Determinants of the quality of internet investor relations –
a study of companies listed on the JSE[#]

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Investor relations is the field of management that is concerned with the relationships between companies and investors, and as such involves a wide variety of information types, for example mandatory, voluntary, financial, non-financial, qualitative and quantitative. While South Africa has recently been ranked number one for the strength of its auditing and reporting standards for the seventh consecutive year (IRBA, 2016), investor relations as a wider and voluntary concept, is largely un-researched in South Africa. The purpose of the study was to establish the determinants of Internet investor relations (IIR).

The quality of IIR was measured for a sample of 85 JSE-listed companies using a measurement instrument that consists of 346 attributes. From the literature, as discussed in the literature review, 15 company characteristics were identified that could explain IIR quality. Stepwise regression model-building was used to develop a regression model that best explains IIR quality.

Company size, leverage, being audited by a big four audit company, JSE industry membership, free float and dual listing status were found statistically significant independent variables, explaining 68.76% of the variation in the dependent variable, IIR. Contributions to the body of knowledge, study limitations and the need for further research are discussed in the conclusion.

Introduction

Granting that several investor relations communication channels are available to companies, for example, presentations, media releases, Twitter, Facebook and corporate websites, the current study examines only one of these channels, namely the corporate website. While JSE-listed companies are mandated by various standards, acts and codes to communicate specific information items to investors (e.g. the integrated annual report), the decision to use the corporate website as investor relations communication channel is voluntary in nature. This study defines Internet investor relations (IIR) as the use of the corporate website to enhance investor relations.

The purpose of this study was to to establish the determinants of IIR. To date, studies examining JSE-listed companies have been limited to mere descriptive studies (Stainbank, 2000; Venter, 2002; Loxton, 2003; Barac, 2004; Nel & Baard, 2007; Esterhyse & Wingard, 2016).

The current study used a measurement instrument that consists of 346 attributes to measure IIR. More specifically,

quality is measured by first of all measuring content as widely as possible, by measuring the presentation of information (accessibility, timeliness and navigation), and, finally, by allowing for the measurement of attributes as only partially available (scored as 0.5) based on breadth, timeliness and usability. For a detailed discussion of this measurement instrument, see Nel and Brummer (2016).

Given the labour-intensity[1] of using such a measurement instrument, a sample of 25% of JSE-listed companies[2] was selected using stratified (JSE industry) random sampling with proportionate allocation. A total of 85 companies were included in the sample. All IIR measurements were done from March to September 2015.

It was found that larger companies, companies with more debt, companies that are audited by a big four audit company, companies with a higher free-float percentage and, lastly, companies that were dual-listed had higher IIR scores. Companies that were members of one of the following four JSE industries, namely consumer services, consumer goods, financials, and technology, each had a lower IIR score

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[1] For example, the average number of hours needed in the current study to measure the IIR per company was seven hours.

[2] The population was defined as all companies listed on the JSE as on 30 September 2014, that had not been suspended, had traded since inception date, had published 2013 annual reports, and had a dedicated, working website.

compared to companies listed in one of the other nine industries.

The remainder of this article is divided into four sections: a literature review, methodology, results and finally, conclusions are drawn and further research avenues proposed.

Literature review

The literature can be categorised as descriptive, determinant or effect studies. Descriptive studies measure and describe the use of the corporate website as communication channel. Determinant and effect studies, on the other hand, explore respectively the determinants and the consequences (effect) of the use of the corporate website. Determinant and effect studies can be further classified in terms of the proxy used for disclosure, i.e. indirect proxy that is not based on an examination of the original disclosure vehicle or a direct disclosure proxy. Direct disclosure proxy studies as such, can be classified in terms of the disclosure medium studied (e.g. an annual report or corporate website). It should further be noted that not all prior studies that have examined the use of the corporate website as communication channel have explicitly measured investor relations. This section discusses variables that were tested in the literature as independent variables to explain variations in disclosure levels.

Company size

Company size is the most widely used variable in the literature to explain disclosure levels (Celik, Ecer & Karabacak, 2006: 107). With a few exceptions, almost all studies show a significant positive relationship between size and disclosure (both annual report and corporate websites). Celik *et al.* (2006: 108) and Marston and Polei (2004: 293) argue that larger companies are more complex and have higher information asymmetry between managers and shareholders, that motivate them to disclosure more information than smaller companies. The political cost hypothesis predicts that larger companies have a stronger motivation to improve corporate reputation and public image, as they are more publicly visible (Celik *et al.*, 2010: 108) and attract the attention of government bodies (Debreceny, Gray & Rahman, 2002).

Larger companies are further expected to disclose more information, given the assumption that the relative costs of information production are lower for larger companies (Marston & Polei, 2004: 294; Bollen, Hassink & Bozic, 2006: 281; Trabelsi, Labelle & Dumontier, 2008; Ashbaugh, Johnstone & Warfield, 1999; Oyelere, Laswad & Fisher, 2003) and as larger companies simply have more to disclose compared to smaller companies (Aly, Simon & Hussainey, 2010: 185).

Leverage

Agency theory is often used to hypothesise a positive association between disclosure and leverage. Debreceny *et al.* (2002) argued that an increase in the debt-equity ratio creates agency costs and, according to Aly *et al.* (2010: 186), companies could voluntarily disclose information on corporate websites to allow creditors to constantly monitor the company in assessing the ability of the company to repay its debts.

Xiao, Yang and Chow (2004: 209) noted that as the risk of default increases with leverage, lenders and shareholders would demand more information to assess the company's health. Larrán and Giner (2002: 66) argued that by increasing disclosure levels, a company can reduce agency costs and the possible conflicts between shareholders and creditors.

Research to date reports positive; negative; and no association between disclosure and leverage. Xiao *et al.* (2004: 215), Celik *et al.* (2006), and Ismail (2002) all reported a positive association. Cormier, Ledoux and Magnan (2009: 8) reported a negative association. The following studies, however, reported no significant association: Aly *et al.* (2010: 191), Bollen *et al.* (2006: 291), Debreceny *et al.* (2002), Froidevaux (2004), Almilia (2009: 95), Larrán and Giner (2002), and Oyelere *et al.* (2003).

Current ratio

Leverage and the current ratio are both risk measures, but where increased leverage is associated with increased risk, increase in the current ratio is associated with decreased risk. Oyelere *et al.* (2003) found a positive association, while Aly *et al.* (2010: 186), and Leventis and Weetman (2004: 240) found no significant association between disclosure and the current ratio.

Financial performance

Signalling theory can be used to hypothesise a positive association between disclosure and financial performance. Companies with good news are more likely to disclose more information compared to companies with bad news (Aly *et al.,* 2010: 185). Profitable companies have an incentive to distinguish themselves from less successful companies in order to raise capital at the lowest possible price (Marston & Polei, 2004: 294). Lev and Penman (1990), and Ettredge, Richardson and Scholz (2002) pointed out that the absence of voluntary disclosure may be perceived as "bad news" about a company. Larrán and Giner (2002: 66) argued that increased disclosure associated with profitability could be seen as a mechanism to improve the image of the company, to secure directors' job security and to improve their remuneration.

Celik *et al.* (2006: 110), Aly *et al.* (2010: 185) and Trabelsi *et al.* (2008) pointed to the mixed results reported in the literature and listed research that found both positive and negative associations. Positive associations were reported by Froidevaux (2004), Celik *et al.* (2006), Aly *et al.* (2010) and Pirchegger and Wagenhofer (1999) (Austrian sample).

On the other hand, Ashbaugh *et al.* (1999), Ettredge *et al.* (2002: 366), Marston and Polei (2004), Oyelere *et al.* (2003),

Pirchegger and Wagenhofer (1999) (German sample), Xiao *et al.* (2004: 215), Larrán and Giner (2002), Abdelsalam, Bryant and Street (2007), Bollen *et al.* (2006: 291), Cormier *et al.* (2009) and Leventis and Weetman (2004) all document no significant association between financial performance and disclosure.

Market to book

The market to book ratio compares the market's valuation of a company to the book value of the company as reflected in its financial statements. Larrán and Giner (2002: 67) argued that as higher market-to-book ratios are associated with higher amounts of intangibles that is not recorded in the financial statements of companies, there will be a greater motivation for such companies to disclose more information to ensure that the company is properly valued. Celik *et al.* (2006: 110) state that companies with high growth prospects and large intangible assets have specific knowledge that is not effectively and efficiently transferable to investors through conventional accounting disclosures.

Significant positive associations were reported by Cormier *et al.* (2009) and Orens, Aerts and Cormier (2010), as opposed to Bollen *et al.* (2006: 291) and Abdelsalam *et al.* (2007: 24) who reported significant negative associations. Froidevaux (2004), Celik *et al.* (2006), Trabelsi *et al.* (2008) and Larrán and Giner (2002), on the other hand, all reported no significant association between the market-to-book ratio and disclosure levels.

Financing activities

Cormier *et al.* (2009: 8) argued that companies that access capital markets on a continuous basis have more pressure to disclose relevant information more regularly, as investors and lenders dislike any unpleasant surprises. Cormier *et al.* (2009: 16) documented a highly positive association at the 1% level between their measure of capital market reliance[3] and web-based performance disclosure.

Trabelsi *et al.* (2008) also reported a significant positive association (although only at the 10% significance level) between their measure of financing activities[4] and incremental[5] voluntary website disclosure. Xiao *et al.* (2004), on the other hand, reported no significant association between their proxy for financing activities and the total disclosure score, and a not expected, significant negative association at the 5% level for a voluntary disclosure sub-category.

Big four audit

Xiao *et al.* (2004: 200) as well as Wang, O and Claiborne (2008: 18) argued that both agency and signalling theory support the hypothesis that increased levels of IIR are expected for companies that are audited by one of the big four audit companies.

Knowing that larger auditing companies usually demand more detailed disclosure, the engagement of a big four auditor is a signal to shareholders and the investment community of their acceptance of such demands. Xiao *et al.* (2004: 201) proposed that international audit companies are more likely to facilitate the use of innovative IIR practices. Larger audit companies further have more to lose from damage to their reputations and are therefore likely to call for more extensive disclosures.

Xiao *et al.* (2004: 215) reported a positive association between audit quality and the level of voluntary disclosure via corporate websites, but no significant associations between the total disclosure score, content, presentation or mandatory scores. Aly *et al.* (2010: 187) cited research that reported, respectively, positive and no association between disclosure and being audited by a big four audit company.

Industry

Aly *et al.* (2010: 187) used signalling theory to explain an association between industry type and disclosure. If a company within an industry discloses less information compared to industry peers it may be interpreted as a signal that the company is hiding bad news. This trend of companies to disclose similar information as industry peers is often referred to in the literature as the 'follower's effect' (e.g. Lybaert, 2002).

Studies that have examined the corporate website as disclosure vehicle showed conflicting results. Abdelsalam *et al.* (2007), Pervan (2006), Lybaert (2002), Celik *et al.* (2006), Aly *et al.* (2010), Bonsón and Escobar (2002; 2006), Ettredge, Richardson and Scholz (2001), and Xiao *et al.* (2004: 202) all reported an association as opposed to Trabelsi *et al.* (2008), Larrán and Giner (2002), Geerings, Bollen and Hassink (2003), Oyelere *et al.* (2003) and Bollen *et al.* (2006), who reported no significant association.

Listing status

A foreign listing will extend the dispersion of shareholders and therefore increase information asymmetry (Bollen *et al.,* 2006: 278; Kang & Stulz, 1997). Disclosure can decrease these information asymmetries (Marston & Polei, 2004: 295; Debreceny *et al*., 2002). Extensive voluntary disclosure via corporate websites can also create the impression of greater transparency (Xiao *et al.,* 2004: 201), which may be important for foreign investors.

On another point, Cooke (1992) and Xiao *et al.* (2004) argued that companies with listings on a foreign stock exchange face additional disclosure requirements and would therefore

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[3] Dummy variable of one for year-to-year change of more than 20% in the debt to market value equity ratio.
[4] Dummy variable of one if any new debt/equity has been issued in the prior three years.

[5] Incremental disclosure was defined as disclosure additional to SEDAR (i.e. mandatory) disclosure requirements.

disclose more information than companies not subject to these additional requirements. Bollen *et al.* (2006: 278) emphasised that for companies to communicate with local and foreign stakeholders (e.g. customers, consumers, corporate partners or investors) a communication channel, such as the corporate website that can simultaneously provide identical information to all interested stakeholders, is needed.

A number of studies to date have documented an association between disclosure (as measured via printed media, e.g. hard copy annual reports) and the number of listings or a listing on a US or UK stock exchange (Celik *et al.*, 2006: 109). A positive association between corporate website disclosure and listing status was reported by Xiao *et al*. (2004), Debreceny *et al.* (2002), Bollen *et al.* (2006: 291) and Aly *et al.* (2010: 191). Oyelere *et al.* (2003), on the other hand, found no association between website disclosure and listing status. Ali (2010), as cited by Khan and Ismail (2012: 7), documented a positive association between listing age and website disclosure.

Ownership

Retail investors have less access to information compared to institutional investors that may obtain information more easily from internal sources within the company. According to Marston and Polei (2004: 294), it could be assumed that investors with relative smaller shareholdings will use corporate websites to gather company-specific information as other information sources may be more inaccessible than they are for the larger shareholders.

According to Ho and Wong (2001) and Marston and Polei (2004: 294), agency theory dictated that in a dispersed ownership shareholder structure, companies will disclose more information to reduce agency cost and information asymmetry. Proxies such as the number of shareholders (e.g. Pervan, 2006) and free float percentage (e.g. Celik *et al.,* 2006) could be used to proxy for ownership dispersion.

Some studies, however, developed a proxy to measure the opposite of shareholder dispersion, i.e. shareholder concentration. Orens *et al*. (2010) measured shareholder concentration as a dummy variable of one if companies had a single investor that had a 20% or more shareholding. Abdelsalam *et al.* (2007) used two proxies to measure shareholder concentration, namely the percentage of shares held by directors and the percentage of shares held by major shareholders.[6]

Directors who are also shareholders will have to bear both the consequences and benefits of the quality of management. Abdelsalam *et al.* (2007: 9) argued that high levels of director

shareholdings align the interest of management and shareholders, which, in turn, reduces the need for additional voluntary disclosure to reduce agency costs.

According to Chau and Gray (2002) family-controlled companies have less motivation than companies that have wider ownership to disclose more information, given their relative weak demand for public disclosure. Trabelsi *et al.* (2008) argued that companies with a concentrated ownership may want to preserve that information advantage by not using disclosure channels such as corporate websites.

Literature measuring disclosure using the printed media as disclosure vehicle reports conflicting results. For example, Chau and Gray (2002) found a positive association between ownership dispersion and voluntary disclosure compared to Raffournier (1995), who reported a non-significant relationship.

More specifically, in regard to studies that measured corporate websites as disclosure vehicle, Orens *et al.* (2010) and Abdelsalam *et al.* (2007) reported significant negative associations between disclosure and ownership concentration, but Trabelsi *et al.* (2008) and Cormier *et al.* (2009) reported no similar significant associations.

Regarding the association between disclosure and ownership dispersion, Bollen *et al.* (2006) reported a significant positive association from their univariate analysis, but reported no significant association following a multivariate analysis. Marston and Polei (2004) found a significant positive association for their 2000 sub-sample, but no significant association for their 2003 sub-sample from their multivariate analysis. Pervan (2006) reported a significant positive association for a Croatian sub-sample, but no significant association for a Slovene sub-sample.

Method of statistical analysis

For each company an IIR score was calculated by totalling the individual attribute scores. No weightings were assigned and the maximum available IIR score per company is therefore 346.

Table 1 lists the independent variables used in the stepwise regression model-building, a brief description of how each variable was calculated, as well as the expected association with the dependent variable, IIR, based on the above literature review.

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[6] Abdelsalam *et al.* (2007) defined major shareholders as all shareholders with a shareholding exceeding 5%.

**Table 1: Independent variables - description and expected associations**

Variable	Description	Predicted direction
Independent continuous variables		
Company size	Average daily market capitalisation of all trading days from 1 December 2014 to 30 November 2015	+
Leverage	Ratio between debt and assets	+
Current ratio	Ratio between current assets and current liabilities	-
Financial performance	Ratio between profit to ordinary shareholders interest (ROE)	+
Market-to-book	Ratio between the share price and the book value of equity	+
Number of years listed	Number of years listed as on the date the IIR of each company was measured	+
Director shareholding	The percentage direct and indirect, beneficial and non-beneficial shareholding of directors	-
Free float	Ratio between the total issued shares minus restricted shares to the total issued shares	+
Independent categorical variables		
Net issue of shares	Dummy variable representing one if the company on net has issued shares in the preceding 12-month period	+
Net buy back of shares	Dummy variable representing one if the company on net has bought back shares in the preceding 12-month period	-
Big four audit	Dummy variable representing one if the company is audited by either PwC, KPMG, Deloitte & Touche or Ernst & Young	+
JSE industry	JSE industry classification	+ / -
Dual listing	Dummy variable representing one if the company is dually listed on the JSE and any other stock exchange	+
Primary listing	Dummy variable representing one if the company has a primary listing other than the JSE	+
Block ownership	Dummy variable representing one if one shareholder has more than 20% of issued shares	-

All independent variables were captured from the INET BFA database, a reputable supplier of financial data in South Africa, with the exception of the audit variable that was captured from the audit report in the latest financial statements[7] and the JSE industry, dual listing, primary listing, years listed and free float that were obtained directly from the JSE.

Results

IIR measurement results

Figure 1 shows the variation in the IIR score over the 85 companies. The minimum and maximum IIR scores are 13.5 and 193.5 respectively, with 71% of scores falling between 45 and 135, and only three scores in each of the lower and upper categories. The average IIR score is 98 and the median 96.
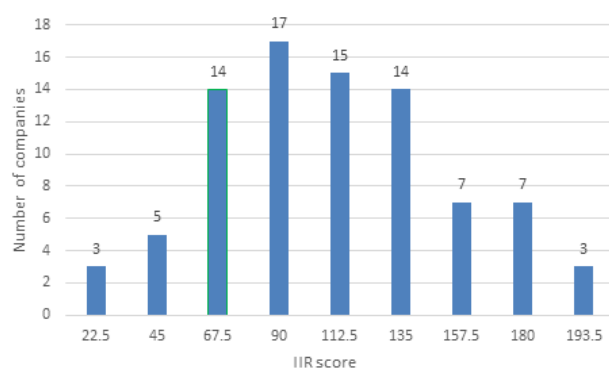
Figure 1: Distribution of Internet investor relations scores over companies

From Figure 1, the following is evident: a significant cross-sectional variation exists between the IIR scores of JSE-listed companies and none of the companies examined in this study achieved a 100% IIR score.

The voluntary nature of IIR may be offered as an explanation of the evident cross-sectional variation. Pirchegger and Wagenhofer (1999: 391) argued that it is not obvious that companies would wish to achieve their maximum disclosure score, nor that users of their corporate websites would want the company to achieve the maximum score. According to Lybaert (2002: 220), companies trade off the benefits and costs of using corporate websites to communicate with investors, with various internal and external factors that can influence a company's decision as to how much to invest in the development of an IIR presence. Further to the reasons offered by Pirchegger and Wagenhofer (1999) and Lybaert (2002), the following can be offered as possible reasons that none of the companies achieved a 100% IIR score:

- The measurement instrument used aimed to measure as widely as possible and it may be argued that many attributes are only 'nice to haves', for example, E-reader (dynamic or interactive PDF documents), Excel downloads, and Webcasts, podcasts and transcripts of presentations;
- Attributes may be deliberately ignored by companies, as they may argue that these attributes are readily available elsewhere (e.g. SENS (Stock Exchange News Service) and share price information) or are already included in their integrated annual report (e.g. shareholder information, company advisors, corporate governance, and corporate responsibility information);

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[7] As available on 30 September 2015.

- Some attributes may be viewed by companies as alternatives in the development of their corporate website, for example, the search function, sitemap and help function as navigation tool or the use of an e-mail alert service and RSS content feed to improve the timeliness of information communicated to investors; and
- Finally, some attributes measured in this study, for example, dividend reinvestment plan, American Depository Receipt programme and information on listed debt instruments may not be applicable to all companies.

Selected descriptive statistics

The descriptive statistics are set out in Table 2. For three independent variables (market capitalisation, market-to-book ratio, and the number of years listed), the natural logarithm was used to reduce the skewness in the distribution of these variables. Statistics for these variables are presented prior to the natural logarithmic transformations, which were used in the stepwise regression analysis.

Table 2: Descriptive statistics: Variables used to examine variations in IIR

Panel A: Continuous independent variables							
	Average	Min	Quartile			Max	Standard deviation
			Q1	Q2	Q3		
Size (ZAR' 000 000)	49 409.17	38.67	584.88	6 247.90	25 944.84	1 411 045.16	169 730.55
Leverage	0.45	0	0.28	0.40	0.61	1.21	0.25
Current ratio	5.07	0.03	0.99	1.32	1.94	159.31	22.52
Financial performance (ROE)	11.03	-40.09	2.78	12.77	20.62	84.02	21.14
Market-to-book	2.28	0.13	0.89	1.43	2.88	12.99	2.53
Number of years listed	22.75	1.78	8.94	17.19	27.58	75.23	17.99
Director shareholding (%)	13.88	0.00	0.10	2.87	23.13	81.79	20.47
Free float (%)	59.70	2.50	36.00	60.00	87.00	100.00	28.63
Panel B: Categorical independent variables							
	Yes (1)	No (0)	Total				
Net issue of shares	36	49	85				
Net buy back of shares	15	70	85				
Big four audit	61	24	85				
Dual listing	25	60	85				
Primary listing (other JSE)	14	71	85				
Block ownership	52	33	85				
Basic material industry	17	68	85				
Consumer goods industry	7	78	85				
Consumer services industry	10	75	85				
Financial industry	21	64	85				
Healthcare industry	3	82	85				
Industrials industry	19	66	85				
Oil and gas industry	1	84	85				
Technology industry	4	81	85				
Telecommunications industry	2	83	85				
Utilities industry	1	84	85				

The average leverage was 0.45. As this ratio was smaller than 0.5, it showed that on average the assets of the sample companies were primarily financed through equity. Although the current ratio varied between as low as 0.03 to a maximum of 159.31, it should be noted that only three companies had a current ratio of more than 5.

The average company was profitable, with an average return on equity (ROE) of just over 11%. As suggested by the average (11.03%) and the median (12.77%), ROE appears to be normally distributed.

The average company was listed on the JSE for nearly 23 years, with 25% of the companies listed for more than 27

years and 25% listed for less than nine years. Twenty-five companies had a dual listing and 14 companies had only a secondary listing on the JSE. Regarding financing activities, 36 companies on net issued shares during 2015, and 15 companies on net bought back shares.

On average, 13.88% of shares were held by directors. Directors' shareholding varied significantly, with 25% of companies where directors had almost no shares (less than 0.1% of issued shares) as opposed to 25% of companies where directors held about one quarter of issued shares. Similar variations were evident in an analysis of the distribution of the free float percentage. Of the 85 companies

in the sample, 52 had a single shareholder who owned more than 20% of the issued shares.

Although, the majority of the companies were audited by PwC, KPMG, Deloitte & Touche or Ernst & Young, almost 30% were audited by smaller audit companies.

Correlation analysis

Table 3 shows the Pearson correlation coefficients between IIR and the independent variables examined. According to Table 3, company size, leverage, being audited by a big four audit company, having a dual listing, directors' shareholding, free float and blockholder ownership are all statistically significantly correlated at the 5% or better level with IIR. All coefficients are as expected.

Table 3: Correlation matrix: IIR and independent variables

Independent variable	IIR
Company size	0.65***
Leverage	0.37***
Current ratio	-0.12
Financial performance (ROE)	0.10
Market-to-book value	0.12
Net issue of shares	0.21*
Net buy back of shares	-0.09
Big four audit	0.44***
JSE Industry - Basic material	0.06
JSE Industry - Consumer goods	-0.07
JSE Industry - Consumer services	-0.09
JSE Industry - Financials	-0.01
JSE Industry - Healthcare	0.03
JSE Industry - Industrials	0.01
JSE Industry - Oil and gas	0.03
JSE Industry - Technology	-0.05
JSE Industry - Telecommunications	0.22**
JSE Industry - Utilities	-0.08
Dual listing	0.26**
Primary listing	0.15
Years listed	0.19*
Director shareholding	-0.30***
Free float	0.37***
Block ownership	-0.27**

*** = significant at the 1% level; ** = significant at the 5% level and * = significant at the 10% level

Table 4 shows Pearson correlation coefficients between independent variables. Only two correlations in Table 4 are significantly higher than 0.5. The correlation between the market-to-book ratio and the return on equity (0.54) and the correlation between dual listing and primary listing (0.69). The high correlation between dual listing and primary listing was expected as 14 of the 25 companies with a dual listing also have a primary listing other than the JSE.

Table 4: Correlation matrix: independent variables used to examine variations in IIR

	SIZE	LEV	CUR	ROE	MTB	NET.ISS	NET.BB	AUDIT	BM	CG	CS	F	H	I	OG	TEC	TEL	U	LIST.D	LIST.P	LIST.Y	DIR.SH	F.FLT	20%.SH
SIZE	1.00																							
LEV	0.28**	1.00																						
CUR	-0.02	-0.30**	1.00																					
ROE	0.41**	0.06	0.44**	1.00																				
MTB	0.49**	0.27**	-0.07	0.54**	1.00																			
NET.ISS	0.41**	-0.03	0.04	0.13	0.33**	1.00																		
NET.BB	0.02	0.01	-0.08	0.00	-0.02	-0.40**	1.00																	
AUDIT	0.42**	0.07	0.09	0.27**	0.14	0.11	-0.26**	1.00																
BM	-0.23**	-0.25**	0.11	-0.25**	-0.38**	-0.25**	0.00	0.12	1.00															
CG	0.12	0.09	-0.05	0.02	0.14	0.00	-0.14	0.00	-0.15	1.00														
CS	0.16	0.19*	-0.06	0.29**	0.49**	0.13	-0.17	0.23**	-0.18*	-0.11	1.00													
F	0.27**	-0.06	0.09	0.17	0.08	0.23**	0.16	0.06	-0.29**	-0.17	-0.21*	1.00												
H	-0.01	0.07	-0.03	-0.03	0.10	0.22**	-0.09	-0.02	-0.10	-0.06	-0.07	-0.11	1.00											
I	-0.23**	0.03	-0.08	-0.14	-0.22**	-0.17	0.12	-0.29**	-0.27**	-0.16	-0.20*	-0.31**	-0.10	1.00										
OG	-0.06	-0.08	-0.02	-0.24**	-0.03	-0.09	-0.05	0.07	-0.05	-0.03	-0.04	-0.06	-0.02	-0.06	1.00									
TEC	-0.07	0.10	-0.03	0.04	0.03	0.03	-0.10	-0.11	-0.11	-0.07	-0.08	-0.13	-0.04	-0.12	-0.02	1.00								
TEL	0.21*	-0.01	-0.03	0.06	0.06	0.02	0.13	0.10	-0.08	-0.05	-0.06	-0.09	-0.03	-0.08	-0.02	-0.03	1.00							
U	-0.19*	0.00	-0.02	-0.04	-0.15	-0.09	-0.05	-0.17	-0.05	-0.03	-0.04	-0.06	-0.02	-0.06	-0.01	-0.02	-0.02	1.00						
LIST.D	0.20*	-0.09	0.24**	-0.10	-0.13	0.18	-0.10	0.18	0.32**	-0.01	-0.16	0.11	-0.12	-0.35**	0.17	-0.02	0.07	0.17	1.00					
LIST.P	0.16	-0.03	0.15	-0.09	-0.12	0.20*	-0.12	0.00	0.17	0.10	-0.16	0.19*	-0.08	-0.24**	-0.05	-0.10	-0.07	0.25**	0.69**	1.00				
LIST.Y	0.16	0.07	0.10	0.14	-0.02	-0.23**	0.16	0.31**	0.14	-0.03	0.15	-0.16	-0.06	-0.03	0.03	0.02	-0.01	-0.08	-0.07	-0.37**	1.00			
DIR.SH	-0.35**	0.00	0.04	-0.07	-0.08	-0.11	0.09	-0.25**	-0.15	0.06	-0.09	-0.16	0.18	0.30**	-0.07	0.06	-0.10	-0.07	-0.31**	-0.17	-0.06	1.00		
F.FLT	0.39**	0.02	0.03	0.19*	0.03	0.20*	-0.12	0.26**	-0.06	-0.18*	0.13	0.09	-0.04	0.02	-0.14	0.05	0.09	-0.15	-0.05	-0.14	0.15	-0.39**	1.00	
20%.SH	-0.34**	-0.20*	0.12	-0.17	-0.33**	-0.29**	0.12	-0.02	0.16	-0.02	-0.16	0.06	-0.11	-0.04	0.09	-0.05	-0.04	0.09	-0.07	-0.23**	0.21*	-0.32**	0.16	1.00

** significant at the 5% level; * significant at the 10% level. Notes: SIZE (company size); LEV (leverage); CUR (current ratio); ROE (return on equity); MTB (market-to-book ratio); NET.ISS (net issue of shares); NET.BB (net buy back of shares); AUDIT (big four audit); BM (basic material); CG (consumer goods); CS (consumer services); F (financials); HC (healthcare); I (industrials); OG (oil and gas); TEC (technology); TEL (telecommunications); U (utilities); LIST.D (dual listing); LIST.P (primary listing); LIST.Y (years listed); D.SH (director shareholding percentage); F.FLT (free float percentage); 20%.SH (block ownership)

Regression estimation results

Table 5 presents the result of the stepwise regression that was performed using the IIR score as dependent, and the independent variables as listed and described in Table 1.

Table 5: Regression results

	IIR
β_0	-151.91***
Company size	9.69***
Leverage	51.66***
Big four audit	21.45***
JSE Industry - Consumer services	-52.99***
JSE Industry – Consumer goods	-37.92***
JSE Industry - Financials	-32.16***
JSE Industry - Technology	-21.89*
Free float	20.18*
Dual listing	10.79*
Adjusted R²	68.76%
F-value	21.55
Durbin-Watson	2.26

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

As depicted in Table 5, company size, leverage, being audited by a big four audit company, JSE industry membership, free float, and dual listing are explanatory factors that explain the level of IIR. As expected, coefficients for company size, leverage and being audited by a big four audit company were positive.

As discussed, almost all prior studies showed a significant positive association between disclosure and company size. Froidevaux (2004), Bollen *et al.* (2006) and Orens *et al.* (2010) all document a significant positive association between website disclosure and company size.

Agency theory is often used in the literature as underlying theoretical foundation to hypothesise a positive association between disclosure and leverage (Debreceny *et al.*, 2002; Xiao *et al.*, 2004 and Larrán & Giner, 2002). As opposed to the association between disclosure and size, empirical research to date has produced mixed results on the association between disclosure and leverage. Following Xiao *et al.* (2004: 215) and Celik *et al.* (2006), this study provides further support for a positive association between website disclosure and leverage.

Signalling theory and agency theory both support the hypothesis of a positive association between disclosure and being audited by a big four audit company. The positive association found in this study between IIR and being audited by a big four audit company do provide support for Xiao *et al.* (2004), Bonsón and Escobar (2002) and Wang *et al.* (2008).

Companies tended to disclose information similar to that disclosed by their industry peers. More specifically, the results in Table 5 showed that lower IIR levels can be expected from companies categorised as constituents of the consumer goods, consumer services, financial, and technology JSE industries rather than other JSE industries.

Also as expected, coefficients for the free float percentage and the dual-listed dummy variable were positive, but only statistically significant at the 10% level. Marston and Polei (2004) also found a significant positive association between free float and website disclosure for their 2000 sub-sample, but found no association for their 2003 sub-sample. A positive association between having a dual listing and website disclosure was reported by Xiao *et al.* (2004), Debreceny *et al.* (2002), Bollen *et al.* (2006: 291) and Aly *et al.* (2010: 191).

The magnitude of the reported adjusted R² of 68.76% compared favourably to studies such as Almilia (2009) that reported an adjusted R² of 47.6%; Leventis and Weetman (2004) (35.6%); Celik *et al.* (2006) (33%); Marston and Polei (2004) (61.7%); Trabelsi *et al.* (2008) (35.42%); Aly *et al.* (2010) (70%); Cormier *et al.* (2009) (27.9%); Ettredge *et al.* (2002) (17.5%); Bollen *et al.* (2006) (21.1%); Pervan (2006) (69%); Xiao *et al.* (2004) (11%); Abdelsalam *et al.* (2007) (35.8%); Larrán and Giner (2002) (33.2%), and Bonsón and Escobar (2006) (50%).

A minimum tolerance value of 0.5 and a Durbin-Watson test statistic of 2.26 confirmed the absence of respectively multicollinearity and autocorrelation. All residuals were approximately normally distributed and no evidence of heteroscedasticity was found.

Summary and conclusion

The purpose of this study was to establish the determinants of IIR quality. IIR were measured for a sample of 85 companies using a measurement instrument that consists of 346 attributes. Overall, the majority of companies did not use corporate websites optimally to communicate with investors.

From the literature, the following company characteristics were identified that could explain variations in IIR levels: company size, leverage, the current ratio, financial performance (return on equity), market-to-book value, number of years listed, directors' shareholding percentage, free float percentage, financing activities (i.e. issue or buy back of shares), auditors, industry membership, dual listing status, primary listing and the existence of block ownership.

Stepwise regression was applied to develop a regression model that best explains variations in IIR levels, using the company characteristics listed in the paragraph above as independent variables and the IIR score per company as dependent variable. The following were found to be significant independent variables as determinants of IIR quality: company size, leverage, being audited by a big four audit company, JSE industry membership, free float percentage and dual listing status.

More specifically, larger companies, companies with more debt, companies that are audited by a big four audit company,

companies with a higher free-float percentage (i.e. fewer restricted shares) and, lastly, companies that were dual-listed had higher IIR scores. Companies that were members of one of the following four JSE industries, namely consumer services, consumer goods, financials, and technology, each had a lower IIR score compared to companies listed in one of the other nine industries.

An understanding of IIR is important for standard setters and regulatory bodies such as SAICA and the JSE. The results of the study specifically contribute to investor relations and accounting literature.

Though the utmost care was taken in measuring corporate websites, it is possible that some attributes might have been overlooked, given the complexity (e.g. number of internal hyperlinks) and the variety of website layouts. Although it is admitted that not all attributes measured may be applicable to all companies, the measurement instrument used made no attempt to distinguish between companies with respect to the relevancy or not of such attributes. Future research should consider the calculation of a unique score per company by removing attributes which are not applicable for some companies, and then calculate their IIR using the lower score.

Based on the investor recognition hypothesis (Merton, 1987), a well-developed investor relations strategy will increase company visibility, which in turn leads to increased share liquidity (Brown & Hillegeist, 2007). Economic theory links increased liquidity to the cost of capital through information asymmetry (Botosan, 2000). This warrants the need for future research to examine the association between IIR and information asymmetry and the cost of capital, using data from JSE listed companies.

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