80 Second: 5.21 – 10.84 Third: 11.20 – 32.47
SHAREHOLDERS	92	Number of shareholders	107.37	5	200	37.33	First: 5 – 92 Second: 93 – 124 Third: 124 – 200
BOARD_SIZE	94	Number of directors	14.13	3	29	4.12	First: 3 – 12 Second: 12 – 14 Third: 15 – 29
IND_DIRECTORS	94	Percentage	17.51	0.00	85.71	21.64	First: 0.00 – 6.25 Second: 6.67 – 13.04 Third: 13.33 – 85.71
GENDER	94	Percentage	28.90	0.00	53.85	11.28	First: 0.00 – 25.00 Second: 25.00 – 33.33 Third: 33.33 – 53.85
TENURE	86	Number of years	7.71	1	19	3.14	First: 1 – 5.58 Second: 5.73 – 8 Third: 8.18 – 19.10
GROUP	92	Number of firms	1,744.55	4	90,412	9,388.86	First: 4 – 336 Second: 355 – 730 Third: 743 – 90,142

Panel B: Categorical, dichotomous, and ordinal variables		
Variable's name	**Nos. of firms**	**% of Obs.**
COUNTRY		
Obs.: 94		
Australia	1	1.06
Belgium	1	1.06
China	3	3.19
Denmark	1	1.06
France	6	6.39
Germany	3	3.19
India	3	3.19
Ireland	4	4.26
Netherlands	2	2.13
Saudi Arabia	1	1.06
Spain	1	1.06
Switzerland	3	3.20
United Kingdom	2	2.13
United States	63	67.02
COUNTRY_D		
Obs.: 94		
USA	63	67.02
Other countries than USA.	31	32.98
STANDARDS		
Obs.: 90		
IFRS	24	26.67
US GAAP	66	73.33
SECTOR		
Obs.: 94		
Communication services	11	11.70
Consumer discretionary	12	12.76
Consumer staples	8	8.51
Energy	4	4.26
Financials	7	7.45
Health care	20	21.28
Industrials	13	13.83
Information technology	16	17.02
Materials	2	2.13
Real estate	1	1.06
INDEPENDENCE		
Obs.: 93		
Low level ownership concentration	70	75.27
Medium-low level ownership concentration	12	12.90
Medium-high level ownership concentration	0	0.00

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High level ownership concentration	11	11.83

AUDIT

Obs.: 91

Deloitte	22	24.18
KPMG	13	14.29
PwC	25	27.47
EY	26	28.57
Non-Big-4 auditor	5	5.49

Notes. This table shows descriptive statistics for the sample firms. Panel A refers to the numeric variables. Panel B refers to the categorical, dichotomous, and ordinal variables.

Table 5. Results of the univariate analysis

Hypothesis	Obs.	Dependent variable	Test of association	p-value	Supported
H1	94	COUNTRY_D	$\chi^2 = 0.1386$	0.9330	NO
H2	90	STANDARDS	$\chi^2 = 0.2770$	0.8710	YES
H3	94	SECTOR	$\chi^2 = 28.3078$	0.0480*	YES
H4	92	SIZE_T	$\rho = 0.5465$	0.0178*	YES
H5	83	GEARING_T	$\rho = -0.5359$	0.0318*	YES
H6	88	ROE_T	$\rho = 0.4868$	0.0000***	YES
	88	ROA_T	$\rho = 0.6147$	0.0000***	YES
H7	92	SHAREHOLDERS_T	$\rho = 0.0159$	0.8807	NO
	93	INDEPENDENCE	$\rho = 0.1500$	0.1512	NO
H8	94	BOARD_SIZE_T	$\rho = -0.5034$	0.0030**	YES
H9	94	IND_DIRECTORS_T	$\rho = 0.0640$	0.5403	NO
H10	94	GENDER_T	$\rho = -0.0159$	0.8793	NO
H11	86	TENURE_T	$\rho = 0.1407$	0.1964	NO
H12	92	GROUP_T	$\rho = -0.5048$	0.0000***	YES
H13	91	AUDIT	$\chi^2 = 2.2229$	0.9730	NO

Notes: This table displays univariate statistics on the influence of the country, accounting standards, sector, business size, financial leverage (measured through the gearing ratio), profitability (measured through ROE and ROA), ownership concentration (measured through the number of shareholders and the Bureau van Dijk's Independence

Indicator), board composition (particularly concerning the board size, the presence of independent directors and the gender diversity), organisational complexity and type of auditor on the magnitude of unaccounted intangible assets to total intangibles. *p-value < 0.05; **p-value < 0.01; ***p-value< 0.001

The research findings confirm seven of our hypotheses; the others are rejected.

More specifically, the results confirm that sector, business size, financial leverage, profitability, board size, and organisational complexity all influence a firm's levels of unaccounted intangibles.

Starting with sector (H3; χ^2 = 28.3078), the p-value of 0.0480 indicates a statistically significant relationship. In the first tertile, where firms have the lowest proportion of unaccounted intangibles (less than 71.19% of total intangibles), we see the strong presence of information technology (64%) and health care (50%). The second tertile, with an intermediate level of unaccounted intangibles (between 71.30% and 92.49% of total intangibles), is primarily composed of consumer discretionary (62.5%) and health care (40%) firms. Lastly, the third tertile, with the highest level of unaccounted intangibles (more than 92.90% of total intangibles), is led by consumer staples (67%) and communication services (55%). Firms in financial services and industrials are equally distributed among the three tertiles. Notably, the sample did not contain enough energy, materials, or real estate firms to produce useful evidence.

These results are not surprising. In fact, they align with several prior studies that demonstrate a firm's sector impacts its decisions over which types of investments to focus attention on (e.g., Calvino et al., 2018) as well as the firm's accounting and reporting policies (e.g., Stadler & Nobes, 2014). Nonetheless, our research sample consisted of the top global firms by intangible value. Further, our aim was not to explore the typologies of investments but, rather, to shed light on the proportion of intangible assets that go unaccounted for. In this endeavour, we were cognisant that this might represent the majority of a firm's intangibles. It turns out we were right, with the average ratio of unaccounted for intangibles averaging 77.48%. We argue that the intensity with which intellectual property (IP) is protected in different sectors is a critical factor influencing the ratio of unaccounted intangibles. Patents, trademarks, copyrights, and so on, are among the few intangibles that the accounting standards allow to be included on the balance sheet (see Section 2.2.). Hence, it seems reasonable that IP-intensive sectors would account for more of their intangibles than other sectors where these types of assets are less common.

This explanation also aligns with data from the last World Intellectual Property Indicators Report (WIPO, 2023). Based on that report, computer technology accounts for the highest number of patents and trademarks worldwide. Our results show that most firms in the information technology sector, whose activity is firmly rooted in computer technology, fall into the first tertile for the magnitude of intangible assets. WIPO (2023) also reports that health care, including its various branches of medical technology, biotechnology, pharmaceuticals, and such, is a leading sector worldwide for the number of patents and

trademarks. Consistently, these research results show that the vast majority of firms in the healthcare sector are included in the first and second tertiles for unaccounted intangibles. The other sector that sees most firms falling into the second tertile is the consumer discretionary sector. Coherently, WIPO (2023) reports that firms in the furniture and household goods, textiles, and accessories sector, which represent some of the pillars of the consumer discretionary industry, are leading the race for industrial design rights globally.

Business size, as measured by the number of employees is another significant influence over intangibles that have not been accounted for ($\rho = 0.5465$; p-value = 0.0178). The association is positive: the higher the number of employees, the higher the proportion of unaccounted for intangibles. This result is in line with our fourth hypothesis and also with evidence from the IFRS Foundation (2021), which suggests that larger firms tend to develop some kinds of internal resources more intensively. These resources, such as know-how and reputation, are typically connected to the organisational, human, social, and relationship capitals, which the current accounting standards do not report in the balance sheet.

Shifting the attention to financial performance, our results demonstrate that financial leverage and profitability are significant factors. In terms of financial leverage ($\rho = -0.5359$; p-value = 0.0318), the association is negative: the higher the financial leverage, the lower the level of unaccounted for intangibles to total intangibles. This evidence confirms our fifth research hypothesis and further feeds the underlying literature showing that firms' investments are strongly affected by financial constraints (e.g., Morikawa, 2015) – especially when they mainly consist of high-risk investments into intangibles that do not even meet the requisites to be recorded in financial statements (e.g., Montresor & Vezzani, 2022; Yang et al., 2014).

A firm's profitability also influences how much of a company's intangibles are accounted for. This association is significant and positive: the higher the firm's profitability, the higher the level of unaccounted for intangibles. The confirmation extends to both the profitability measures we used, i.e., ROE ($\rho = 0.4868$; p-value = 0.0000) and ROA ($\rho = 0.6147$; p-value = 0.0000). In our opinion, this evidence is a direct consequence of the financial constraints explained above. Indeed, since banks, financial institutions, and other creditors show a low propensity to finance high-risk investments, it is reasonable to assume that firms have to support these investments mainly through their own internal resources. Hence, higher profitability implies more internal resources to dedicate to investments in general and, above all, to these investments, which would have fewer possibilities to be financed otherwise.

Board size also impacted our independent variable with a negative association ($\rho = -0.5034$; p-value = 0.0030). In other words, the higher the number of directors, the lower the level of unaccounted for intangibles. This evidence confirms our eighth hypothesis, where we conjectured that board size would influence the level of unaccounted for intangibles but without specifying the sign of the association because of the contrasting literature on the subject. After testing, our results support the scholars who argue that a large board implies a more divided position and one that is less prone to taking risky decisions (Goodstein et al., 1994; Jensen, 1993). This further feeds the plethora of empirical contributions demonstrating

a negative association between board size and high-risk investments in innovation and intangibles (e.g., Rossi & Cebula, 2015; Sharma et al., 2018).

Finally, organisational complexity is the last firm-specific characteristic that significantly affects the level of unaccounted for intangibles (H12; ρ = -0.5048; p-value = 0.0000). For this factor, as for board size, we again hypothesised an association but did not specify the sign due to the lack of consensus in the literature. From testing, we find a negative association: the higher the organisational complexity, the lower the level of unaccounted for intangibles. This result aligns with some studies showing that simple firms invest relatively more in research and development and other radical innovations (e.g., Coad et al., 2016; Henkel et al., 2015). Concerning those studies, scholars explain that simple firms often lack the internal resources to manage the often long and complicated processes of incremental innovation. However, in the case of this research, this explanation is not convincing. Outsourced innovation processes usually generate intangible assets that meet the requisites to be accounted for since they are regulated through contractual agreements that determine specific rights and obligations. Hence, in line with this premise, the level of unaccounted for intangibles to total intangibles should be lower for simpler firms, whereas our results demonstrate the opposite. Considering that we used the number of firms in the company group as a proxy of organisational complexity, we argue that this negative association is more likely attributable to difficulties with decision-making. The higher the number of firms in a company group, the higher the number of boards and, thus, directors. Hence, in line with our results concerning a firm's board size, we argue that the higher the number of firms involved in a company group, the higher the complexity of decision-making processes, which ultimately discourages more risky decisions, such as those related to investments in unaccounted for intangibles.

Country is the first institutional factor that does not seem to be associated with unaccounted for intangibles (H1; χ^2 = 28.3078; p-value=0.9330). We attribute this result to the composition of our research sample, which, for the most part, included mostly US firms with just a few firms located in countries with very different political, social, and economic conditions, such as China and France. Hence, our category 'other countries' returned results that were too heterogeneous. Thus, we are not surprised that nationality turned out to be an insignificant factor. Notwithstanding this, no different classification was possible since each country other than USA accounted for just a few firms.

Additionally, we did not find accounting standards to be a factor in the level of unaccounted for intangibles (H2; χ^2 = 0.2770; p-value=0.8710). This result was expected as 96% of firms in the sample follow either the IFRS or the US GAAP. The other 4% included one firm using local accounting standards and three others that did not specify the set of standards followed. The IFRS and US GAAP are substantially aligned in terms of accounting for intangibles. Their only major difference concerns the capitalisation of development expenses, which the US GAAP excludes but the IFRS admits under specific conditions. Hence, the accounting standards followed would only ever be a significant factor if development expenses were a prominent issue for many of the sample firms. In light of the results, we deduce that they are not.

Neither of the proxies for ownership concentration had a significant impact on the dependent variable (H7). The number of shareholders returned values of ρ = 0.0159; p-value = 0.8807, while Bureau van Dijk's Independence Indicator returned values of ρ = 0.1500; p-value = 0.1512. These results run counter to our expectations. Indeed, the literature widely demonstrates that ownership structure is a significant factor in investment decisions, despite some conflicting empirical evidence as to the direction of the association. For example, Minetti et al. (2015) report that firms with a more concentrated ownership tend to have a higher propensity for high-risk investments, whereas Aghion et al. (2013) report the opposite – that dispersed ownerships undertake riskier investments. One possible explanation for our findings is, again, the composition of our research sample. 88% of sample firms have dispersed ownership (see Table 4), whereas only 12% have a high ownership concentration. Hence, we argue that the overrepresentation of firms with a dispersed ownership did not allow us to properly determine the impact of different ownership structures.

Concerning board composition, board size was the only characteristic demonstrated to significantly influence a firm's levels of unaccounted for intangibles. The percentage of independent directors was insignificant (H9; ρ = 0.0640; p-value = 0.5403) in line with scholars such as Takahiro (2015) and Valencia (2008). The same is true for gender diversity (HP10; ρ = -0.0159; p-value = 0.8793). Like Bianchi et al. (2012) and Whitler et al. (2018), we found that this factor does not significantly affect the magnitude of unaccounted intangibles. Within our sample, the average percentage of women on boards was 28.90%. Hence, we share similar reservations to Torchia et al. (2011), who suggest that there are often not enough women on boards to affect a firm's decisions. Our findings also reject the hypothesis that director tenure significantly influences the value of unaccounted for intangibles (H11; ρ = 0.1407; p-value = 0.1964). Several scholars agree that director tenure does impact a firm's investment policies (e.g., Patro et al., 2018; Lu et al., 2017). However, the evidence is conflicting, with some empirical contributions showing that a long tenure incentivises investments into research, development, and innovation (e.g., Wincent et al., 2009), while others report long tenure disincentivises the same (e.g., Bravo & Reguera-Alvarado, 2017). Given that we find no association, our results are not aligned with the extant literature. A possible explanation is that tenure could influence a director's propensity toward all investments in intangibles in the same way, without making any distinction between those that meet or do not meet the requisites to be recognised in the firm's balance sheets.

Lastly, the auditor had little impact on the levels of unaccounted for intangibles (H13; χ^2 = 2.2229; p-value=0.9730). This result is not surprising since empirical contributions demonstrating auditing as a discriminant factor over the quality of accounting and reporting practices are generally based on a distinction between audited and unaudited financial statements (e.g., Fallatah et al., 2021) or between firms with Big-4 versus non-Big-4 auditors (e.g., Cascino & Gassen, 2015; Demir & Bahadir, 2014). In the case of our sample, 95% of the firms were audited by one of the Big-4 auditors, so no great distinctions were found.

5. Conclusions

The findings of this study demonstrate that sector, business size, financial leverage, profitability, board size, and organisational complexity significantly influence the ratios of unaccounted for intangibles compared to the total intangibles of firms. In practical terms, our findings alert financial statement users to the kinds of factors that often lead to intangibles being underestimated. These findings should inform standard setters of firms' conditions (sector, size, etc.) under which reforms to improve accounting for intangibles are more urgent. On the theoretical side, these results enrich the literature on the institutional factors that influence the magnitude of unaccounted intangibles.

Several studies on the harmonisation of accounting and reporting policies underline that dissimilarities persist because a variety of accounting standards and options exist (e.g., Nobes, 2013). That is, firms can select from a few different methods to evaluate a specific accounting item, and different sets of accounting standards admit different options. A crucial peculiarity of unaccounted for intangibles is that the IFRS and the US GAAP are almost perfectly aligned in terms of what they allow to be recognised in the balance sheet. Hence, differences in the ratio of unaccounted for intangibles to total intangibles between firms mainly depend on a firm's investment policies and its propensity toward innovation, not on which standards are followed.

This research is affected by three main limitations.

The first derives from the composition of the research sample. We based this research on the top global firms in terms of intangible value to be sure that we focused on firms that are relevant to the topic of intangibles. However, because of this choice, our sample included firms with similar characteristics in many instances, such as nationality, the accounting standards adopted, the ownership structure, and the type of auditor used. This meant we could not effectively assess all the factors we identified as being potentially pertinent. Further research using a different and larger sample might reinforce our results or provide additional evidence as to the influence of these institutional factors.

The second limitation arises from the definition of unaccounted for intangibles. These items are not quantitatively reported in financial statements, which makes identifying them complex. In fact, they can only be defined as a differential value – this being the difference between a firm's market value and the sum of its tangible net assets, net accounted intangibles, and accounted goodwill. However, this difference encompasses elements that are not the result of specific investment decisions, like a firm's reputation, but rather the overall approach to business and the perceptions of financial markets concerning a firm's qualities or performance. Therefore, despite evidence that institutional factors influence the policies of firms in terms of unaccounted for intangibles, we cannot assert that the magnitude of these intangibles solely depends on the firm's decisions.

Lastly, a significant limitation pertains to the object of our analysis, namely financial statements. These reports typically provide little to no information about unaccounted for intangibles. Consequently, our focus on a firm's market value and the content of its financial

statements prevented us from fully understanding the types and magnitude of the different resources underlying these unaccounted for intangibles (e.g., resources related to social capital, relationship capital, or human capital). In future research, we propose to include both financial and non-financial data in our sample. This approach would allow for a more comprehensive understanding of the qualitative composition of unaccounted for intangibles and which institutional factors significantly influence the various classes of intangible assets firms invest in.

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