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Qualitative Approach to Analyze Business Disclosures – A Content Analysis Perspective

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Abstract

The main purpose of this paper is to present various qualitative aspects, issues, and methodologies that have been involved in accounting and disclosure research. Specifically, matching to current research trend. This article outlines various key principles and issues involved in qualitative approach to undertake research based on business disclosures. As a result, the study outlines the main issues involved in disclosure research in an illustrative way by considering principles, procedures to be followed in employing qualitative approach. As an illustrative qualitative approach to analyze business disclosures, the study will help scholars make an informed choice when selecting a qualitative approach for their study. The paper demonstrates the potential of content analysis technique in business disclosure research by employing various illustrative examples that are related to current research.

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1. Introduction

Business disclosure is a key site of interest for qualitative researchers, and many scholars across the social sciences employ qualitative methods to study business disclosures (Hahn, and Lülfs, 2014). The accounting and business

disclosures are key documents that speaks about the performance outlook of business organizations (Kavitha & Nandagopal, 2011). Qualitative research approach is well-suited to analyze the pattern of business disclosure so as to achieve the particular research objective (Parker and Northcott, 2016.). However, there remains substantial scope for social science researchers in general, and business researchers in particular, to expand their involvement in carrying the qualitative research based on the information communicated in business disclosures (Kenno, et al., 2017).

Even there are many qualitative approaches to carry research in business disclosures, content analysis technique gained more prominence in accounting and disclosure research that allows researchers to analyze large amounts of textual data (Vourvachis, and Woodward, 2015). In this context, textual data means the textual and numeric information communicated by companies in their business reports (Li, 2010). Conducting statistical analysis to attain a specific research goal through readymade information on business organizations is an easy task. But gathering both quantitative and qualitative information from business reports needs some scientific procedures (Guthrie & Abeysekera 2006; Steenkamp & Northcott, 2007; Kavitha & Nandagopal, 2011). Quantitative information in business reports means the data pertaining to the presence and absence of specific aspects. For example, examining the presence ‘1’ and absence ‘0’ of significant accounting policy in business reports (Pistoni, et al., 2018). Whereas qualitative information in business reports means the data representing the extent, nature, and depth of information on a particular aspect. For example, examining the type of accounting policy adopted, method of recognition, measurement, and disclosure is followed on a particular financial event (Michelon et al., 2020). Further, non-financial information and their disclosures also getting more prominence during recent days, therefore, conducting research based on vast content published in business reports matters many qualitative methodological issues (Fouché and Uys, 2023). Such methodological issues are essential to examine how business disclosures catering the information needs of various stakeholders, modes of interpretation of reports, and the conversion of textual data into numerical data so as to assist various interested parties for their decision-making process (Dumay and Cai, 2015).

However, there are many literatures debated on disclosure research (Previts, et al., 1994; Peters & Bagshaw, 2014; Xie et al.,2019). There is a lack of detailed methodological dialogue about how one might use qualitative methods in a scientific way so as to match the current trend in disclosure research domain (Fouché and Uys, 2023). The existing literature has rarely discussed on qualitative research methodology, particularly on business and non-financial disclosure research aspects such as sustainability accounting research, green business practices, integrated reporting practices etc., and there have been fewer attempts have been made to formalize, refine and redevelop the methodology particularly on integrated business disclosures. This is not mean that there are no literatures dedicated to outline the principles, procedures and methodological issues that ought to guide the interpretation of business disclosures. However, this paper argues, genuinely an illustrative approach that is different from earlier literatures and that exclusively guides the current business disclosure research.

Thus, this article intends to offer a qualitative approach to analyze business disclosures so as to achieve particular research objective.

Further, the article offers accounting scholars the methodological foundation that are necessary to support qualitative

analysis of business reports. In this article, an attempt has been made to explain the systematic procedure involved in content analysis, developing disclosure indices, and statistical analysis of the same to achieve the specific objective of accounting research. This paper is of conceptual nature and helps to accounting researchers to understand the scientific way of data collection and analysis from business reports.

2. Methodological Aspects Involved in Content Analysis

Content analysis involves the identification and analysis of patterns and themes in textual data (Guthrie & Abeysekera 2006; Steenkamp & Northcott, 2007; Kavitha & Nandagopal, 2011). Accounting and disclosure research involves analyzing financial reports, disclosures, and other financial information to identify patterns and themes that may provide insights into a company's financial performance (Previts, et al., 1994; Peters & Bagshaw, 2014; Xie et al.,2019). To do this gathering required information on particular context from the business reports involves various steps (Breton & Taffler, 2001; Dumay & Cai 2014; Guthrie, 2014; Dumay & Cai, 2015) and also see Fig.1.

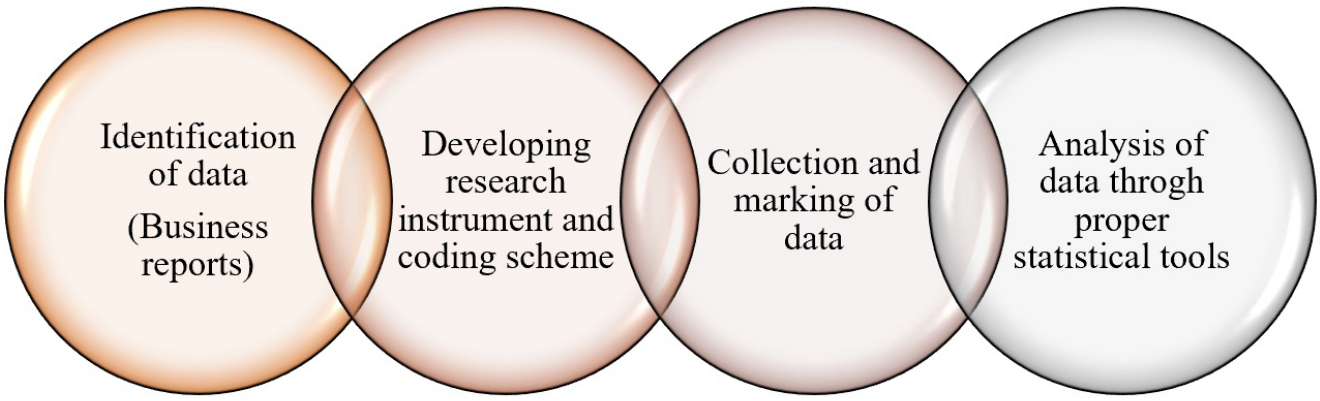

Figure 1. Qualitative approach to gather data through content analysis

Source: Author compiled

Figure 1: Content Analysis Procedure

The first step in content analysis is to identify the relevant data to be analyzed. In accounting and disclosure research, this may include financial statements, auditor reports, and other financial disclosures such as significant accounting policies, management discussion and analysis, corporate governance disclosures, CSR reports, sustainability reports and so on.

The next step is to develop a coding scheme that will be used to categorize the data. The coding scheme should be based on the research questions and objectives and should be developed in a systematic and objective manner. The coding scheme should be designed to capture the key themes and patterns that are relevant to the research questions. Further, the coding scheme may be based on binary or ordinal coding system and which is totally depends on the nature of study i.e., quantitative or qualitative.

Once the coding scheme (research instrument) has been developed, the data can be coded. This involves reading through the data and categorizing it according to the coding scheme by using either binary (0 or 1) or ordinal (1 to 5) scores. The coding should be done in a systematic and consistent manner to ensure that the results are reliable and valid.

Finally, the data can be analyzed using statistical methods to identify patterns and relationships. The results can then be used to draw conclusions and make inferences about the financial performance of companies.

This process varies depending upon the research purpose and some may use to develop disclosure indices to make analysis more meaningful (Marston & Shrives, 1991; Bin Ali Khan et al., 2011).

3. Areas of Applications of Content Analysis in Accounting and Disclosure Research

Content analysis has been used extensively in accounting and disclosure research to analyze financial reports, disclosures, and other financial information (Boolaky, 2006). Some of the areas of applications of content analysis in accounting and disclosure research include:

a. **Financial Performance Analysis:** Content analysis can be used to analyze financial reports and disclosures to identify patterns and trends in financial performance. This can include analyzing financial ratios, trends in revenue and expenses, and other key financial indicators. Further, it may also use to analyze the relationship between business performance and financial position so as to critically evaluate the financial strengths and weaknesses of the business organizations (Jones & Shoemaker, 1994; Bin Ali Khan et al., 2011).
b. **Disclosures Analysis:** Content analysis can be used to analyze business and financial disclosures to identify patterns and trends in disclosure practices. This can include analyzing the level of disclosure, the quality of disclosure, and the consistency of disclosure across companies. Further, through content analysis regulatory compliance of companies, accountability of companies to various stakeholders can also be done (Patel & Dallas, 2002; Ettredge et al., 2011).
c. **Earnings Management Analysis:** Content analysis can be used to identify patterns and trends in earnings management practices. This can include analyzing the use of accruals, the timing of revenue recognition, and other earnings management techniques (Jo & Kim, 2007; Sofian et al., 2022; Almahrog et al., 2018).
d. **Corporate Social Responsibility Analysis:** Content analysis can be used to analyze corporate social responsibility disclosures to identify patterns and trends in CSR practices. This can include analyzing the level of CSR disclosure, the quality of CSR disclosure, and the consistency of CSR disclosure across companies. Further, it can also be used for evaluating the firms' commitment towards CSR activities as per established frameworks (Lock & Seele, 2016; Landrum & Ohsowski, 2018). In addition, content analysis is also useful to evaluate and study the corporate contributions toward the environment and sustainable development at large. These two aspects are more debated aspects in the corporate reporting environment, with the help of content analysis of business reports on these aspects stakeholders may cultivate their own opinion on such companies while making their decisions (Parker, 2014; Torelli et al., 2020).
e. **Risk Management Disclosures Analysis:** risk management disclosure is also one of the new business disclosure

trend. Through this disclosure companies can create good image in the market. The content analysis may also be applied to examine the pattern of risk management disclosures scientifically (Lajili & Daniel, 2005; Heinle & Smith, 2017; Ibrahim & Hussainey, 2019).

4. Disclosure indices in accounting research

Disclosure indices and content analysis are commonly used in accounting and disclosure research to analyze financial reports, disclosures, and other financial information to provide insights into the financial affairs of companies (Cheung et al., 2010; Hassan& Marston, 2019). Some of the applications of disclosure indices and content analysis in accounting and disclosure research include:

a. **Quality of Financial Reporting:** Disclosure indices and content analysis can be used to measure the quality of financial reporting by analyzing the financial reporting practices of companies in confirmation with various qualitative characteristics of financial reporting such as reliability, completeness, and other aspects. Through disclosure indices, the ability of business reports in fulfilling the stakeholders' information can be assessed in a quantitative manner (Steenkamp & Northcott, 2007; Gallery et al., 2008; Kavitha & Nandagopal, 2011).
b. **Earnings Management:** Disclosure indices and content analysis can be used to identify patterns and trends in earnings management practices by analyzing the use of accruals, the timing of revenue recognition, and other earnings management techniques. Further, it also can be used to assess the influence of various factors on earnings management of the firm with the help of information communicated through business reports (Almahrog et al., 2018; Jeanjean & Stolowy, 2008).
c. **Corporate social responsibility, sustainability, and integrated reporting practices:**today business reporting has transformed from traditional financial reporting to integrated reporting. The research concentrating on the examination and evaluation of such reporting practices can also be done with the help of Disclosure indices and content analysis (Parker, 2014; Torelli et al., 2020). Further, it can also be used to measure the level and quality of disclosure practices by analyzing the completeness and quality of disclosures related to environmental impact, labor practices, and community involvement (Marx & Mohammadali-Haji, 2014; Lock & Seele, 2016; Landrum & Ohsowski, 2018).

5. Procedure of construction of Disclosure Indices

Disclosure indices are commonly used in content analysis to measure the extent and quality of disclosures made by companies. Researchers usually rely on either published indices or unpublished indices. If they relied on unpublished indices then, it is necessary to construct indices separately (Buzby, 1975; Stanga, 1976 & Hooks et al., 2002). The construction of a disclosure index involves several steps, including selecting disclosure items, scoring the items, and weighting the scores (also see Fig. 2). This article provides a detailed overview of the procedures for constructing disclosure indices and their types. The procedures involved in constructing disclosure indices are:

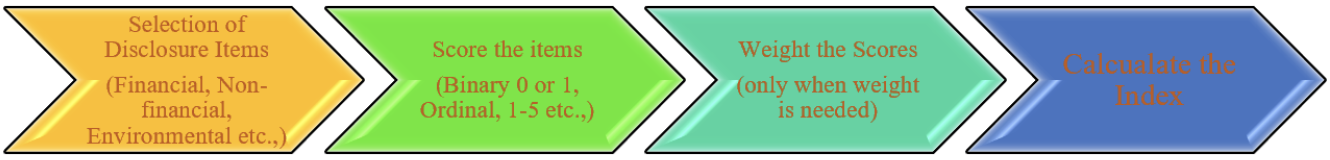

Figure 2. Disclosure Index Development Procedure

Source: Author compiled

Figure 2: Steps involved in construction of disclosure index

a. **Select Disclosure Items:** The first step in constructing a disclosure index is to identify a set of disclosure items that are relevant to the research question or objective. The items should be specific and measurable. For example, a disclosure index for corporate social responsibility might include items such as environmental impact, labor practices, and community involvement.
b. **Score the Items:** Once the disclosure items have been selected, they need to be scored based on the extent and quality of disclosure provided by the company. The scoring system can be binary (0 or 1), ordinal (1 to 5), or continuous (0 to 10). The scores should reflect the completeness and quality of the disclosure. This is totally based on nature of study. If the study's purpose is to quantitative measurement of disclosure practice i.e., presence or absence of disclosure elements in the business reports then, binary code has to be used(Marston & Shrives, 1991). If the purpose is to assess the qualitative aspect the ordinal or continuous scoring method has to be used (Guthrie & Abeysekera 2006; Steenkamp & Northcott, 2007; Kavitha & Nandagopal, 2011).
c. **Weight the Scores:** After the items have been scored, they need to be weighted to reflect their importance. The weighting can be equal or based on expert judgment (Buzby, 1975; Stanga, 1976 & Hooks et al., 2002). For example, a disclosure item that is considered more important may be given a higher weight than a less important item. The assignment of weights to the score arises only when the researcher needs to give importance to disclosure elements (Benjamin, & Stanga, 1977; Kavitha & Nandagopal, 2011).
d. **Calculate the Index:** Finally, the disclosure index can be calculated by summing the scores for each disclosure item and multiplying them by their respective weights. The index can then be normalized to a scale of '0 to 100 or 0 to 1' for ease of interpretation.

6. Types of Disclosure Indices

In this paper, an attempt has also been made to explain the various types of disclosure indices along with illustrative instances

6.1. Unweighted disclosure indices

An unweighted disclosure index is a simple way to measure the level or quality of disclosure in a particular domain or industry, without assigning different weights to individual disclosure items. In an unweighted disclosure index, each

disclosure item is given equal importance, and the index score is calculated as the sum of all the scores for each disclosure item. This index is very simple to calculate and not biased. Because it assumes all the disclosure elements considered for the study are equally important (Cooke, 1991; Benjamin, & Stanga, 1977; Kavitha & Nandagopal, 2011).

For instance, let's assume a study is related to companies' corporate social responsibility (CSR) reporting practices in a particular industry. The study identifies 10 disclosure items as per CSR regulations and framework applicable to CSR reporting in the industry, these elements are:

1. Employee benefits and working conditions(EBWC)
2. Environmental impact assessment(EIA)
3. Supply chain management and fair trade practices(SCM)
4. Community outreach and philanthropy(COP)
5. Product safety and quality assurance(PSQA)
6. Diversity and inclusion policies(DIP)
7. Anti-corruption and ethics policies(ACCP)
8. Board of Directors Composition and Independence(BODC)
9. Executive compensation and accountability(ECA)
10. Risk management and crisis response planning(RMCRP)

The study then collects gathered the information through content analysis on the extent to which each company discloses information on each of these items, using a scoring system such as 0-5 or 0-10. The scores for each item are then added up to create an unweighted disclosure index score for each company. Unweighted disclosure indices can be useful when the researcher wants to avoid assigning subjective weights to individual disclosure items, or when the relative importance of different items is not well established or agreed upon. However, unweighted indices may oversimplify the complex nature of disclosure practices, and may not reflect the relative importance of different disclosure items to stakeholders or the industry(Cooke, 1991).

For example, let's say the scores for a sample of three companies in the industry are as follows:

Table 1. Disclosure Scores of companies of food and beverage industry

Disclosure Items	Company-1	Company-2	Company-3
EWC	4	6	5
EIA	6	7	5
SCM	3	4	2
COP	5	6	4
PSQA	7	8	6
DIP	2	3	2
ACCP	5	6	4
BODC	3	4	2
ECA	4	5	3
RMCRP	2	3	1
Total Score	41	52	34
Index	**.41(41/100)**	**.52(52/100)**	**.34(34/100)**

Source: Authors compiled

In this instance, Company 2 has the highest unweighted disclosure index score of 52, indicating that it discloses more information on the 10 disclosure items than the other companies in the sample. Company 3 has the lowest score of 34, indicating that it discloses less information on the 10 disclosure items than the other companies in the sample.

6.2. Weighted disclosure indices

These disclosure indices are usually employed only when researchers needed to give importance to disclosure elements among many elements. This requires more effort in finalizing the weights of such elements. Usually, weights are finalized based on the opinions of experts on concerned area of research. The various types of these indices are:

Comprehensive Disclosure Index: A comprehensive disclosure index is designed to capture all relevant disclosure items in a particular area. For example, a comprehensive disclosure index for corporate social responsibility might include items such as environmental impact, labor practices, and community involvement.

The formula for calculating a comprehensive disclosure index is:

Comprehensive Disclosure Index = (Sum of Scores for all Disclosure Items X Weight for each Disclosure Item) / Total Weight of all Disclosure Items

The comprehensive disclosure index is calculated by adding up the scores for all the disclosure items, multiplied by their respective weights, and dividing by the total weight of all the disclosure items. The resulting value can be normalized to a scale of 0 to 100 for ease of interpretation.

The Comprehensive Disclosure Index (CDI) is a measure used to evaluate the level of voluntary disclosure of a company in its financial reporting. It assesses the extent to which a company provides relevant information to its stakeholders

beyond what is legally required.

The CDI score is calculated by assigning points to various disclosure items, such as financial statements, accounting policies, and risk management information. The total points achieved are then divided by the total possible points to obtain a percentage score. A higher CDI score indicates a higher level of disclosure.

Let's assume that a company has disclosed information on the following items:

- Financial statements: 10 points
- Accounting policies: 5 points
- Risk management information: 8 points
- Corporate governance: 6 points
- Environmental and social impact: 7 points

The total points achieved by the company would be 36. If the total possible points for all the disclosure items were 50, then the CDI score for this company would be:

CDI score = (36/50) x 100% = 72%

A CDI score of 72% indicates that the company has disclosed a significant amount of information voluntarily, beyond what is legally required. However, it also suggests that there may be some areas where the company could improve its disclosure practices.

If weights are used to reflect the relative importance of different disclosure items, the CDI score calculation would involve multiplying the points achieved for each item by its corresponding weight before adding up the total points achieved.

For example, let's say that the weights for the same disclosure items as in the previous example are as follows:

- Financial statements: 0.4
- Accounting policies: 0.2
- Risk management information: 0.3
- Corporate governance: 0.1
- Environmental and social impact: 0.2

Using these weights, the points achieved by the company for each item would be multiplied by its corresponding weight before being added up to calculate the total points achieved.

Total points achieved = (10 x 0.4) + (5 x 0.2) + (8 x 0.3) + (6 x 0.1) + (7 x 0.2) = 8.8

If the total possible points for all the disclosure items were 25, then the CDI score for this company would be:

CDI score = (8.8/25) x 100% = 35.2%

A CDI score of 35.2% indicates that the company has disclosed a relatively low amount of information voluntarily, given

the importance assigned to each disclosure item by its weight. This suggests that there is significant room for improvement in the company's disclosure practices.

Specific Disclosure Index: A specific disclosure index is designed to capture disclosure items related to a particular research question or objective. For example, a specific disclosure index for earnings management might include items such as accruals, discretionary expenses, and revenue recognition.

The formula for calculating a specific disclosure index is:

Specific Disclosure Index = (Sum of Scores for all Relevant Disclosure Items X Weight for each Relevant Disclosure Item) / Total Weight of all Relevant Disclosure Items

The specific disclosure index is calculated by adding up the scores for all the relevant disclosure items, multiplied by their respective weights, and dividing by the total weight of all the relevant disclosure items. The resulting value can be normalized to a scale of 0 to 100 for ease of interpretation.

The specific disclosure index is designed to capture disclosure items related to a particular research question or objective. Therefore, only the relevant disclosure items are included in the calculation of the index.

The Specific Disclosure Index (SDI) is a measure that focuses on a specific area of disclosure, such as environmental or social responsibility. It is calculated by dividing the number of disclosure items related to the specific area by the total number of disclosure items examined and multiplying the result by 100.

Let's consider an example of an SDI for a company's environmental disclosures. Suppose a research study analyzed the annual reports of a company and identified a total of 20 disclosure items, out of which 5 are related to the company's environmental performance. The SDI for the company's environmental disclosures can be calculated using the following formula:

SDI = (Number of Environmental Disclosure Items / Total Number of Disclosure Items Examined) x 100%

In this example, the SDI for the company's environmental disclosures would be:

SDI = (5/20) x 100% = 25%

This indicates that 25% of the company's disclosures are related to environmental performance. A higher SDI would suggest a greater emphasis on a particular area of disclosure. The SDI can be calculated for other areas of disclosure as well, such as social responsibility, corporate governance, or financial reporting.

If weights are used in calculating the Specific Disclosure Index (SDI), then the formula would be slightly modified. The weighted SDI would be calculated by assigning weights to each disclosure item related to the specific area and then dividing the sum of the weighted scores by the total sum of the weights assigned to all disclosure items examined.

Let's consider the same example as before where a research study analyzed the annual reports of a company and identified a total of 20 disclosure items, out of which 5 are related to the company's environmental performance. However,

in this case, let's assume that weights were assigned to each of the five environmental disclosure items based on their relative importance, as determined by expert opinion or stakeholder surveys.

For example, let's assume that the weights assigned to the five environmental disclosure items are as follows:

- Carbon Emissions - 30%
- Water Usage - 20%
- Waste Management - 25%
- Environmental Policies - 15%
- Environmental Performance Targets - 10%

The weighted SDI for the company's environmental disclosures can be calculated using the following formula:

Weighted SDI = (Weighted Score for Item 1 + Weighted Score for Item 2 + Weighted Score for Item 3 + Weighted Score for Item 4 + Weighted Score for Item 5) / (Total Weight Assigned to All Disclosure Items Examined) x 100%

The weighted score for each environmental disclosure item is calculated as follows:

Weighted Score for Item = (Weight for Item) x (Presence of Disclosure Item)

Where the presence of a disclosure item would be equal to 1 if the company has disclosed information related to that item and 0 if it has not.

For example, if the company has disclosed information related to carbon emissions and waste management, but has not disclosed information related to water usage, environmental policies, or environmental performance targets, then the presence of disclosure items would be:

- Carbon Emissions - 1
- Water Usage - 0
- Waste Management - 1
- Environmental Policies - 0
- Environmental Performance Targets - 0

Plugging in the numbers for this example, we get:

Weighted Score for Item 1 = (0.3) x (1) = 0.3 Weighted Score for Item 2 = (0.2) x (0) = 0 Weighted Score for Item 3 = (0.25) x (1) = 0.25 Weighted Score for Item 4 = (0.15) x (1) = 0.15 Weighted Score for Item 5 = (0.1) x (0) = 0

Therefore, the weighted SDI for the company's environmental disclosures would be:

Weighted SDI = (0.3 + 0 + 0.25 + 0.15 + 0) / (0.3 + 0.2 + 0.25 + 0.15 + 0.1) x 100% = 44.83%

In this example, the company has a weighted SDI of 44.83%, indicating that it has disclosed information related to 2 out of the 5 environmental disclosure items examined, with a relatively higher weight assigned to carbon emissions and waste

management.

Disclosure Quality Index: A disclosure quality index is designed to measure the overall quality of disclosures made by a company. This type of index typically includes items related to the completeness, accuracy, and relevance of disclosures.

The formula for calculating a disclosure quality index is:

Disclosure Quality Index = (Sum of Scores for all Disclosure Quality Items * Weight for each Disclosure Quality Item) / Total Weight of all Disclosure Quality Items

The disclosure quality index is calculated by adding up the scores for all the disclosure quality items, multiplied by their respective weights, and dividing by the total weight of all the disclosure quality items. The resulting value can be normalized to a scale of 0 to 100 for ease of interpretation.

The disclosure quality index is designed to measure the overall quality of disclosures made by a company. This type of index typically includes items related to the completeness, accuracy, and relevance of disclosures. Therefore, only disclosure quality items are included in the calculation of the index.

The Disclosure Quality Index (DQI) is a measure that takes into account both the quantity and quality of disclosure items. It assigns a weight to each disclosure item based on its relative importance, and then calculates the index score as the sum of the weighted scores for each disclosure item.

Let's consider a hypothetical example of a DQI for a company's financial reporting, which includes four disclosure items:

- Revenue Recognition criteria
- Depreciation methods and procedures
- Inventory Valuation procedures
- Income Tax

The weight assigned to each disclosure item can be determined through a variety of methods, such as expert opinion, stakeholder surveys, or statistical analysis. For this example, let's assume that expert opinion was used to assign the following weights:

- Revenue Recognition - 30%
- Depreciation - 20%
- Inventory Valuation - 25%
- Income Tax - 25%

Next, the quality of disclosure for each item can be rated on a scale of 0-10, with 10 being the highest quality. Let's assume that the company's disclosure quality scores for each item are as follows:

- Revenue Recognition - 8
- Depreciation - 6

- Inventory Valuation - 9
- Income Tax - 7

To calculate the DQI for this company's financial reporting, we can use the following formula:

DQI = (Weighted Score for Item 1) + (Weighted Score for Item 2) + (Weighted Score for Item 3) + (Weighted Score for Item 4)

The weighted score for each item is calculated as follows:

Weighted Score for Item = (Weight for Item) x (Quality Score for Item)

Plugging in the numbers for this example, we get:

Weighted Score for Item 1 = (0.3) x (8) = 2.4 Weighted Score for Item 2 = (0.2) x (6) = **1.2** Weighted Score for Item 3 = (0.25) x (9) = 2.25 Weighted Score for Item 4 = (0.25) x (7) = **1.75**

Therefore, the DQI for this company's financial reporting is:

DQI = 2.4 + 1.2 + 2.25 + 1.75 = 7.6

In this example, the company has a DQI of 7.6 out of a possible 10, indicating that its financial reporting has a relatively high level of quality and quantity of disclosure across the four items.

Disclosure Index for Comparative Analysis: A disclosure index for comparative analysis is designed to compare the level and quality of disclosures made by different companies in the same industry or sector. This type of index typically includes items that are relevant to the industry or sector being analyzed.

For instance, Let's say we have three companies in the oil and gas industry, and we want to compare their level and quality of environmental disclosures. We have identified five disclosure items that are relevant to the industry, and we have assigned weights to each item based on its importance to environmental reporting in the industry. The disclosure items and their weights are as follows:

- Disclosure Item 1: Greenhouse Gas Emissions Reporting (Weight = 30%)
- Disclosure Item 2: Water Usage Reporting (Weight = 20%)
- Disclosure Item 3: Waste Management Reporting (Weight = 15%)
- Disclosure Item 4: Renewable Energy Reporting (Weight = 25%)
- Disclosure Item 5: Environmental Impact Assessment Reporting (Weight = 10%)

Table 2. Company's level of disclosure for each item on a scale of 0 to 10.

Disclosure Items	Company1	Company2	Company3
1	8	7	9
2	6	8	7
3	7	6	8
4	5	7	6
5	4	6	5

Source: Author compiled

To calculate the comparative disclosure index for each company, we multiply the scores for each disclosure item by their respective weights, and then add up the weighted scores. Finally, we divide the sum of weighted scores by the total weight of all the disclosure items.

For Company 1, the calculation would be:

[(80.3) + (60.2) + (70.15) + (50.25) + (4X0.1)] / 1 =**6.6**

For Company 2, the calculation would be:

[(70.3) + (80.2) + (60.15) + (70.25) + (6X0.1)] / 1 =**6.85**

For Company 3, the calculation would be:

[(90.3) + (70.2) + (80.15) + (60.25) + (5X0.1)] / 1 =**7.1**

The resulting comparative disclosure index scores range from 0 to 10, with higher scores indicating higher levels of disclosure. In this example, Company 3 has the highest index score of 7.1, indicating that it discloses more environmental information than the other companies in the sample. Company 1 has the lowest index score of 6.6, indicating that it discloses less environmental information than the other companies in the sample.

7. Assigning weights to construct weighted disclosure index

Assigning weights to each disclosure item in a comparative disclosure index is a subjective process that depends on the researcher's judgment and the purpose of the study (Cooke, 1991; Benjamin, & Stanga, 1977; Kavitha & Nandagopal, 2011). Assigning weights for disclosure scores can be made based on the following assumptions:

Importance: Assign higher weights to disclosure items that are more important or material to the industry or the stakeholders. For example, in an environmental disclosure index for the oil and gas industry, greenhouse gas emissions reporting may be assigned a higher weight than waste management reporting, because it is a more significant environmental impact of the industry.

Availability: Assign higher weights to disclosure items that are less commonly reported or harder to obtain, as they may

provide more valuable information to stakeholders. For example, if renewable energy reporting is less common in the industry, it may be assigned a higher weight to incentivize companies to disclose this information.

Relevance: Assign weights that reflect the relative importance of each disclosure item to the specific research question or objective. For example, if the research objective is to compare the environmental performance of companies in the industry, then disclosure items that are more directly related to environmental impact may be assigned higher weights.

Consensus: Consider the opinions of experts or stakeholders in the industry to determine the relative importance of each disclosure item. For example, if a group of environmental organizations, investors, or regulators have identified specific disclosure items as important for the industry, their opinions may be used to assign weights.

Ultimately, the weighting scheme should be transparent and justified in the research methodology, so that readers can understand the rationale behind the weights assigned and evaluate the validity of the comparative disclosure index.

8. Reliability and validity of disclosure indices

Reliability and validity tests are important for any research tool, including content analysis and disclosure indices. Reliability refers to the consistency and stability of a research tool, while validity refers to the accuracy and appropriateness of the tool in measuring the construct it intends to measure (Beattie, et al. 2004).

8.1. Reliability Test for Content Analysis Tool

One common test for the reliability of a content analysis tool is inter-coder reliability, which measures the consistency of different coders in coding the same set of data (Milne & Adler, 1999). For example, if two or more coders code the same set of data using the same content analysis tool, inter-coder reliability can be calculated by comparing the level of agreement between the coders' coding results. One commonly used measure of inter-coder reliability is Cohen's kappa coefficient, which measures the level of agreement between two coders beyond chance.

For example, suppose we develop a content analysis tool to analyze news articles for their level of gender bias. We have two coders who use the tool to code a set of 50 news articles. After coding, we compare the coding results and calculate Cohen's kappa coefficient, which gives a value of 0.85. This indicates a high level of inter-coder reliability, indicating that the content analysis tool is consistent and stable in its measurement of gender bias in news articles.

8.2. Validity Test for Disclosure Indices

One common test for the validity of a disclosure index is construct validity, which refers to the degree to which a disclosure index measures the construct it is intended to measure (Krippendorff, 1980). For example, if we develop a disclosure index to measure the level of corporate social responsibility (CSR) disclosure in company annual reports, we need to ensure that the index is measuring the construct of CSR disclosure accurately.

One way to test the construct validity of a disclosure index is to compare it with other measures that are known to be related to the same construct. For example, we can compare the scores on our CSR disclosure index with other measures of CSR, such as the Dow Jones Sustainability Index or the Global Reporting Initiative. If there is a high level of correlation between our CSR disclosure index and these other measures of CSR, it indicates that our index is measuring the construct of CSR disclosure accurately.

For example, suppose we develop a CSR disclosure index and apply it to a sample of 100 companies. We also collect data on the companies' sustainability performance from the Dow Jones Sustainability Index. After analyzing the data, we find a high level of correlation ($r = 0.87$) between our CSR disclosure index and the sustainability performance scores, indicating that our index is measuring the construct of CSR disclosure accurately.

In summary, reliability and validity tests are important for ensuring the accuracy and appropriateness of research tools, including content analysis and disclosure indices. By testing for reliability and validity, we can ensure that our research tools are consistent, stable, and accurate in their measurement of the constructs we are interested in.

8.3. Internal Consistency Reliability

This procedure assesses the consistency of the measurements obtained from different items within the same tool. The tool is administered to a group of participants, and the scores obtained for each item are compared using a statistical measure such as Cronbach's alpha (Sydserff & Weetman, 1999).

For example, suppose we have a disclosure index with 10 items. We administer the index to a group of participants, and calculate the Cronbach's alpha value to be 0.85. This indicates that the items in the index are highly correlated with each other and consistently measure the same construct, and therefore the index has good internal consistency reliability.

8.4. Validity Testing Procedures

Validity test is done to assess the strength of the conclusions drawn from the content analysis tool (Matthes & Kohring, 2008). There are several procedures for testing the validity of a content analysis tool or disclosure index. Here are two commonly used ones:

Face Validity: This procedure assesses the extent to which a tool appears to measure what it is supposed to measure. Experts in the relevant field are asked to review the tool and provide their opinions on whether it appears to measure the intended construct.

For example, suppose we have a content analysis tool that measures the portrayal of gender roles in advertisements. We ask experts in the field of gender studies to review the tool and provide their opinions on whether it appears to measure gender roles in advertisements. If the experts agree that the tool appears to measure gender roles in advertisements, then the tool has good face validity.

Criterion Validity: This procedure assesses the extent to which a tool correlates with an external criterion that is known

to measure the same construct. The tool is administered to a group of participants along with the external criterion, and the scores obtained are compared using a statistical measure such as Pearson's correlation coefficient (Wancata et al., 2006).

9. Statistical tools may be applied for analysis of data in disclosure studies

The statistical tests to be employed for the analysis of content analysis and disclosure indices depend on the research questions, hypotheses, and data characteristics. Here are some examples of statistical tests that can be employed based on different contexts:

9.1. *Statistical tools may be used for the data gathered from Content Analysis*

Frequency Analysis: This test counts the number of times a particular word, phrase, or theme occurs in a dataset and is used to describe the content of the dataset.

Chi-square Test: This test is used to determine whether there is a significant association between two categorical variables. For example, it can be used to test whether there is a significant association between the gender of the speaker and the type of language used in political speeches.

Regression Analysis: This test is used to determine the relationship between one or more independent variables and a dependent variable. For example, it can be used to determine the relationship between the frequency of a particular theme in news articles and public opinion on a particular issue.

9.2. *Statistical and econometric tools may be used for the data gathered from content analysis and constructed disclosure indices*

Descriptive Statistics: This test is used to describe the distribution of a dataset. For example, it can be used to describe the distribution of scores on a disclosure index.

Cronbach's Alpha: This test is used to assess the internal consistency reliability of a disclosure index. It is used to determine whether the items in the index are measuring the same construct.

Factor Analysis: This test is used to identify the underlying factors that contribute to the variation in the scores on a disclosure index. For example, it can be used to determine whether the items in a disclosure index are measuring different aspects of corporate social responsibility.

Correlation Analysis: This test is used to determine the strength and direction of the relationship between two continuous variables. For example, it can be used to determine the correlation between the scores on a disclosure index and the financial performance of a company.

Regression Analysis: This test is used to determine the relationship between one or more independent variables and a dependent variable. For example, it can be used to determine the relationship between the scores on a disclosure index and the market value of a company.

It is important to note that the choice of statistical tests depends on the research question, data characteristics, and the assumptions of the statistical tests. Therefore, it is important to consult with a statistician or a research expert before selecting the appropriate statistical tests for the analysis.

Econometric tools are statistical methods used to analyze economic data. These tools are used to test economic theories and models, estimate economic parameters, and make forecasts. Here are some examples of econometric tools:

Time Series Analysis: Time series analysis is a statistical method used to analyze time series data, which is data that is collected at regular intervals over time. This tool is used to identify trends and patterns in economic data and make forecasts (Brockwell & Davis, 2016). For instance, if a researcher wants to analyze the decision pattern of companies based on financial variables such as stock prices, interest rates, exchange rates over the time, this tool can be used.

Panel Data Analysis: Panel data analysis is a statistical method used to analyze data that contains observations on multiple individuals or entities over time. This tool is used to estimate the effects of variables that vary across individuals or entities (Wooldridge. 2010). For instance, the researcher may use this tool in case of determinants of financial reporting choices, determinants of auditing behavior, tax policy on firm behavior, CSR policy on firms' performance and so on.

Instrumental Variables Analysis: Instrumental variables analysis is a statistical method used to address endogeneity in regression analysis. Endogeneity occurs when there is a correlation between the independent variables and the error term in the regression equation. This tool is used to estimate causal relationships between variables (Bound et al., 1995). This can be used for studying financial reporting quality, earnings management practices, effect of corporate governance practices on firm outcomes.

Monte Carlo Simulation: Monte Carlo simulation is a statistical method used to model complex systems and estimate the probability of different outcomes. This tool is used to analyze economic scenarios and make forecasts (Kroese et al., 2014). This tool can be employed in financial planning, performance evaluation, investment analysis, and financial risk management studies.

Bayesian Analysis: Bayesian analysis is a statistical method used to update probabilities based on new data. This tool is used to estimate the probability of different outcomes and make forecasts (Gelman et al., 2013). This tool can also be used in studies that focus on financial forecasting, financial modeling, fraud detection, audit research and accounting standard-setting aspects, and so on.

Econometric tools are used in a wide range of applications in economics, including macroeconomics, microeconomics, finance, and econometrics. They are important tools for economists to test economic theories, estimate economic parameters, and make forecasts.

10. Conclusion

As qualitative approach, content analysis is a powerful research method that can be used to analyze large amounts of textual data. In accounting and disclosure research, content analysis can be used to provide insights into the financial performance of companies, the quality of financial reporting, and other important issues. The use of this qualitative approach in accounting and disclosure research is likely to continue to grow in importance as researchers seek to better understand the financial performance of companies and the quality of financial reporting. This paper contributes to the existing literature on accounting disclosure research that an illustrative approach to disclosure methods in accounting research.

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