International Journal of Hospitality Management 119 (2024) 103705

Contents lists available at ScienceDirect

International Journal of Hospitality Management

journal homepage: www.elsevier.com/locate/ijhm

Simplifying the complex: 10-K readability and asset structure☆

Jean-Philippe Weisskopf

EHL Hospitality Business School, HES-SO // Haute Ecole Specialisee de Suisse Occidentale, Route de Berne 301, Lausanne 1000, Switzerland

ARTICLE INFO

Keywords:
Bog Index
Readability
Asset-light
Lodging
Casino

ABSTRACT

This study explores the relationship between corporate asset intensity and the readability of 10-K forms within the U.S. lodging industry over the period 1994–2020. Using OLS regressions, the study reveals that as a company's asset intensity decreases, so does the readability of its 10-K form. Additionally, we show that this relationship has become more pronounced since 1998 and is stronger for larger companies or those in the hotel industry. These results suggest that, in light of ongoing discussions and policies surrounding the readability of financial statements, companies produce more comprehensible documentation when their business operations are less specialized. This finding indicates that companies that need to address a more diverse investor base try to be as understandable as possible. This should also lead to social implications in terms of enhanced transparency, improved financial literacy, investor confidence, and a positive impact on corporate responsibility for stakeholders.

1. Introduction

Over the past 25 years, the U.S. lodging industry has shifted towards an asset-light strategy.[1] Many larger hotel groups have opted for management or franchising contracts to specialize in their core activity and free up cash to expand rapidly. In contrast, smaller groups have remained relatively asset-heavy. Asset intensity and the degree of this mixture of two distinct businesses (hospitality and real estate) have been shown to have a multitude of effects on corporate performance and policies.

The consensus is that lodging groups with a lower asset intensity perform better (Seo and Soh, 2019; Sohn et al., 2013) even though some sources disagree (Märklin and Bianchi, 2022) or propose moderating effects such as the ownership structure (Masset et al., 2019). The construct also impacts dividend policies (Poretti and Blal, 2020), capital structure decisions (Li and Singal, 2019), risk management practices (Sohn et al., 2013) or market penetration strategies (Brookes and Roper, 2012).

Very recently, literature on asset-light strategies in the hospitality industry has turned to investigating the construct's effect on analyst forecasts and financial reporting complexity. Sohn et al. (2014) suggest that the asset-light strategy has increased operational complexity by splitting the lodging business into ownership and management. Poretti et al. (2023) further argue that the ALFO (asset-light and fee-orientation) strategy leads to higher financial report complexity and U-shaped audit efforts. However, Poretti et al. (forthcoming) also show that fee orientation leads to more accurate analyst forecasts, especially for companies with concentrated ownership.

This paper contributes to expanding this nascent evidence on the impact of the asset-light strategy on information and financial report complexity. Instead of examining information from financial analysts or auditors, it proposes to focus on the readability of the information provided by lodging groups in their 10-K forms. This provides complementary evidence to the existing literature and is of interest to all investors and not only to finance industry professionals. Ultimately, the relationship also has an impact on corporate governance practices (transparency and information help stakeholders form an opinion about a company) and potential obfuscation of performance or fair compensation contracts.

Using an unbalanced panel of U.S. lodging companies from 1994–2020, the study examines how asset intensity affects 10-K readability proxied by Bog index scores. Its findings indicate an inverse relationship between these two variables. In other words, the more asset-light and specialized a lodging company is, the more complex its annual report becomes. This may be due to the new and innovative nature of the asset-light construct over the time period, for which companies needed to use a more specialized jargon to explain the shift in assets and the new business based on intangible assets. We further show

☆ I would like to thank the editor and two anonymous referees for the helpful guidance and comments.
E-mail address: jean-philippe.weisskopf@ehl.ch.
[1] See, for example, Sohn et al. (2013) or Lussi et al. (2023) for more background on the asset light strategy.

https://doi.org/10.1016/j.ijhm.2024.103705
Received 14 February 2023; Received in revised form 8 January 2024; Accepted 8 February 2024
Available online 14 February 2024

that results are specific to the hotel industry, are mitigated by company size, evolved through time with the increased attention of regulators and stakeholders on reporting readability, but are independent of the stock exchange.

Previous research has examined multiple aspects of the asset-light strategy (Lussi et al., 2023; Masset et al., 2019; Poretti and Blal, 2020). However, to the best of our knowledge, there has been no targeted investigation into the effect of the readability of financial disclosures, which represents a research gap worth analyzing. This study aims to fill this gap and provide a comprehensive understanding of the communicative needs imposed by the different asset structures existing in the hospitality industry and the ensuing narrative construction within annual reports. Furthermore, this study contributes to the literature on corporate transparency and disclosure practices within the hospitality industry. This study aims to improve our understanding of how companies balance conveying complex financial information while maintaining a coherent, reader-friendly narrative. Thus, the study adds to the existing literature on readability and emphasizes the significance of contextual specificity of an industry and its trends in shaping disclosure practices.

The remainder of the article presents existing literature in Section 2 and provides information on data and the methodology in Section 3. Section 4 exhibits the findings of the study, while Section 5 concludes.

2. Literature review and hypothesis

2.1. Past evidence

Narratives form the major part of corporate information in annual reports. As stakeholders use narratives to analyze corporate information, readability is essential. However, in reality, corporate information is often challenging to understand. While the relationship between asset intensity and 10-K readability has not been studied, previous evidence may explain the sources of a potential linkage.

Obfuscation theory suggests that managers will lower 10-K readability when they have to hide (Li, 2008) or explain (Bloomfield, 2008) their poor performance. The evolution towards the asset-light construct offers these managers a unique opportunity to conceal performance while reducing 10-K readability under the motive of a new business model.

Bonsall and Miller (2017) and Ertugrul et al. (2017) further establish that less readable annual reports lead to challenges in obtaining debt financing and a higher cost of debt due to the opacity and, thus, a higher risk that asks for additional compensation. As lodging groups reduce their asset intensity, the need for debt financing via mortgages to buy properties becomes less stringent. Thus, readability is less crucial as the pressure by capital providers somewhat decreases. Furthermore, asset-light strategies involve more intricate financial arrangements, such as leasing agreements, joint ventures, and management or franchise contracts. These structures' complexity may demand more detailed disclosures in 10-K forms, contributing to higher technical jargon and reduced readability.

Sun (2023) finds a significantly negative relationship between asset redeployability and 10-K readability, suggesting that 10-K forms of companies with more redeployable assets are easier to read. The improved flexibility following the sale of fixed assets increases corporate liquidity and thus helps these companies meet their operational and financial obligations and maintain flexibility. This increases corporate performance and 10-K readability due to an observed positive link between performance and readability (Li, 2008). The decision of lodging companies to go asset-light reduces asset redeployability as properties for which a large secondary market exists exit the balance sheet. This reduction in redeployability is accompanied by an increase in intangibles (e.g., strong brand management or loyalty programs) (Lussi et al., 2023). These intangibles are relatively more recent in the lodging industry, more complex to understand and evaluate and less numbers-based than real assets. Moreover, a secondary market is inexistent. All of this is especially true in the lodging industry as the asset-light construct is relatively new and has taken off only in the mid-1990 s (Parrino, 1997).

The reduction in asset intensity in the lodging industry from the traditional asset-heavy business model to the asset-light construct has vast repercussions on the entire business and industry. Consequently, companies must offer more extensive explanations of the new concept, its impact on the business and performance and how it diverges from the known strategy. This is reinforced by new industry-specific terminology related to brand management, customer experience, and contract structures. Including such terminology in 10-K forms decreases readability for readers unfamiliar with the construct's nuances.

The shift towards the asset-light construct and other advances in the hospitality industry has also increased the need for innovation. Lodging groups at the forefront of these trends and innovations may not want to reveal information that may hurt their competitive advantage. As 10-K provide details about firm operations, these may obfuscate information, leading to relatively poorer readability. Lim et al. (2018) and Habib and Hasan (2020) confirm this by showing that prospectors (more innovative firms) display narratives with lower readability than defenders (low-innovation firms). Rahman et al. (2023) find a positive linkage between product market competition and annual report readability, further enhanced by R&D intensity and proprietary information.

2.2. Hypothesis development

Annual reports should be understandable and effectively convey the writer's message to the reader (Hrasky and Smith, 2008; Jones and Smith, 2014). Readability, which "measures the textual difficulty of a passage" (Jones and Smith, 2014), is a significant factor in evaluating the quality of communication between a company and its stakeholders (Rennekamp, 2012; Tan et al., 2014). Effective communication depends on clear presentation, concise structure, appropriate length, and especially minimal complexity. The readability of annual reports is essential for a company's transparency and its ability to communicate effectively with stakeholders (Rutherford, 2003). This can be hindered by excessive complexity, making it difficult for stakeholders to perceive the actual state and complexity of the company and its management practices (Courtis, 1995). Courtis (2004) further argues that managers may use information to appear in a better light or to tilt the perception of the readership.

The problem is that managers sometimes create more complicated reports to serve their own purposes (Bloomfield, 2008; Jones and Shoemaker, 1994; Li, 2008). However, the narrative should be an effective communication tool for investors to accurately and precisely understand the message sent by the company (Smith and Taffler, 1992). On the other hand, Bushee et al. (2018) argue that complex language can simply signal the supply of complex information that needs to be transmitted to stakeholders, such as technical disclosures. Therefore, linguistic complexity in reporting blends two dimensions - obfuscation and true information. Both are related to information asymmetry, but in opposite directions. Obfuscation increases information asymmetry, while true information decreases it.

This prompts an analysis of corporate communication during organizational changes, particularly within industries characterized by innovation and dynamic strategies, such as the lodging industry. Information may safeguard competitive advantages within asset-light companies, which had to shift to a fee-based business and a more substantial construction and use of intangible assets. This is exemplified through linguistic manipulation, where specific elements such as sentence length, passive voice, verb choice, and industry-specific jargon may contribute to informational opacity, reducing annual report readability.

Lengthy sentences represent one facet of linguistic complexity, where excess information can potentially overwhelm readers' comprehension. The calculated application of the passive voice can further

introduce ambiguity and deflect accountability. Similarly, weak verbs may dilute the obviousness of actions and require more effort from readers to interpret them. Furthermore, including specialized language elements such as acronyms, industry-specific terminology, and legal language can work as barriers for a broader readership, constraining the accessibility of annual reports.

Therefore, we suggest that under outcome uncertainty concerning performance, organizational changes or innovation following the adoption of the asset-light paradigm in the lodging industry, firms with lower asset intensity may resort to more complex language and longer sentences and a reduction in the overall readability of narratives. Based on the above evidence, we propose the following hypothesis:

H1. Lower asset intensity leads to lower 10-K readability.

The findings of this study related to the hypothesis may help hotel executives improve their communication strategies, ensuring that financial information is accurate and accessible to a diverse range of stakeholders. An increased readability will promote stakeholder engagement, facilitate informed decision-making, and enhance overall transparency within the industry, benefiting policymakers, investors and stakeholders alike. The study also contributes to the academic literature on corporate communication within the hospitality industry, aligning with prior evidence on the drivers of the readability of financial disclosures. More specifically, it enhances our knowledge of the relationship between financial transparency, strategic communication and how it links to innovation and the asset-light construct - one of the largest shifts in the hospitality industry over the past two decades.

3. Data

3.1. Sample and variables

3.1.1. Sample

The initial sample includes all U.S. lodging companies with a SIC code 7000 (hotels, rooming houses, camps & other lodging places). To ensure that we do not, by mistake, include non-lodging groups or omit lodging companies from the sample, we cross-check observations with ICB codes (hotels & motels and casinos & gambling) and business descriptions provided by Refinitiv. This allows us to obtain a sample of 122 lodging companies that can be assigned to this industry with certainty.

3.1.2. Variables

The Bog Index proxies the readability data and follows the logic outlined in more detail by Bonsall et al. (2017).[2] In short, the Bog Index puts a numerical value on the readability of texts. The higher the Bog Index, the less readable a document is. It includes three distinct parts and is defined as Sentence Bog + Word Bog - Pep. Sentence Bog looks into sentence length. The longer a sentence is, the less readable the text and the higher the Bog Index. Word Bog uses the difficulty of words, the presence of acronyms and abbreviations, or specialist terms. Again, a higher Word Bog indicates a less readable text and a higher Bog Index. Pep examines features of good writing (e.g., names, interesting words, conversational tone, sentence variety). In this case, the higher the Pep, the better, as the text gains clarity and lowers the Bog Index. Bog Index scores for 10-K forms of U.S. companies are available for all years between 1994 and 2020 on Miller's website.[3] We downloaded and matched this data with financial data from the Refinitiv database. As not all financial data and Bog scores are available for the initial sample of 122 companies, the final sample reduces to 901 observations drawn from 96 lodging groups between 1994 and 2020.

The main variable of interest is *asset intensity*. In line with past studies on the asset-light construct in the lodging industry (Li and Singal, 2019; Sohn et al., 2013), we use the fixed-asset ratio defined as property, plants & equipment (PPE) over total assets to proxy for it. The lower this ratio, the more asset-light or, in other words, the lower the asset intensity of a lodging company. In line with previous literature (e.g. Habib and Hasan 2020, Hasan 2020, Rahman et al. 2023), we use other control variables that may impact 10-K readability. These include company *size* and *age* measured with the natural logarithm of total assets and the company's age since its incorporation. *Leverage* is defined as total debt over capital (total debt plus equity). *Foreign assets* is computed as foreign over total assets, and *stock volatility* as the annual stock price volatility.

3.2. Descriptive statistics

Figs. 1 and 2 show a brief overview of the Bog Index scores. Fig. 1 displays that Bog Index scores appear normally distributed and mainly take values between 70 and 90 with a range between 50 and 117.[4]

Fig. 2 shows that average Bog Index scores have increased over the sample period. The average was around 78 in the mid-1990 s and more than 90 at the end of the 2010 s. Thus, overall 10-K readability appears to have deteriorated over time.

Table 1 presents summary statistics. The Bog Index scores display a mean (median) of 80.33 (80.00), which aligns with the evidence in Fig. 1. Sample companies are relatively asset-heavy, with a mean of 56.62% of total assets made of property, plants & equipment. However, the wide dispersion represents the industry in which some companies are very asset-light, and others continue to own all their properties. The median company has total assets of around 637 million USD, but several large companies appear in the sample.

Most of the total assets are in the United States; on average, only 6.63% are abroad. This can be explained by small companies being predominantly U.S.-centered while larger, while international groups are nowadays relatively asset-light. The median company is 22 years old, has a leverage ratio (debt over capital) of 60%, and an annual stock price volatility of around 36%.

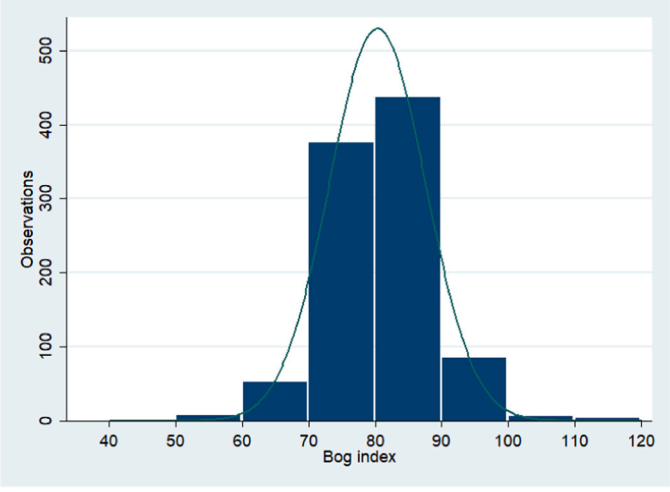

Fig. 1. : Distribution of readability scores. This figure illustrates the distribution of Bog Index scores for sample companies over the period 1994 and 2020.

[2] While the Bog Index is not the only way to measure readability Bonsall et al. (2017), amongst others, argue that it is best suited to analyze financial texts and has been extensively used in the literature.

[3] See https://host.kelley.iu.edu/bpm/activities/bogindex.html

[4] The scores in the Bonsall et al. (2017) database range between 44 and 211 with an average of 82. Thus lodging companies' 10-K forms appear relatively aligned with the overall market.

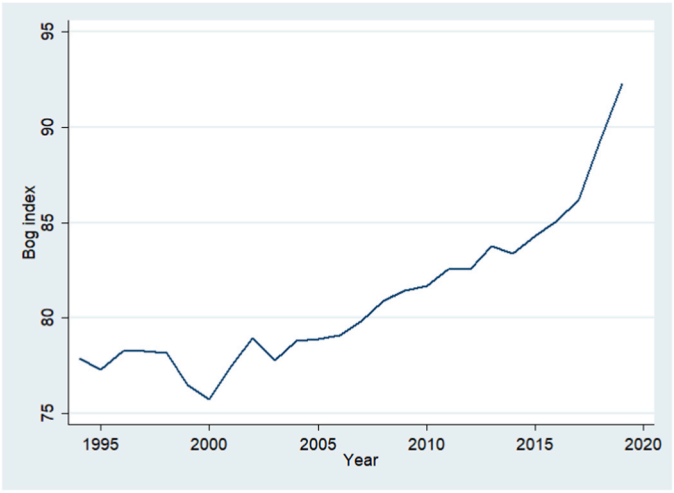

Fig. 2. : Evolution of readability scores. This figure illustrates the evolution of sample companies' average Bog Index scores over the period 1994 and 2020.

Table 1
Descriptive statistics.

	Obs.	Mean	Median	Std. dev.	p10	p90
Bog Index	959	80.33	80	7.22	72.00	89.00
Asset intensity (in %)	1110	56.62	66.46	27.59	9.29	86.06
Total assets (in '000 USD)	1159	2546,685	637,667	4755,173	49,334	7555,383
Age (in years)	2731	25.86	22.00	18.34	6.00	52.00
Leverage (in %)	1134	62.19	59.95	34.12	20.83	98.06
Foreign assets (in %)	966	6.63	0.00	16.78	0.00	25.09
Stock volatility (in %)	876	38.76	36.56	13.71	23.99	59.03

This table presents descriptive statistics (mean, median, standard deviation and the 10th and 90th percentile) for different variables. Bog Index is the Bog Index score for a given company and year. Asset intensity denotes PPE over total assets; age is the age of a company since its incorporation; leverage is total debt over capital; foreign assets is the proportion of foreign over total assets and stock volatility is the annual volatility of the stock price of a given company.

3.3. Methodology

In line with past literature on 10-K readability (Habib and Hasan, 2020; Rahman et al., 2023), we run several specifications using unbalanced panel regressions to examine the linkage between asset intensity and 10-K readability. These take the following generic form

$$Bog\_Index\_Score_{i,t} = \beta_0 + \beta_1 asset\_intensity_{i,t} + \beta' X_{i,t} + \mu_t + \gamma_i + \delta_{i,t} + \varepsilon_{i,t} \quad (1)$$

where Bog_Index_Score is a continuous variable describing the readability of the 10-K form of firm *i* in year *t*. Asset_intensity designates the proportion of PPE over total assets. *X* denotes a vector of control variables and consists of firm size (natural logarithm of total assets) and age (natural logarithm of company age), leverage (total debt over capital), foreign assets (foreign over total assets), and stock volatility (annual stock price volatility). We also include year (μ_t), industry (γ_i) and stock exchange ($\delta_{i,t}$) fixed effects.[5] All specifications use firm clustered robust standard errors. We also run a variance inflation factor analysis, which shows no multicollinearity issue.

4. Empirical results

4.1. Baseline results

The columns in Table 2 show the relationship between asset intensity and 10-K readability depending on the inclusion of different control variables in the specifications. Overall, we find conclusive and similar results irrespective of the specification. The more asset-light a company is, the lower its 10-K readability. Thus, we confirm hypothesis 1. With a mean Bog Index of 80.33, a reduction of 0.06% (i.e., 0.047/80.33) from the mean is economically significant. The results also suggest that a one standard deviation increase in asset intensity is linked with a 1.61% (i.e. (27.59*−0.047)/80.33) decrease in the Bog Index compared to the mean. Therefore, the results show that asset intensity's impact on readability is meaningful. We further find that company age has a significantly negative linkage with readability. Younger companies may be inexperienced in providing easy-to-read reports and lose themselves in explanations which may be difficult to understand. The same logic and significantly negative relationship applies to more international companies. However, it appears that control variables and their choice

Table 2
Readability and asset intensity.

	(1)	(2)	(3)	(4)
Asset intensity	-0.046**	-0.048***	-0.047***	-0.047**
	(0.020)	(0.018)	(0.017)	(0.018)
Size			0.233	0.243
			(0.302)	(0.276)
Age			-2.053***	-2.393**
			(0.634)	(1.015)
Leverage				-0.012
				(0.013)
Foreign assets				-0.071***
				(0.022)
Stock volatility				0.088
				(0.057)
Constant	83.002***	81.182***	83.284***	80.908***
	(1.462)	(1.904)	(4.229)	(6.490)
Observations	901	901	901	577
R-squared	0.032	0.393	0.450	0.561
Year FE	NO	YES	YES	YES
Industry FE	NO	YES	YES	YES
Exchange FE	NO	YES	YES	YES

The variables for the sample of 901 (577 for specification 4) firm-year observations include the Bog Index score. Asset intensity denotes PPE over total assets; size and age are the natural logarithm of total assets and the company's age since incorporation. Leverage is total debt over capital, foreign assets is the foreign over total assets, and stock volatility is the annual stock price volatility. The last three variables are winsorized at the 2.5–97.5%-levels. Standard errors are in parentheses and clustered at the firm level. ***, **, * denote significance at the 1%, 5%, and 10%-level, respectively.

[5] Companies are classified into the "hotels and motels" (around 66% of the sample) or the "casino and gambling" (34%) industry. All companies are listed in the U.S. on the New York Stock Exchange (41%), the NASDAQ (29%) or over-the-counter (30%) on one of the two exchanges.

are not driving the general relationship between readability and asset intensity. Overall, the more complex or experienced a company is, the more it must facilitate access to information and, thus, readability.

This finding expands prior evidence that the asset-light construct has complexified the operation of lodging groups (Sohn et al., 2014) and their financial reporting and audit efforts (Poretti et al., 2023). Therefore, it appears that companies tend to issue more and more accurate information, but it is not always readable to investors. We explain this finding because asset-light companies shifted towards a new and more innovative business model composed of relatively more intangibles. This had to be explained in more detail by managers, which reduced the readability of their 10-K forms, which confirms Bushee et al. (2018) who propose that complexity in readability may simply be driven by more complex information that needs to be conveyed to stakeholders. This also expands the findings of Sun (2023), who finds that companies with less redeployable assets (i.e., in this paper, asset-light companies) publish more difficult-to-read reports. This reduction in redeployability is accompanied by an increase in intangibles (e.g., strong brand management or loyalty programs) and a need for innovation, which constitutes a competitive advantage. Therefore, this paper also expands evidence of Lim et al. (2018) and Habib and Hasan (2020), who find that more innovative firms display a lower readability than low-innovation firms.

4.2. Sub-sample results

Table 3 studies whether the initial relationship between asset intensity and 10-K readability depends on different corporate and sample characteristics. The first two columns split the sample into two time periods to examine whether the introduction by the SEC in 1998 of a plain English handbook (Li, 2008) affected readability. Results show that the linkage is only significant and more pronounced after introducing these guidelines. Thus the willingness of the SEC to make financial statements more readable appears fruitful. We further find that the relationship is stronger for larger companies. This can be interpreted as larger firms having more resources and knowledge to present complex information comprehensively.

We also find that the link is more pronounced and significant only in the hotel industry but not for casinos. This can be explained by the fact that most casino companies are relatively asset-heavy with little variance in the sample, are more local, and are mainly geared towards the gaming business. In this, casinos also appear to be easier to grasp due to their local anchoring, smaller size, and specialized core business, which generates most of their revenues. In comparison, traditional hotel groups may be geographically dispersed and cater to different business segments. It is also linked to the hotel industry following a more innovative business strategy, which leads to less readable reports (Habib and Hasan, 2020; Lim et al., 2018). Finally, we find evidence that the exchange on which a company is listed does not appear to influence the relationship. Both companies listed on the NYSE or NASDAQ and over-the-counter traded display a significantly negative link of similar magnitude. This result is surprising as one would expect the disclosure and readability of small, less-regulated OTC companies to be lower.

4.3. Robustness tests

We perform several robustness tests to ensure that the results are not biased. First, it could be argued that the relationship between asset intensity and readability is not specific to the lodging industry but is generally present in the U.S. market. Explicitly studying the lodging industry has merit in both cases as the asset-light strategy, while not exclusive to it, has significantly influenced this industry (e.g., Sohn et al. 2013 or Lussi et al. 2023). However, to more formally test the industry-specificity, we conduct an identical analysis to Table 2 for a random sample of 100 and 300 U.S. companies from 20 non-hospitality industries, respectively. The purpose is to determine whether the relationship is generalizable or specific to the lodging industry. Table 4 presents the results, which indicate that the relationship remains consistent across all cases. However, the asset intensity coefficients are much smaller in amplitude and lose significance. The observed heterogeneity in asset intensity within the lodging industry suggests that an asset-light, more fee-oriented construct may differ significantly from the traditional asset-heavy approach. Therefore, while the effect appears specific to the hospitality industry, further research may be necessary.

Table 5 presents the results of five specific robustness tests. For the sake of brevity, we only report the findings for the specifications with size and age control variables (refer to Table 2, column 3). However, these are representative of the other specifications. First, we use the natural logarithm of Bog index scores as dependent variables instead of the raw score (column 1), but the results remain equivalent. Second, we test whether outliers in Bog index scores or the asset intensity measure could bias the findings. To do this, we drop all observations of Bog index scores (column 2) or asset intensity (column 3) above the 90th percentile or below the 10th percentile. In both cases, the coefficients remain aligned and highly significant. Third, we test whether the relationship could be non-linear by adding a squared asset intensity term to the specification (column 4). The relationship between readability and asset intensity remains strong and significant, as evidenced by the linear relationship that persists even when considering the quadratic term,

Table 3
Readability in sub-samples.

	1994–1998	1999–2020	Small	Big	Hotels	Casinos	Listed	OTC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Asset intensity	-0.031	-0.050***	-0.036**	-0.075**	-0.044**	-0.033	-0.049**	-0.054**
	(0.021)	(0.019)	(0.017)	(0.030)	(0.020)	(0.023)	(0.022)	(0.025)
Size	0.467	0.203	0.558	-1.140	0.238	0.816**	0.545	0.571
	(0.441)	(0.329)	(0.552)	(0.735)	(0.328)	(0.309)	(0.422)	(0.520)
Age	-2.496***	-1.906**	-2.099**	-2.194**	-2.490***	-0.515	-2.297**	-1.820*
	(0.716)	(0.749)	(0.924)	(0.819)	(0.740)	(0.457)	(0.911)	(0.987)
Constant	81.743***	83.570***	75.928***	109.452***	81.758***	71.903***	81.015***	78.119***
	(5.331)	(4.653)	(6.539)	(9.845)	(4.474)	(3.930)	(6.037)	(6.385)
Observations	175	726	517	384	514	387	711	190
R-squared	0.312	0.465	0.325	0.543	0.519	0.434	0.448	0.354
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	NO	NO	YES	YES
Exchange FE	YES	YES	YES	YES	YES	YES	NO	NO

The variables for the sample of 901 firm-year observations include the Bog Index score. Small (big) are companies with less (more) than one billion USD in total assets; Hotels and Casinos denote two sub-industries; Listed are companies on the NYSE or NASDAQ, while OTC is over-the-counter traded companies. Asset intensity denotes PPE over total assets; size and age are the natural logarithm of total assets and the company's age since its incorporation. Standard errors are in parentheses and clustered at the firm level. ***, **, * denote significance at the 1%, 5%, and 10%-level, respectively.

Table 4
Readability and asset intensity outside the lodging industry.

	(1)	(2)	(3)	(4)
Asset intensity	-0.025	0.017	-0.024	-0.017
	(0.030)	(0.029)	(0.017)	(0.021)
Size	1.062***	1.556***	0.936***	1.273***
	(0.245)	(0.302)	(0.141)	(0.193)
Age	-2.062***	-1.605**	-1.338***	-0.854*
	(0.655)	(0.715)	(0.391)	(0.440)
Leverage		-0.004		0.002
		(0.017)		(0.011)
Foreign assets		-0.018		-0.036
		(0.027)		(0.023)
Stock volatility		0.253***		0.144***
		(0.050)		(0.027)
Constant	69.623***	50.856***	69.044***	59.958***
	(3.484)	(5.260)	(1.841)	(3.132)
Observations	1561	1151	5059	3835
R-squared	0.536	0.629	0.425	0.472
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Exchange FE	YES	YES	YES	YES

The variables for the sample of 100 (columns 1 and 2) and 300 (columns 3 and 4) randomly selected non-lodging U.S. firms include the Bog Index score. Asset intensity denotes PPE over total assets; size and age are the natural logarithm of total assets and the company's age since incorporation. Leverage is total debt over capital, foreign assets is the foreign over total assets, and stock volatility is the annual stock price volatility. The last three variables are winsorized at the 2.5–97.5%-levels. Standard errors are in parentheses and clustered at the firm level. ***, **, * denote significance at the 1%, 5%, and 10%-level, respectively.

Table 5
Robustness tests.

	(1)	(2)	(3)	(4)	(5)
Asset intensity	-0.001***	-0.030**	-0.039**	-0.142*	-0.012
	(0.000)	(0.013)	(0.019)	(0.074)	(0.014)
(Asset intensity) ^2				0.001	
				(0.001)	
Size	0.003	0.001	0.374	0.287	-0.567
	(0.004)	(0.217)	(0.327)	(0.306)	(0.401)
Age	-0.027***	-1.091***	-1.818**	-1.903***	-2.715**
	(0.009)	(0.412)	(0.707)	(0.625)	(1.263)
Constant	4.424***	82.861***	81.744***	83.806***	89.075***
	(0.054)	(3.066)	(4.713)	(4.220)	(5.811)
Observations	901	744	748	901	901
R-squared	0.439	0.229	0.448	0.457	0.376
Firm FE	NO	NO	NO	NO	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	NO
Exchange FE	YES	YES	YES	YES	NO

The variables for the sample of U.S. lodging companies include the natural logarithm of the Bog Index score (column 1) and the Bog Index score (columns 2–5). Asset intensity denotes PPE over total assets; (asset intensity)^2 the squared asset intensity variable; size and age are the natural logarithm of total assets and the company's age since incorporation. Standard errors are in parentheses and clustered at the firm level. ***, **, * denote significance at the 1%, 5%, and 10%-level, respectively.

which is positive but insignificant. Finally, we also conduct panel regressions with firm fixed effects (column 5). The asset intensity coefficient remains negative but loses significance due to the small number of observations and low intra-firm variation in the data. Overall, the strong relationship between readability and asset intensity appears to hold.

5. Conclusion

5.1. Summary

Using an unbalanced panel of U.S. lodging companies from 1994 to 2020, the study examines how asset intensity affects 10-K readability. Its findings indicate a significant inverse relationship between these two variables. In other words, the more asset-light and specialized a lodging company is, the more complex its annual report becomes. This may be due to the new and innovative nature of the asset-light construct over the time period, for which companies needed to use a more specialized jargon to explain the shift in assets and the new business based on intangible assets. We further show that results are specific to the hotel industry, are mitigated by company size, evolved through time with the increased attention of regulators and stakeholders on reporting readability, but are independent of the stock exchange.

5.2. Implications

The study's findings have implications for the finance and hospitality industries. Companies with a high asset intensity recognize the significance of clear and accessible communication in their reporting. However, even companies with low asset intensity should take steps to enhance the readability of their reports for the general public. This involves using clear and simple language, visual aids, and communication tools to increase the transparency of financial information. Companies should also adjust their reporting practices to align with standards. Policymakers could further incentivize companies to adopt more transparent and reader-friendly financial reporting. This aligns with the broader goal of enhancing financial literacy and enabling a wider spectrum of society to make well-informed financial decisions. Therefore, clear and understandable financial reporting can increase investor confidence, potentially reducing information asymmetry and fostering trust in financial markets among a wider population.

5.3. Limitations

Due to the exploratory nature of this study, it is important to acknowledge certain limitations. First, the findings may not be generalizable as they only focus on the lodging industry in the United States, which uses standardized reporting forms and is relatively transparent compared to many other markets. Therefore, further research in different industries and less developed markets could ensure a broader understanding. Second, the study covers a significant period marked by economic, regulatory, and industry changes. While the heterogeneity in characteristics allows for robust results, exploring the relationship over shorter intervals or specific economic cycles could be beneficial. Moreover, the finalization of the asset-light conversion process in the lodging industry may lead to different outcomes as the market adapts. Furthermore, it may be worthwhile to explore the impact of technology, including artificial intelligence, machine learning, and natural language processing, on the comprehensibility and clarity of financial reports.

5.4. Future research

Future research should also go into more depth on the different dimensions of the asset-light construct that make hospitality companies unique and how they relate to 10-K readability. For example, Lussi et al. (2023) show that asset-lightness is cross-dimensional and encompasses fee orientation and asset intangibility characteristics. These may also influence readability. Moreover, the hospitality industry, generally, is multi-faceted and contains many different companies from diverging sub-industries. These may display different financing policies (Sikveland et al., 2022) or ownership structures (Masset et al., 2019), impacting the wish to make financial statements more comprehensible. Finally, managers should pay attention to the presentation of their company and how

intelligible they make it for (future) investors and financial analysts to evaluate their companies. More readable documents may ease access to financing and lower the cost of capital.

CRediT authorship contribution statement

Weisskopf Jean-Philippe: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

References

Bloomfield, R., 2008. Discussion of "annual report readability, current earnings, and earnings persistence. J. Account. Econ. 45, 248–252.

Bonsall, S.B., Miller, B.P., 2017. The impact of narrative disclosure readability on bond ratings and the cost of debt. Rev. Account. Stud. 22, 608–643.

Bonsall, S.B., Leone, A.J., Miller, B.P., Rennekamp, K., 2017. A plain english measure of financial reporting readability. J. Account. Econ. 63, 329–357.

Brookes, M., Roper, A., 2012. Realising plural-form benefits in international hotel chains. Tour. Manag. 33, 580–591.

Bushee, B.J., Gow, I.D., Taylor, D.J., 2018. Linguistic complexity in firm disclosures: obfuscation or information? J. Account. Res. 56, 85–121.

Courtis, J.K., 1995. Readability of annual reports: western versus asian evidence. Account. Audit. Account. J. 8, 4–17.

Courtis, J.K., 2004. Corporate report obfuscation: artefact or phenomenon? Br. Account. Rev. 36, 291–312.

Ertugrul, M., Lei, J., Qiu, J., Wan, C., 2017. Annual report readability, tone ambiguity, and the cost of borrowing. J. Financ. Quant. Anal. 52, 811–836.

Habib, A., Hasan, M.M., 2020. Business strategies and annual report readability. Account. Financ. 60, 2513–2547.

Hasan, M.M., 2020. Readability of narrative disclosures in 10-K reports: does managerial ability matter? Eur. Account. Rev. 29, 147–168.

Hrasky, S., Smith, B., 2008. Concise corporate reporting: communication or symbolism? Corp. Commun.: Int. J. 13, 418–432.

Jones, M., Smith, M., 2014. Traditional and alternative methods of measuring the understandability of accounting narratives. Account. Audit. Account. J. 27, 183–208.

Jones, M.J., Shoemaker, P.A., 1994. Accounting Narratives: A Review of Empirical Studies of Content and Readability. J. Account. Lit. 13, 142.

Li, F., 2008. Annual report readability, current earnings, and earnings persistence. J. Account. Econ. 45, 221–247.

Li, Y., Singal, M., 2019. Capital structure in the hospitality industry: the role of the asset-light and fee-oriented strategy. Tour. Manag. 70, 124–133.

Lim, E.K., Chalmers, K., Hanlon, D., 2018. The influence of business strategy on annual report readability. J. Account. Public Policy 37, 65–81.

Lussi, S., Masset, P., Weisskopf, J.-P., Blal, I., 2023. Cross-dimensional measures of asset lightness and fee orientation in lodging groups. Int. J. Hosp. Manag. 109, 103391.

Märklin, P., Bianchi, G., 2022. A differentiated approach to the asset-light model in the hotel industry. Cornell Hosp. Q. 63, 313–319.

Masset, P., Uzelac, I., Weisskopf, J.-P., 2019. Family ownership, asset levels, and firm performance in Western European hospitality companies. J. Hosp. Tour. Res. 43, 867–889.

Parrino, R., 1997. Spinoffs and wealth transfers: The Marriott case. J. Financ. Econ. 43, 241–274.

Poretti, C., Blal, I., 2020. The asset-light strategies and the dividend puzzle: international evidence from the hospitality industry. Int. J. Hosp. Manag. 91, 102639.

Poretti, C., Jérôme, T., Heo, C.Y., 2023. Business strategies and financial reporting complexity in hospitality firms. Int. J. Hosp. Manag. 110, 103429.

Poretti, C., Aoun, A., Singal, M., forthcoming. Fee-Oriented Strategies, Ownership Structure and Analyst Forecast Accuracy in the Hospitality Industry. Journal of hospitality & tourism research.

Rahman, D., Kabir, M., Ali, M.J., Oliver, B., 2023. Does product market competition influence annual report readability? Account. Bus. Res. 1–32.

Rennekamp, K., 2012. Processing fluency and investors' reactions to disclosure readability. J. Account. Res. 50, 1319–1354.

Rutherford, B.A., 2003. Obfuscation, textual complexity and the role of regulated narrative accounting disclosure in corporate governance. J. Manag. Gov. 7, 187–210.

Seo, K., Soh, J., 2019. Asset-Light business model: an examination of investment-cash flow sensitivities and return on invested capital. Int. J. Hosp. Manag. 78, 169–178.

Sikveland, M., Xie, J., Zhang, D., 2022. Determinants of capital structure in the hospitality industry: impact of clustering and seasonality on debt and liquidity. Int. J. Hosp. Manag. 102, 103172.

Smith, M., Taffler, R., 1992. Readability and understandability: different measures of the textual complexity of accounting narrative. Account. Audit. Account. J. 5, 0-0.

Sohn, J., Tang, C.-H.H., Jang, S.S., 2013. Does the asset-light and fee-oriented strategy create value? Int. J. Hosp. Manag. 32, 270–277.

Sohn, J., Tang, C.-H.H., Jang, S.S., 2014. Asymmetric impacts of the asset-light and fee-oriented strategy: the business cycle matters! Int. J. Hosp. Manag. 40, 100–108.

Sun, L., 2023. Asset redeployability and readability of annual report. Res. Int. Bus. Financ. 64, 101843.

Tan, H.T., Ying Wang, E., Zhou, B., 2014. When the use of positive language backfires: the joint effect of tone, readability, and investor sophistication on earnings judgments. J. Account. Res. 52, 273–302.