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The Value Relevance of Business Model Disclosure Quality in Integrated Reports

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Abstract

Purpose: Despite the vast array of literature on integrated reporting, there is scant empirical evidence on the value relevance of the specific content elements of integrated reports. This paper investigates whether a specific content element of integrated reports, namely, business model disclosure quality influences the share price of South African listed companies. Business model disclosure was selected because it is integral to all stakeholders in understanding companies' value creation processes to make informed decisions.

Design/Methodology/Approach: The value relevance was tested using the Ohlson (1995) Model through the application of panel data. A new proxy was used for the "other information" variable in the Ohlson (1995) Model for business model disclosure. Two scenarios were evaluated: one sample included profit-making and loss-making companies (350 observations) and another sample of profit-making companies (260 observations) for five years from 2016 to 2020.

Findings: The results for both scenarios indicated that the quality of business model disclosure had no effect on the share price of South African listed companies.

Originality/Value: The paper makes four contributions to the existing literature. Firstly, analysing the value relevance of one specific component of integrated reports, namely, business model disclosure. Secondly, using a new a proxy for business model disclosure to incorporate into the Ohlson (1995) Model. Thirdly, the paper provides empirical evidence on the value relevance of one of the critical elements of integrated reports of companies that have a mandatory requirement to publish integrated reports. Fourthly, two samples were analyzed: one sample of profit-making and loss-making companies and another sample of profit-making companies.

Keywords Integrated reports, Business model disclosure, Value relevance, Ohlson (1995) Model

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1. Introduction

The interest in integrated reports has increased significantly in recent years due to the demand for non-financial information (Stolowy & Paugam, 2018). Integrated reports provide mainly non-financial information to stakeholders and may influence investors' decisions to buy, sell, or hold shares in a company. Combining non-financial information in integrated reports with traditional financial information could explain market valuations better than financial information alone (de Klerk & de Villiers, 2012). In 2009, King III introduced the concept of integrated reporting, which has been adopted into the Johannesburg Stock Exchange (JSE) listing requirements. Hence, integrated reporting is a legal requirement for all listed companies in South Africa to prepare integrated reports or disclose why they have not done so. South Africa, being one of the first countries to mandate integrated reporting, provides a unique setting for research, because companies have had fourteen years to improve their integrated reports. The International Integrated Reporting Framework was disseminated by the International Integrated Reporting Council (IIRC) in 2013 to provide guidelines for companies preparing integrated reports, and a revised Framework was issued in 2021 (IIRC, 2013, 2021). The Framework is a broad framework with scope for interpretation, and no two companies would have the same disclosure.

Most prior studies assessed the quality and value relevance of the entire integrated report. There are conflicting views on whether adopting integrated reporting provides value-relevant information to investors (Dumay et al., 2017; Veltri & Silvestri, 2020). Some studies found that integrated reports are useful for investors (Barth et al., 2017; Dey, 2020; Lee & Yeo, 2016; Pavlopoulos et al., 2017; Zhou et al., 2017), while other studies found that integrated reports are not useful for investors (Abhayawansa, 2014; Cortesi & Vena, 2019; Maniora, 2017). The overarching research problem identified is the need for more certainty about the usefulness of integrated reports for investors—the increased resources utilized in preparing integrated reports raised the question of whether integrated reports add value to the firm. Therefore, empirical research is necessary for the various content elements of the integrated report. This paper examines the value relevance of business model disclosure. Business model disclosure was selected because the value-creation process is depicted in the business model, which discloses how the six capitals contribute to the value-creation process, thereby leading to the question of whether business model disclosure provides value to investors.

Two studies assessed the value relevance of business model disclosure on firm value using the Ohlson (1995) Model (Mechelli et al., 2017; Simoni et al., 2019). Mechelli et al., (2017) assessed the value relevance of business model disclosure from an International Accounting Standards Board (IASB) perspective of companies in the financial sector in Europe while Simoni et al., (2019) evaluated the value relevance of business model disclosure in the strategic reports of companies in the United Kingdom (UK). Both studies used the Ohlson (1995) Model to evaluate value relevance of business model disclosure. The research gap identified is that prior research evaluated companies in different jurisdictions. This paper builds on prior research to assess the usefulness of business model disclosure quality in integrated reports from an IIRC perspective. The research

question examined is - Is the quality of business model disclosure in integrated reports of South African listed companies value relevant for investors?

The remainder of this paper is structured as follows: literature review; hypothesis development, methodology; results; and conclusion.

2. Literature review

Companies prepare integrated reports as a mechanism to present additional information for capital market participants to accurately evaluate the nature of the companies' business activities, strategic goals and the amount of resources necessary to achieve its strategic goals, which potentially leads to higher share prices, higher growth in revenue and higher firm values (Baboukardos & Rimmel, 2016; IIRC, 2013; Lee & Yeo, 2016; Zhou et al., 2017). Business model disclosure is a starting point for investors and allows the company to disclose its ability to create value (Bini et al., 2018; Silvestri et al., 2017). Integrated reporting focuses on strategy, business models, six capitals and risks, which investors use to evaluate companies' capacity to create future value (Fasan & Mio, 2017; Nielsen & Roslender, 2015; Simoni et al., 2017). Business model disclosure is non-financial and unique to each company. It leads to whether it could be measured to be included in the Ohlson (1995) Model as other information to assess its value relevance.

In non-financial reporting guidelines, there are a few ways in which the business models are disclosed (Girella et al., 2019; Michalak et al., 2017; Simoni et al., 2019). Globally, business models are disclosed in corporate reports following guidelines issued by the European Union Directive 2014/95 of the European Parliament and the Council (EU Directive), the United Kingdom Corporate Governance Code (UKCGC), the International Accounting Standards Board's (IASB) Management Commentary and the IIRC's Framework. One of the requirements of the EU Directive is a concise narrative of the business model. However, the EU Directive does not provide specific guidance on what should be included in the business model disclosure (The European Parliament, 2014). The UKCGC provides a definition of the business model and a short description of the elements of the business model (The Financial Reporting Council Limited, 2018). The IASB suggested that financial reports should include a description of the nature of the business in the management commentary, which has been interpreted to be the company's business model (IASB, 2010). Similarities between these four reporting frameworks are the value-creation concept, connectivity, and forward-looking information (Michalak et al., 2017). However, the IIRC Framework is more robust regarding the qualitative information attributes, business model description requirements, and the structure of integrated reports.

Two prior studies assessed the value relevance of business model disclosure on firm value using the Ohlson (1995) Model (Mechelli et al., 2017; Simoni et al., 2019). Mechelli et al., (2017) examined the management commentary in the annual reports for information about each macro-component of the business model, namely "the nature of the business, objectives and strategies, resources, risks and relationships, results, prospects and the critical performance measures and indicators". Proxies were created for each of these components, zero was awarded if the company provided limited disclosure and one was awarded if the company provided detailed disclosure. The sample comprised of 124 European financial entities over the period 2010–2013. A

quarter of the sampled companies conformed to the requirements of the IASB. Most of these companies provided adequate disclosure about the nature of the business and resources, risks and relationships (Mechelli et al., 2017). The authors found that the value relevance of earnings was positive and statistically significant when companies disclosed business models, whereas the value relevance of book value was not statistically significant.

Simoni et al., (2019) examined the value relevance of business model disclosure by obtaining information from the annual reports of UK listed companies, where it is mandatory to disclose business model information. A proxy was created for business model disclosure, zero was awarded if the company did not disclose a business model and one was awarded if a business model was disclosed. The sample comprised of 279 UK listed companies from 2010 to 2016. The authors concluded that business model disclosure had a positive and significant effect on net income when business models were disclosed and a negative moderating effect on the value relevance of book value. Similarly, Cortesi & Vena (2019) evaluated the value relevance of voluntarily adopting integrated reporting by 636 companies in 57 countries and concluded that the voluntary adoption of integrated reporting has a negative effect on book value but has a positive effect on earnings.

Recent research on value relevance explored the value relevance of various financial statement items of profit-making and loss-making companies in the old and new economies from 1971 to 2018 (Barth et al., 2023). The companies in the new economy ranged from 1970 to 2009 and new economy companies ranged from 2010 to 2018. New economy companies are defined in Barth et al., (2023) as companies operating in the technology industry or incurring a loss in their initial public offering of shares. The samples are categorized into profit-making and loss-making companies in the old and new economies. The authors concluded that earnings were more value relevant than book value for profit-making companies in the new and old economies, whereas book value was more value relevant than earnings for loss-making companies in the new and old economies.

3. Hypothesis development

A company's main objective is to create value for its customers (Osterwalder, 2004). Therefore, the main goal of an integrated report is to describe companies' value-creation process (IIRC, 2011). Value-creation is the "process that results in increases, decreases or transformations of the capitals resulting from the company's business activities" (Beattie & Smith, 2013; IIRC, 2013, p. 33). According to the Framework, value is created through a company's business model. The business model transforms inputs through business activities to produce outputs and outcomes that create, preserve or destroy value for the company (IIRC, 2021). The value-creation process is depicted in the business model, which discloses the company's business activities, strategic goals, and how the six capitals contribute to the value-creation process (Beattie & Smith, 2013; Nielsen & Roslender, 2015). Investors use business model disclosure to assess companies' capability to create value in the future (Bini et al., 2018; Fasan & Mio, 2017; Lee & Yeo, 2016; Nielsen & Roslender, 2015; Zhou et al., 2017). Prior studies using the IASB criteria for business model disclosure in management commentary found that a

higher level of business model disclosure resulted in higher market values, concluding that business model disclosure is value-relevant (Mechelli et al., 2017). A further assessment of business model disclosure using the IIRC criteria should lead to higher share prices. Therefore, the hypothesis is:

H_1: *The quality of business model disclosure has a positive impact on firm value.*

4. Methodology

This section is set out as follows: the data description; development of the disclosure index to measure business model disclosure quality and the estimation of the regression model.

4.1 Data description

The variables are tested using two datasets, one that includes loss-making companies and one that excludes loss-making companies, thereby illustrating the effect of loss-making companies when applying the Ohlson (1995) Model. Prior studies found more robust results when loss-making companies were excluded from the sample because investors perceive loss-making companies to be losing value, and investors would opt to sell these shares (Filip & Raffournier, 2010; Sixpence & Adeyeye, 2018; Zulu et al., 2017).

The selection of the first dataset starts with the top one hundred JSE-listed companies based on market capitalization. Companies were eliminated from the sample due to dual listings, incomplete listings from 2016 to 2020, trading two types of shares, no business model disclosure in any of the years, and limited financial information on Equity RT. The final sample for the first dataset, which includes loss-making companies, is 70 companies (350 observations) and ranges for five years from 2016 to 2020. The second dataset eliminates eighteen loss-making companies in the five years and hence were removed from the sample, resulting in a sample of 52 companies (260 observations).

Business model disclosure was obtained from companies' integrated reports, and the process to measure business model disclosure is detailed in the next section. The integrated reports were downloaded from Equity RT or company websites. Optical character recognition (OCR) software was used to extract interactive or encrypted reports into a readable format in cases where information could not be copied and pasted. The book value per share, earnings per share, market value per share, and Weighted Average Cost of Capital (WACC), were obtained from Equity RT.

4.2 Measurement of non-financial variable

The proxy for the quality of business model disclosure is evaluated by using the scores from a multi-dimensional disclosure index developed by Sukhari, Ade-Ibijola & Coetsee (2024). The multi-dimensional disclosure index to measure the quality of business model disclosure comprises the Relative quantity index (RQN) and the Richness index (RCN) index. The Richness index is the average sum of the Width (WID) and Depth (DEP) of disclosure. The Width (WID) of the business model disclosure encompasses the Dispersion (DIS) and Coverage (COV) of sub-topics in the business model disclosure. The details of the multi-dimensional disclosure index are provided in Appendix A. The calculations for each aspect is implemented into a text analysis software from which the

scores were generated and inserted into the Ohlson (1995) Model. The calculations for BMQ are calculated as follows: BMQ is calculated as 20% of the Relative quantity index (RQN) and 80% of the DIS, COV and DEP. A summary of the calculations for BMQ is available in Appendix B.

4.3 Empirical model

A new non-financial variable was introduced into the Ohlson (1995) Model for the business model disclosure quality, named BMQ. The process of measuring BMQ is detailed in the section above. Equation 1 is estimated as follows:

$$P_{i,t} = \propto_0 bv_{i,t} + \propto_1 x^a_{i,t} + \propto_2 BMQ_{i,t} + \delta_{i,t} + \mu_{i,t} \quad (1)$$

where:

$P_{i,t}$ = market value per share three months after the year end,

$bv_{i,t}$ = closing book value per share for the period t,

$x^a_{i,t}$ = abnormal earnings for the period t,

$BMQ_{i,t}$ = Business model quality index,

δ_i = fixed cross-sectional effects,

δ_t = period effects,

$\mu_{i,t}$ = an error term.

The Ohlson (1995) Model was run using panel data in EViews, a statistical software. The Redundancy Fixed Effect-Likelihood Ratio and Hausman Test were applied to decide which panel data estimation technique was more appropriate to the different data sets. The Redundancy Fixed Effect-Likelihood Ratio evaluates whether cross-section and period fixed effects should be included in the model. A prior study suggested using the Hausman Test to choose between a fixed-effects model and a random-effects model (Onali et al., 2017).

5. Discussion

The results from the descriptive statistics, panel regression additional tests are presented below.

5.1 Descriptive statistics

Table 1 provides the descriptive statistics for the variables utilized in the panel regression for BMQ for datasets including loss-making companies and excluding loss-making companies. The results for the dataset, including loss-making companies are discussed followed by the results for the dataset excluding loss-making companies.

Including loss-making companies						
Variable	n	**Mean**	**Median**	**Std. dev.**	**Min**	**Max**
P	350	109.932	75.050	153.496	1.000	2152.200
bv	350	57.198	39.560	59.535	1.100	391.310
x^a	350	2.924	1.470	9.875	-28.390	99.360
$BMQ_{i,t}$	350	58.057	61.000	13.759	18.000	89.000
Excluding loss-making companies						
Variable	n	**Mean**	**Median**	**Std. dev.**	**Min**	**Max**
P	260	120.370	82.515	169.588	1.000	2152.150
bv	260	55.963	38.415	54.879	1.100	391.310
x^a	260	4.693	2.380	10.051	-12.900	99.000
$BMQ_{i,t}$	260	56.800	59.000	14.065	18.000	89.000
Note: P, bv and x^a are in Rands. $BMQ_{i,t}$ is in percentages.						

Table 1. Descriptive statistics - $BMQ_{i,t}$

5.1.1 Including loss-making companies

The average company in the sample had a market value of R109.93 per share. The median exceeds the mean for market value, indicating that the average is skewed toward higher values. The standard deviation for market value is R153.50 per share. The minimum market value per share is R1, and the maximum market value per share is R2 152. The average company in the sample had a book value of R57.20 per share. The median book value is R39.56. The standard deviation for book value is R59.54. The minimum book value per share is R1.10 per share, and the maximum is R391.31.

The average company in the sample had abnormal earnings of R2.92 per share. The median is R 1.47, and the standard deviation is R9.88. The minimum abnormal earnings per share is R28.39, and the maximum abnormal earnings per share is R99.36. The negative minimum abnormal earnings is due to some companies making losses, resulting in negative abnormal earnings. The average score for BMQ is 58.06%. The median exceeds the mean for BMQ indicating that the average is skewed toward higher values. The standard deviation for BMQ is 13.76%. The minimum BMQ score is 18% and the maximum BMQ score per share is 89%.

5.1.2 Excluding loss-making companies

The average company in the sample had a market value of R120.37 per share. The median is R82.52. The standard deviation for market value is R169.59 per share. The minimum market value per share is R1 and the maximum market value per share is R2 152. The average company in the sample had a book value of R55.96 per share. The median book value is R38.42. The standard deviation for book value is R54.88. The minimum book value per share is R1.10 per share, and the maximum is R391.31.

The average company in the sample had abnormal earnings of R4.69 per share. The median is R2.38, and the standard deviation is R10.05. The minimum abnormal earnings per share is -R12.90, and the maximum abnormal earnings per share is R99.00. The average score for BMQ is 56.80% The median exceeds the mean for BMQ indicating that

the average is skewed toward higher values. The standard deviation for BMQ is 14.07%. The minimum BMQ score is 18% and the maximum BMQ score per share is 89%.

The average price in the sample excluding loss-making companies was higher than the sample including loss-making companies, indicating better market valuation when loss making companies are removed from the sample. The mean book value is slightly lower when excluding loss-making companies, but the median decreases slightly, indicating changes in distribution. Abnormal earnings are higher when loss-making companies are excluded, which is expected. The BMQ is slightly lower when loss-making companies are excluded but the standard deviation remains similar. Excluding loss-making companies resulted in higher mean values for most variables for market value and abnormal earnings. The medians follow a similar trend to the mean, with profitability and price higher in the sample excluding loss-making companies. The standard deviation for most variables is comparable between the datasets, indicating that the exclusion of loss-making companies does not drastically affect the distribution spread.

5.1.3 Pearson correlation

The results of the Pearson Correlation between market value, book value, abnormal earnings and BMQ are provided in Table 2. The results indicate that book value and abnormal earnings are moderately correlated with market value for both samples including and excluding loss-making companies. There is no correlation between market value and BMQ for both samples.

	P	
	Excluding loss-making companies	**Including loss-making companies**
Variables	**Pearson (p-value)**	**Pearson (p-value)**
bv	0.564 (0.000)***	0.566 (0.000)***
x^a	0.799 (0.000)***	0.715 (0.000)***
$BMQ_{i,t}$	0.0725 (0.244)	0.046 (0.394)

*KEY: ***Significant at the 0.01 level*

Table 2. Pearson correlations between market value and book value, abnormal earnings and $BMQ_{i,t}$

5.2 Regression results

Table 3 provides the results for the value relevance of BMQ. Table 4 provides the results for the Redundant Fixed Effect-Likelihood Ratio and the Hausman Test. The same regression model and ratios were used on both samples including and excluding loss-making companies.

Model: $P_{i,t} = \propto_0 bv_{i,t} + \propto_1 x^a_{i,t} + \propto_2 BMQ_{i,t} + \delta_i + \delta_t + \mu_{i,t}$		
Variables	**Including loss-making companies**	**Excluding loss-making companies**
Constant	61.826 (0.024)**	57.478 (0.059)*
$bv_{i,t}$	0.400 (0.027)**	0.269 (0.167)
$x^a_{i,t}$	9.338 (0.000)***	11.326 (0.000)***
$BMQ_{i,t}$	-0.036 (0.933)	-0.094 (0.846)
Period effects	Fixed	Fixed
Cross section effects	Fixed	Fixed
n	350	260
Adj R^2	0.802	0.829

*KEY: ***Significant at the 0.01 level; **Significant at the 0.05 level; *Significant at the 0.10 level.*

Table 3. Regression results - $BMQ_{i,t}$

		Including loss-making companies	**Excluding loss-making companies**
Redundant Fixed Effect-Likelihood Ratio	Cross-section F	0.000	0.000
	Cross-section Chi-squared	0.000	0.000
	Period F	0.005	0.009
	Period Chi-square	0.001	0.002
Hausman Test	Cross-section random	0.001	0.012
	Period random	0.005	0.007

Table 4. Redundant Fixed Effect-Likelihood Ratio and Hausman Test - $BMQ_{i,t}$

5.2.1 Including loss-making companies

The most appropriate model for the sample, which includes loss-making companies, is the fixed cross-section and fixed period effects model. The adjusted R^2 is 80%. The co-efficient for $P_{i,t}$ is positive and significant at the 10% level. The co-efficient for $bv_{i,t}$ is positive and significant at the 5% level. The co-efficient for $x^a_{i,t}$ is positive and significant at the 1% level. The co-efficient for BMQ is -0.036, with a p-value of 0.933, which indicates a negative, but insignificant relationship between $P_{i,t}$ and BMQ. The co-efficient for BMQ is negative and insignificant, indicating that BMQ has no effect on the share price when loss-making companies are included in the sample.

Table IV presents the scores for the Redundant Fixed Effect-Likelihood Ratio. The p-value and Chi-square for cross-section are 0.000, therefore the null hypothesis that fixed-effects are redundant is rejected, and heterogeneity must be accounted for in the cross-sections. The Chi-square for period effects is 0.001 with a p-value of 0.005, therefore the null hypothesis that period effects are redundant is rejected and heterogeneity must be accounted for in the period effects. The scores for the Hausman Test are also presented in Table IV. The Chi-square for cross-section effects is 0.001, therefore the null hypothesis

that random cross-section effects model is the best model is rejected. The Chi-square for period effects is 0.005, therefore the null hypothesis that random period effects model is the best model is rejected.

5.2.2 Excluding loss-making companies

The most appropriate model for the sample excluding loss-making companies is the fixed cross-section and fixed period effects model, which has a high explanatory power of 83%. The co-efficient for $P_{i,t}$ is positive and significant at the 10% level. The co-efficient for $x_{i,t}^{a}$ is positive and significant at the 1% level. The co-efficient for $bv_{i,t}$ is positive but insignificant. The co-efficient for BMQ is -0.094, with a p-value of 0.846, which is negative but insignificant. The co-efficient for BMQ is negative and insignificant, indicating that BMQ has no effect on share price when loss-making companies are eliminated from the sample.

The scores for the Redundant Fixed Effect-Likelihood Ratio are presented in Table IV. The Chi-square for cross-section is 0.000; therefore, the null hypothesis that fixed-effects are redundant is rejected, and heterogeneity must be accounted for in the cross-sections. The Chi-square for period effects is 0.002; therefore, the null hypothesis that period effects are redundant is rejected, and heterogeneity must be accounted for in the period effects. The scores for the Hausman Test are presented in Table IV. The Chi-square for cross-section effects is 0.012; therefore, the null hypothesis that random cross-section effects model is the best model is rejected. The Chi-square for period effects is 0.007; therefore, the null hypothesis that random period effects model is the best model is rejected.

5.3 Additional test

The additional test assesses the effect of the dimensions of BMQ on firm value. Equation (1) is modified to include the dimensions of BMQ, which are RQN, DIS, COV, and DEP. The equation is estimated as follows:

$$P_{i,t} = \propto_0 bv_{i,t} + \propto_1 x_{i,t}^{a} + \propto_2 RQN_{i,t} + \propto_3 DIS_{i,t} + \propto_4 COV_{i,t} + \propto_5 DEP_{i,t} + \delta_i + \delta_t + \mu_{i,t} \quad (2)$$

$P_{i,t}$ = market value per share three months after the year end,

$bv_{i,t}$ = closing book value per share for the for the period t,

$x_{i,t}^{a}$ = abnormal earnings for the period t,

$RQN_{i,t}$ = Relative quantity index,

$DIS_{i,t}$ = Dispersion index,

$COV_{i,t}$ = Coverage index,

$DEP_{i,t}$ = Depth index,

δ_i = fixed cross-sectional effects,

δ_t = period effects,

$\mu_{i,t}$ = an error term.

Table 5 provides the results for the Ohlson (1995) Model, using the dimensions of BMQ, namely RQN, DIS, COV, and DEP as proxies for other information. Table 6 provides the results for the Redundant Fixed Effect-Likelihood Ratio and the Hausman Test.

Model: $P_{i,t} = \propto_0 bv_{i,t} + \propto_1 x_{i,t}^a + \propto_2 RQN_{i,t} + \propto_3 DIS_{i,t} + \propto_4 COV_{i,t} + \propto_5 DEP_{i,t} + \delta_i + \delta_t + \mu_{i,t}$		
Variables	**Including loss-making companies**	**Excluding loss-making companies**
Constant	58.028 (0.132)	40.229 (0.351)
$\boldsymbol{bv_{i,t}}$	0.432 (0.020)**	0.320 (0.111)
$\boldsymbol{x_{i,t}^a}$	9.312 (0.000)***	11.349 (0.000)***
$\boldsymbol{RQN_{i,t}}$	0.343 (0.422)	0.516 (0.309)
$\boldsymbol{DIS_{i,t}}$	0.052 (0.886)	0.222 (0.594)
$\boldsymbol{COV_{i,t}}$	0.130 (0.772)	0.269 (0.608)
$\boldsymbol{DEP_{i,t}}$	-0.343 (0.527)	-0.693 (0.281)
Period effects	Fixed	Fixed
Cross section effects	Fixed	Fixed
$\boldsymbol{n}$	350	260
Adj $\boldsymbol{R^2}$	0.800	0.829

*KEY: *** Significant at the 0.01 level; ** Significant at the 0.05 level.*

Table 5. Regression results - Dimensions of $BMQ_{i,t}$ ($RQN_{i,t}$, $DIS_{i,t}$, $COV_{i,t}$ and $DEP_{i,t}$)

		Including loss-making companies	**Excluding loss-making companies**
Redundant Fixed Effect-Likelihood Ratio	Cross-section F	0.000	0.000
	Cross-section Chi-squared	0.000	0.000
	Period F	0.010	0.024
	Period Chi-square	0.002	0.005
Hausman Test	Cross-section random	0.001	0.031
	Period random	-	-

Table 6. Redundant Fixed Effect-Likelihood Ratio and Hausman test – Dimensions of $BMQ_{i,t}$

First the results for the sample including loss-making companies are discussed, followed by the results for the sample excluding loss-making companies.

5.3.1 Including loss-making companies

The most appropriate model for the sample including loss-making companies, is the fixed cross-section and fixed period effects model, which has an explanatory power of 80%. The co-efficient for $bv_{i,t}$ is positive and significant at the 5% level. The co-efficient

for $x_{i,t}^{a}$ is positive and significant at the 1% level. The co-efficient for RQN is 0.343 with a p-value of 0.422. The co-efficient for DIS is 0.052, with a p-value of 0.886. The co-efficient for COV is 0.130, with a p-value of 0.772. The co-efficient for DEP is -0.343, with a p-value of 0.527. The co-efficient for DEP is negative and insignificant. The co-efficient for RQN, DIS and COV are positive but not significant. These results indicate that none of the dimensions of BMQ affect share price when loss-making companies are included in the sample.

The scores for the Redundant Fixed Effect-Likelihood Ratio are presented in Table VI. The Chi-square for cross-section is 0.000. Therefore, the null hypothesis that fixed-effects are redundant is rejected, and heterogeneity must be accounted for in the cross-sections. The Chi-square for period effects is 0.002. Therefore, the null hypothesis that period effects are redundant is rejected, and heterogeneity must be accounted for in the period effects. The scores for the Hausman Test are presented in Table VI. The Chi-square for cross-section effects is 0.001; therefore, the null hypothesis that the random cross-section effects model is the best model is rejected.

5.3.2 Excluding loss-making companies

The most appropriate model for the sample, which excludes loss-making companies, is the fixed cross-section and fixed period effects model, which has a high explanatory power of 83%. The co-efficient for $bv_{i,t}$ is positive but insignificant. The co-efficient for $x_{i,t}^{a}$ is positive and significant at the 1% level. The co-efficient for RQN is 0.516 with a p-value of 0.309. The co-efficient for DIS is 0.222, with a p-value of 0.594. The co-efficient for COV is 0.269, with a p-value of 0.608. The co-efficient for DEP is -0.693, with a p-value of 0.281. The co-efficient for RQN, DIS and COV are positive but not significant. The co-efficient for DEP is negative and insignificant. These results indicate that none of the dimensions of BMQ affects share price when loss-making companies are eliminated from the sample.

The scores for the Redundant Fixed Effect-Likelihood Ratio are presented in Table VII. The Chi-square for cross-section is 0.000. Therefore, the null hypothesis that fixed-effects are redundant is rejected, and heterogeneity must be accounted for in the cross-sections. The Chi-square for period effects is 0.005. Therefore, the null hypothesis that period effects are redundant is rejected, and heterogeneity must be accounted for in the period effects. The scores for the Hausman Test are presented in Table VI. The Chi-square for cross-section effects is 0.031; therefore, the null hypothesis that the random cross-section effects model is the best model is rejected.

Both models have an insignificant relationship between $P_{i,t}$ and RQN, DIS, COV and DEP. To address multi-collinearity, the effect of a strong correlation between the independent variables, the Variance Inflation Factors (VIF) were calculated on EViews. Table 7 below presents the results for the VIF for the variables used in the regressions. The scores for the different independent variables range between 1.131 and 3.191, therefore multi-collinearity between variables is not a concern. The results from the first additional test confirms that H_1 is rejected because none of the dimensions of BMQ are value relevant.

Variable	$bv_{i,t}$	$x^a_{i,t}$	RQN	DIS	COV	DEP	n
VIF – Dataset 5	1.167	1.141	1.169	1.189	2.839	2.974	350
VIF – Dataset 6	1.172	1.131	1.186	1.167	3.018	3.191	260

Table 7. Variance Inflation Factors – Dimensions of BMQ (RQN, DIS, COV and DEP)

H_1 predicted a positive relationship between the market value of share price and the quality of business model disclosure. Both models show an insignificant negative relationship between $P_{i,t}$ and BMQ. H_1 is rejected for both scenarios, including and excluding loss-making companies. The research question examined in this paper is whether business model disclosure is value relevant. Our study finds that when assessing the value relevance of BMQ, for samples including and excluding loss-making companies, earnings are positive and significant and BMQ is negative and insignificant. For the sample including losses, book value is significant, and the sample excluding loss-making companies, book value is positive and insignificant. When the dimensions of BMQ are split into RQN, DIS, COV and DEP to assess the value relevance, we find that earnings and book value are positive and significant for both samples including and excluding loss-making companies. RQN, DIS and COV are positive and not significant for both samples, whereas DEP is negative and insignificant. The results indicate that the overall business model disclosure and its components does not affect share price and is not value relevant. Similarly, Simoni et al, (2019) and Mechelli al., (2017) found that earnings are positive and significant when evaluating the value relevance of business model disclosure, whereas book value is negative and not significant. Our findings are consistent with Barth et al., (2023) in which the authors concluded that earnings were more value relevant than book value for profit-making companies in the new and old economies, whereas book value was more value relevant than earnings for loss-making companies in the new and old economies.

Our findings are in contrast with those of Mechelli *et al.,* (2017). These prior studies assessed the value relevance of business model disclosure in the management commentary using criteria from the IASB. The authors found a positive relationship between market value and the level of business model disclosure and concluded that the business model disclosure is value relevant. The sample in Mechelli *et al.,* (2017) were limited to the financial sector and the quality of business model disclosure was calculated using the quantity for each macro-component of the business model. This paper differs in that it evaluated the value relevance of different dimensions of business model disclosure quality in integrated reports of loss-making and profit-making companies.

6. Conclusions

This paper assessed the value relevance of the quality of business model disclosure in integrated reports using a multi-dimensional disclosure index, which measured quantity, dispersion, coverage, and depth of business model disclosure. The scores obtained from the multi-dimensional disclosure index (Sukhari et al., 2024) were used as a proxy for other information in the Ohlson (1995) Model (Ohlson, 1995). Two samples were

assessed, one including and one excluding loss-making companies. The results revealed that BMQ is negative and insignificant for both samples. BMQ had a positive and significant effect on net income and a negative moderating effect on the value relevance of book value for both samples. An additional test that assessed the value relevance of business model disclosure quality dimensions also had no effect on the share price.

For the period assessed in this paper, 2016 to 2020, the business model information in integrated reports has not been captured in the share price of South African listed companies. There are a few reasons why the business model disclosure is not value relevant. Firstly, business models are dynamic and constantly evolving, and investors may view the business model disclosure as a tool to promote the company as opposed to offering substantial insights. Secondly, the results indicate that business model disclosure could be disclosed on other platforms, such as social media, instead of integrated reports. Thirdly, there is a lack of universally accepted guidelines that reduces the comparability and makes it difficult for investors to compare and evaluate companies. Companies may need more guidance in applying different weights to the various content elements of integrated reports. Fourthly, investors are familiar with the business model, and there will only be an effect on the share price when there is a substantial change in the business model. The business model could be providing generic high-level disclosure which does not provide actionable insights and investors may find it difficult to link business model disclosure to key performance indicators or future cash flows. Fifthly, the business model disclosure may not provide sufficient integration with financial information such as revenue, profits and investments.

The study has a few limitations. The sample was limited to South African listed companies, for which integrated reporting is a legal requirement since 2009. Results may differ when applying the measurement criteria to other settings. The list of the top 100 companies was extracted from Equity RT on 28 March 2022, after the sample period; therefore, survivorship bias is a limitation of the paper. To address survivorship bias, only companies that maintained their listing between 2016 and 2020 were included in the sample. Dual-listed companies, companies trading two types of shares, and companies that did not disclose business models were removed from the sample. The companies that were excluded were considered not to be useful to the study. The companies that survived in the sample are the companies that had all the necessary information available for all the periods.

Future research could explore the value relevance of business model information disclosed on companies' web pages and social media. Comparison of business model disclosure between companies in different countries and industries could be undertaken using criteria in the UKCGC, EU directive, IASB and IIRC. New techniques to measure value creation, preservation, and erosion of value for each of the six capitals for specific industries could be developed, and the value relevance assessed.

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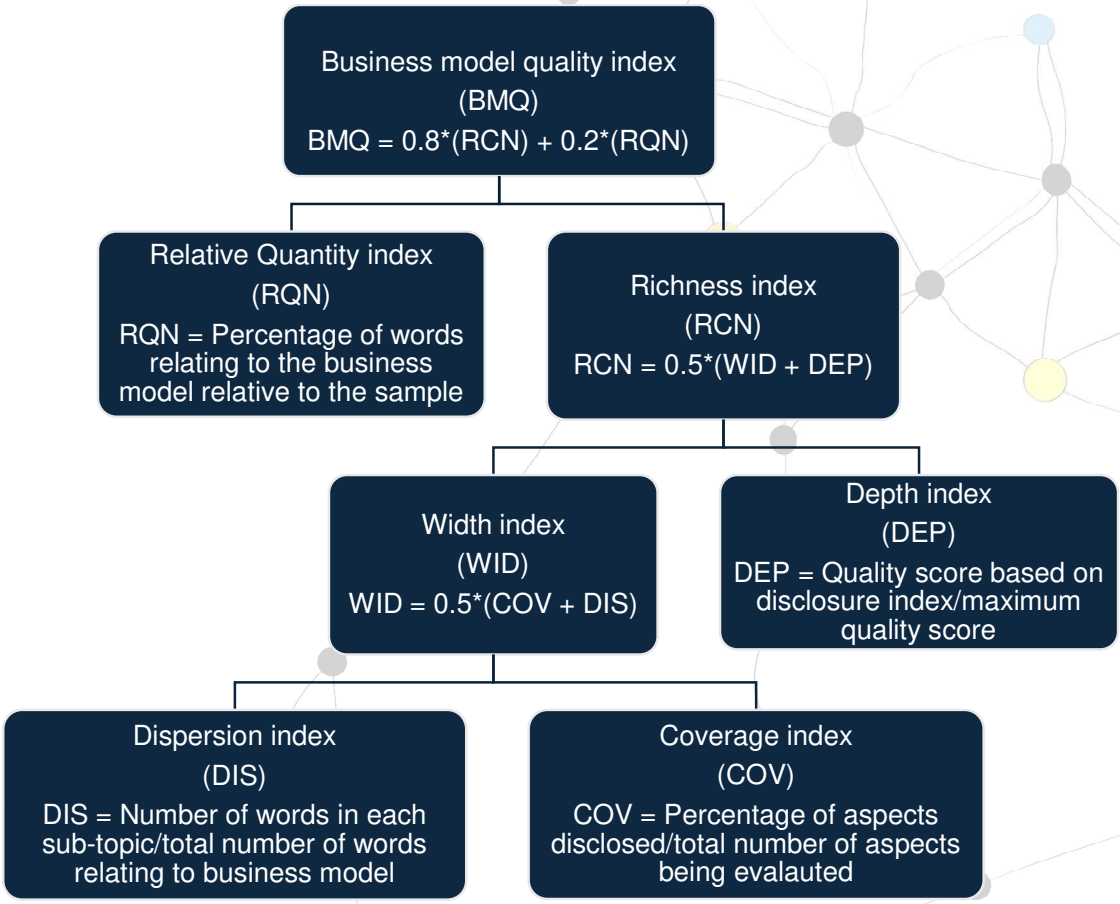
Appendix 1: Aspects of the multi-dimensional disclosure index



Appendix 2: Calculation of quality measures for business model quality disclosure

Dimension	Sub-dimension	Index	Name	Formula
Overall business model quality		$\boldsymbol{BMQ}$	**Business model quality**	$\boldsymbol{BMQ_i = 0.5(RQN_i + RCN_i)}$ where: BMQ_i = Business model quality RQN_i = Relative quantity index RCN_i = Richness index
Quantity		RQN	Relative quantity index	$\frac{\text{total number of words of business model information}}{\text{highest number of words of business model information in the sample}}$
Richness		RCN	Richness index	$RCN_i = \frac{1}{2}(WID_i + DEP_i)$ where: RCN_i = Richness index WID_i = Width index $\mathrm{DEP_i}$ = Depth index
	Width	WID	Width index	$WID_i = \frac{1}{2}(COV_i + DIS_i)$ where: WID_i = Width index COV_i = Coverage index DIS_i = Dispersion index
		COV	Coverage index	Is the percentage of aspects disclosed by the company out of the total number of aspects being evaluated (14).
		DIS	Dispersion index	$\frac{\text{the number of words in each sub} - \text{topic}}{\text{total number of words that pertain to the business model}}$
	Depth	DEP	Depth index	$\frac{\text{Quality score based on scoring index table}}{\text{Maximum quality score}}$ where: Maximum quality score = Number of items on disclosure index X Maximum possible score