




INTEGRATED REPORTING AND COVID-19: A CONCEPTUAL REFERENCE DISCLOSURE INDEX FOR FUTURE PANDEMICS

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ABSTRACT

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The COVID-19 pandemic struck the global community in December 2019 in China and by the beginning of 2020, it had spread to many other countries. The pandemic affected people's lives and most business sectors. Its impact on business organizations warranted disclosure in the integrated reports for information to investors and other stakeholders. In the absence of a known pandemic disclosure framework, some researchers developed a COVID-19 pandemic reporting framework based on the pre-existing integrated reporting framework, literature from medical, scientific and pharmaceutical field journals, newspapers, and specialized websites as well as interviews of various professional investors in 2020 to guide firms in disclosing COVID-19 issues. This framework has not yet been contrasted by researchers to date. With challenges known to exist in trying to determine the extent of the pandemic disclosure, the objective of this study is to develop a conceptual reference disclosure index for future pandemics using the COVID-19 pandemic as a baseline. The pandemic was severe in 2020 but started to abate in 2021 due to the development of vaccines. COVID-19 information was used to develop the proposed index, and it is anticipated that the proposed index will also be useful for future pandemics. The proposed index should be instrumental in determining the extent of the pandemic disclosure by companies, information that is crucial for investors and all stakeholders for decision making. As there is also paucity in literature on COVID-19 because it is a new experience, this study will contribute to the body of literature in this field.

Contribution/Originality: The existing framework for integrated reporting together with the COVID-19 pandemic-specific reporting framework, developed in 2020, do not give guidance and determination of the extent of disclosures. This study developed a disclosure index that can be used as a reference to determine the extent of disclosure for COVID-19 and future pandemics.

1. INTRODUCTION

The COVID-19 pandemic was a new experience when it struck the global community in December 2019 in China and in other countries across the globe in 2020. According to the [OECD \(2020\)](#), the pandemic ignited the worst global economic crisis since the great depression that occurred between 1929 and 1939. The new experiences ushered in by the pandemic caused disruption in people's lifestyles as well as ways of doing business. For stock companies, the impact of COVID-19 warranted disclosure in the companies' integrated reports to provide the much-needed information for investors and other stakeholders. Disclosing the impact of the COVID-19 pandemic in companies' integrated reports is crucial for maintaining businesses' legitimacy regarding value creation for stakeholders ([Deegan,](#)

2019; Denhere, 2022; Parmar et al., 2010). Furthermore, Elmarzouky, Albitar, Karim, and Moussa (2021) argued that disclosure of COVID-19-related information conveys positive signals to both investors and markets. So, when the pandemic struck, it was only natural for both investors and stakeholders to want to know the extent of the impact on business performance by companies across all sectors of the economy.

Comparing integrated reporting with exclusive financial reporting shows that exclusive financial reporting has not been a challenge for firms because it has clear standards and guidelines, such as International Financial Reporting Standards (IFRS), accounting standards that govern the reporting of particular categories of events and transactions. Furthermore, financial reports can be vigorously audited, and external auditors provide assurance. Integrated reporting came to light in 2010 as a comprehensive framework to guide long-term and inclusive business and investment decisions (Value Reporting Foundation, 2018). However, this framework has no clear guiding standards that are binding, and firms are free to decide what information to disclose, but this information is not always subjected to auditing as is done with financial statements (Keddie, 2021). This makes the whole integrated reporting process complex as there is no uniformity on integrated reports from different firms.

The lack of clear guiding standards on integrated reporting makes it difficult to determine the extent of disclosure for non-financial matters, such as environmental, social and governance (ESG) issues, for firms. In 2020, the complexity of integrated reports was compounded by the new COVID-19 pandemic experience requiring listed companies to be innovative in order to report on COVID-19 for their businesses. The pandemic is also another ESG issue which requires firms' disclosure, particularly in the 2020 integrated reports, as this was the year the pandemic struck and was severe in most nations across the globe. Since this was a new experience and there was no framework to guide the reporting of COVID-19 by firms, García-Sánchez, Raimo, Marrone, and Vitolla (2020) drew up a sequence of information pertaining to COVID-19 that should be included in integrated reports to preserve and safeguard legitimacy. Reporting using this information would enable firms to succinctly inform the shareholders and stakeholders about the impact of COVID-19 on their business models and how the firms managed the pandemic (García-Sánchez et al., 2020). Furthermore, the study by García-Sánchez saw the provision of this information as a remedy for firms to acquire legitimacy in the tempestuous environment brought by the pandemic. The information became a useful guide for investors and stakeholders, as well as a guide for firms during the preparation of integrated reports for any future pandemics. Furthermore, García-Sánchez et al. (2020) argued that how firms manage the pandemic's impacts will constitute a material issue for both firms and investors, hence firms would be required to furnish information on these issues. This issue then requires standards that guide its disclosure by firms. It therefore becomes important to determine the extent of disclosing information on this material issue.

Numerous scholars have underscored challenges of integrated reporting (IR) implementation, raising the absence of regulation, lack of assurance, and the obscurity of IR key concepts (Adams, 2017; Dumay, Bernardi, Guthrie, & La Torre, 2017; Dumay & Dai, 2017). There is therefore a lot of rhetoric in IR, and there are calls for more research to assess this rhetoric (La Torre, Bernardi, Guthrie, & Dumay, 2019). According to Lacuzzi, Garlatti, Fedele, and Lombardo (2020) and the International Integrated Reporting Council (IIRC) (2013), it is uncertain how IR is implemented within firms and whether it really steers change as suggested by those who promote it. Hence, development of a conceptual reference disclosure index is an attempt to address the uncertainty of IR implementation. Currently, there is no known COVID-19 disclosure index to indicate the extent of COVID-19 disclosure by firms. This leaves firms free to disclose what they choose, meaning that the users of those reports are faced with a situation where they are not able to tell the adequacy and extent of the disclosure. Furthermore, it was also observed that some firms indulge in greenwashing and fraudulent activities to avoid with ESG commitments (Dzomonda & Fatoki, 2020).

Against this background, this study aims to develop a conceptual reference disclosure index for future pandemics using the COVID-19 pandemic as a baseline. The proposed index could be referred to in the event of future pandemics. The COVID-19 pandemic now seems to be under control, but when it struck it disrupted businesses, and firms struggled with the related disclosure as it was a new experience. The main consumers of the proposed index are

investors. To develop the index, this study used information that should be included in integrated reports according to the COVID-19 disclosure framework, which was developed by [García-Sánchez et al. \(2020\)](#) and has not yet been contrasted by researchers to date. It is also anticipated that the proposed index will be instrumental in determining the extent of pandemic disclosure by companies, providing information that is crucial for investors and all concerned stakeholders to guide them in decision making. The index will provide a base to allow comparison of the extent of COVID-19 disclosure by firms. Furthermore, the proposed index may also be considered for the development of other frameworks in the event of future pandemics.

2. LITERATURE REVIEW

The literature review section covers the theoretical framework, managing stakeholders' expectations using integrated reporting, processes involved in developing a disclosure index, the [García-Sánchez et al. \(2020\)](#) COVID-19 reporting framework, and an empirical literature review.

2.1. Theoretical Framework

This study is based on two theories, namely the legitimacy theory and the signaling theory. [Suchman \(1995\)](#) defined legitimacy theory as “a generalized perception or assumption that the actions of an entity are desirable, proper, and appropriate within some socially constructed system of norms, values, beliefs and definitions”. The theory is anchored on the assumption that a firm's operations should be endorsed as legitimate by the community in which it operates ([Deegan, 2019](#)). To achieve this, firm managers should ensure that their operations conform with community expectations. The theory views firms as constituting a wide social system in which they are not entitled to an innate right to resources but instead should earn this right. Consequently, it is only those legitimate firms that are capable of upholding the right to resources. The theory also assumes that those firms that do not comply with community expectations are deemed illegitimate and the community will impose sanctions on them ([Deegan, 2019](#)). Examples of such sanctions include boycotting the firm's goods and services and their restricting access to the required resources. [Denhere \(2022\)](#) and [Schiopoiu and Popa \(2013\)](#) share the view that this theory drives firms to taking the ESG disclosures seriously to fulfill their social contract. Therefore, a firm should ensure that it upholds legitimacy according to the community for its continued survival. Furthermore, [Adler, Mansi, and Pandey \(2018\)](#) argued that legitimacy can be likened to a social contract, which constitutes a host of implied and explicit community expectations from a firm and how it should conduct its operations.

The legitimacy theory is relevant to this study because pandemic disclosure becomes a necessity for those firms that require legitimacy. The community has to be informed about how a particular firm operated during the pandemic as it was a completely new experience. For instance, the disclosure of COVID-19 automatically became one of the expectations from firms by both investors and the community. Firms that did not disclose pandemic-related issues when expected would be deemed illegitimate by the community. On the other hand, firms knowing what is expected of them by the community might decide to give impressive and unsubstantiated information regarding the pandemic and their operations ([Keddie, 2021](#)).

The signaling theory was developed by [Spence \(1973\)](#), and is based on the communication of information between a sender (signaler) and a receiver. According to [Connelly, Certo, Ireland, and Reutzel \(2011\)](#), the signaling theory is crucial for describing behavior when two parties, either individuals or organizations, access different information about the same issue. In this case, the party that is the sender of information chooses whether and how to communicate (that is the signal) the information, and the other party, the receiver, chooses how to interpret the signal. [Gambetta \(2008\)](#) posited that the signaling theory addresses a basic communication problem. This problem pertains to how the receiver of information establishes how the signaler is conveying the truth about what they want to communicate, which the signaler might want to misrepresent, and contrarily, how the signaler might convince the receiver that they are telling the truth. This usually occurs in a situation where the interests of the signaler and receiver collide or

divide, resulting in the existence of asymmetric information, a situation where the signaler is better informed than the receiver.

The signaling theory is also applicable to this study. The two parties involved in this study are the firms (the signalers) and the investors and other stakeholders (the receivers). The firms communicate their ESG information to the receivers, who are supposed to legitimize them. The firms usually decide on what information they are going to disclose (Keddie, 2021), and investors rely upon the disclosed information to make decisions. However, if there is information asymmetry caused by firms reporting false information in order to earn legitimacy, investors, stakeholders and the community would be misdirected in their decision making and sustainable investment would therefore be hampered. Van Zijl, Maroun, and Wöstmann (2017) argued that, from a signaling viewpoint, ESG reporting goes beyond social or political significance, but can affect a firm's operations and exert influence on the firm's capability to generate earnings (Integrated Reporting Committee South Africa (IRCSA), 2011; Van Zijl et al., 2017). Consequently, high quality ESG reports reduce information asymmetry as well as the cost of equity as they signal effective management of potential business risks by firms (De Klerk, De Villiers, & Van Staden, 2015; Van Zijl et al., 2017). A growing body of research supports this view as it has established a positive correlation between non-financial reporting and return on equity, the quality of a firm's management, and the perceived sustainability of a firm (Van Zijl et al., 2017).

2.2. Managing Stakeholders' Expectations using Integrated Reporting

After the realization that traditional financial reporting provides inadequate information on both value creation and sustainability issues, having an integrated reporting framework became the best approach to take (International Integrated Reporting Council (IIRC), 2013). This was the most appropriate option amongst other available models and reporting practices because it provides both disclosure and integrated comprehension of a firm's strategies and policies modeled toward value creation for all stakeholders (International Integrated Reporting Council (IIRC), 2016; Lacuzzi et al., 2020). Integrated reporting (IR) has gained momentum during the past five years with an increase also recorded in academic research in this area (Dumay, Bernardi, Guthrie, & Demartini, 2016). IR addresses the need for legitimacy, accountability and transparency as well as assisting in widely reporting and communicating the benefits to society (Caperchione, Cohen, Manes-Rossi, & Brusca, 2019). This makes it an important mechanism in managing stakeholder expectations. Furthermore, firms are responsible for value creation and stewardship, hence they need to promote value co-creation that can be accounted for and promoted by IR (Lacuzzi et al., 2020).

A stakeholder of a business or firm is described by Corporate Finance Institute (2022) as "any individual, group, or party that has an interest in an organization and the outcomes of its actions". Examples of stakeholders in this case include governments, communities, suppliers, customers, employees, and shareholders. Integrated reports cater for different information needs of various stakeholders who have different interests. Keddie (2021) and Corporate Finance Institute (2022) outlined the following information needs for different stakeholders:

- Customers need information on the quality and value of products and services offered by a firm.
- Employees have a direct stake in a firm and need information on employment income and safety.
- Investors include shareholders and debtholders who are concerned with shareholder value and need information on financial returns.
- Suppliers and vendors sell goods and/or services to firms and need information on revenue and safety.
- Communities are major stakeholders for businesses in their localities and are affected by issues such as economic development, job creation, health, and safety, hence their requirement for information around these issues.
- Governments can also be major stakeholders in businesses, and they need information regarding corporate income taxes, payroll taxes, sales taxes, and gross domestic product (GDP) contributions.

Since investors are an example of stakeholders who commit funds or capital and partly own the business with the expectation of a return on investment, Floeck (2021) and Keddie (2021) indicated that investors would be interested in a firm's financial performance as well as the environmental, social, and governance issues to guide them in decision making. In addition to the obvious financial performance indicators, McNulty (2022) highlighted the ESG issues that investors would want to be informed about. With regard to environmental issues, investors would consider how a firm protects the environment as well as corporate policies that address climate change. Regarding social issues, investors consider how firms manage relationships with employees, suppliers, customers, and the communities in which they operate. For governance issues, investors consider how a firm deals with a company's leadership, executive pay, audits, internal controls, and shareholder rights. All this information is crucial for investors when making decisions related to returns on their investments. These issues all have an impact on investor value creation.

Considering the various information needs of stakeholders, Van Zijl et al. (2017) argued that firms cannot disregard the need to preserve legitimacy through managing stakeholder expectations. The fact that best corporate governance and reporting practices entail justifiable non-financial reporting, warrants inclusion of ESG in firms' communication with stakeholders (Tregidga, Milne, & Kearins, 2014; Van Zijl et al., 2017). Botten (2009) and Van Zijl et al. (2017) posited that information deemed relevant for the most influential stakeholders should be highlighted or stressed in corporate communications. For instance, if a firm considers ESG issues crucial to the business model, it will inform the stakeholders of how it is managing these issues in an effort to conserve or grow firm value as well as reduce the risk of unfavorable choices (Van Zijl et al., 2017). Consequently, ESG disclosures would be included in the principal corporate report. In contrast, if a firm does not consider ESG issues crucial to its business model, the ESG information value is reduced and disclosures will only be provided to please those stakeholders who have limited influence and those who have no direct interest in the firm (Marcia, Maroun, & Callaghan, 2015). Therefore, the extent of disclosure can be compromised, or the information can be incorporated into insignificant parts of the corporate reports.

Van Zijl et al. (2017) posited that firms that provide client-centered services or businesses with a direct connection to the environment and community that tend to consider social and environmental issues as strategically relevant. The explanation is that such firms are subject to pressures from large groups of stakeholders who have a direct interest in the firms. As a result, De Villiers and Van Staden (2011) argued that ESG issues are value-relevant and must be incorporated in integrated reports distinctly as strategic issues. Furthermore, literature has indicated that ESG criteria increasingly inform investment choices for investors. Wagiet (2021) quoted Fatima Vawda, Managing Director at 27four Investment Managers in South Africa, as saying, "ESG is a number one priority for investors domestically and globally. If you are an asset manager, and you do not integrate ESG into your evaluation process of underlying assets, you will not get a seat at the table". This statement confirms how important the information on ESG has become in determining investors' choices.

2.3. Developing a Disclosure Index

Disclosure can be described as the process by which accounting measurements are communicated to users of financial statements and how they are used in decision making (Meiryani, 2019). Literature has shown three common levels of disclosure, namely full, fair, and sufficient (adequate). According to Meiryani (2019), full disclosure with regard to financial reporting refers to a complete and comprehensive disclosure of financial data and management with the aim of informing the general public. This is transparent, complete and honest reporting. Sufficient disclosure prevents misunderstandings, while fair disclosure serves an ethical purpose as it treats all potential users equally (Meiryani, 2019).

A disclosure index was defined by Lemos (2019) as "an indicator of the extent of the disclosure presented by a certain company, relative to certain information, measured by the sum of the items disclosed on the total items considered". A disclosure index can be used to calculate a score for a firm showing a measure of the extent of its

disclosure. However, [Bravo, Abad, and Trombetta \(2009\)](#) argued that the score does not necessarily show the quality of disclosure. Furthermore, [Bravo et al. \(2009\)](#) concurred with [Beattie, McInnes, and Fearnley \(2004\)](#), who stated that quality is a complicated concept with a multifaceted and subjective nature to an extent that there is no theoretical support to enable the construction of representation for the concept.

[Bravo et al. \(2009\)](#) posited that whilst it is common to employ disclosure indices to represent disclosure quality, there is no consensus on the best design. However, most disclosure studies assume that quality of disclosure is expressed in the measure of the level of disclosed information. Three types of indices were identified by [Bravo et al. \(2009\)](#) – the quality index, described as multidimensional in nature; the scope index, which is designed specifically to measure the scope of information; and the quantity index, which measures information disclosed purely with regard to quantity. Considering these different types of indices, [Bravo et al. \(2009\)](#) highlighted that there is no preceding empirical evidence proving the yielding of different results from the use of different measures of voluntary disclosure. This current study developed the quantity index, which is based on the number of disclosure items mentioned in an integrated report.

For this study, the development of the COVID-19 disclosure index was informed by [Hassan \(2012\)](#) from a study titled “A disclosure index to measure the extent of corporate governance reporting by UAE listed corporations”, which crafted the index in three stages. [Hassan \(2012\)](#) based the index on four important sources of relevant information applicable to the UAE jurisdiction. This study follows this method of disclosure index development because the study by [Hassan \(2012\)](#) dealt with governance disclosure, which is an ESG issue just like the COVID-19 pandemic referred to in this current study.

The three stages that were followed by [Hassan \(2012\)](#) in developing the corporate governance reporting index are:

- First stage – Index item selection.
- Second stage – Classification of index items.
- Third stage – Item weightings.

First stage: This stage involves the selection of potential index items from the literature review. The potential items are then classified accordingly and checked against the identified sources of the index items in order to modify the categories and items in the index for harmonization with the regulatory requirements.

Second stage: The stage involves classification of mandatory and value-adding items. Mandatory disclosure is guided by strict regulatory requirements, unlike voluntary disclosure. Consequently, those firms that exercise voluntary disclosure exhibit firm transparency, a situation that reduces information asymmetry between the firm and its stakeholders. Furthermore, firms have the option to disclose or not, but the need for legitimacy might compel them to disclose. However, the current study treats all disclosure items from the study by [García-Sánchez et al. \(2020\)](#) as both mandatory and value-adding because the framework did not categorize them as such.

Third stage: Several studies on the disclosure index have attempted to evaluate both quantity and quality of disclosure. To accomplish this, some studies employed surveys, while others employed a weighting approach for the identified disclosure items ([Cheung, Jiang, & Tan, 2010](#)). This study employed the weighting approach. This involves evaluation of each item according to its importance considering the perceptions of public accountability and transparency in ESG issues. After weighting, the scoring is done. [Hassan \(2012\)](#) measured the importance of each index item based on the source that recognizes it from the four sources used in the study. Four scores, from 0 to 3, were employed. A score of 1 is allocated to an index that is mandatory according to the UAE code of governance; a score of 2 is allocated to an index item that is value-adding as per the examined annual reports; and a 3 is allocated to an index item that was recommended by prior studies as value-adding. A 0 is allocated to an index item if a firm does not report on it. Therefore, according to [Hassan \(2012\)](#), the final corporate governance reporting index had four categories with a total score of 91. However, for the purpose of the current study, the weighting and scoring employed

were different from those in the Hassan (2012) study. Details of the weighting for the current study are given in the methodology section.

2.4. The García-Sánchez et al. (2020) COVID-19 Reporting Framework

García-Sánchez et al. (2020) opined that the COVID-19 pandemic generated a great need among stakeholders and investors for future-oriented information pertaining to the impacts of the pandemic. This required a revisiting of the content incorporated in the integrated reports. García-Sánchez et al. (2020) employed the legitimacy theory based on a two-step methodology to come up with a sequence of pandemic-related information that should be included in integrated reports. The first step focused on identifying consequences of the pandemic on business activities and global economies and new information requirements by investors in light of the pandemic. Hence, this step involved conducting a literature review from medical, scientific and pharmaceutical field journals, newspapers, and specialized websites as well as interviewing various professional investors. Professional investors had to indicate their information requirements that would guide them in investment decisions. This step allowed a better understanding of the changes that occurred within firms and illuminated the new information requirements related to the pandemic.

The second step catered for the detailed analysis of the IR framework provided by the International Integrated Reporting Council (IIRC) (2013) together with various integrated reports. This involved an examination of the guiding principles, content elements, and capitals. Furthermore, various integrated reports from different firms were also examined to identify the most frequently used structures as well as the contents that firms tend to disclose. Focus was put on integrated reports from healthcare structures and firms providing risk-related information. This step allowed the researchers an outright overview of the IR framework as well as different structures and different contents that are incorporated into firms' integrated reports.

The two-step method yielded a series of new information on the COVID-19 pandemic in various sections and perspectives anticipated by the IR framework based on the guiding principles. The steps also allowed the researchers to develop a revised the framework in light of the COVID-19 pandemic. The overall outcome was a framework of content elements and capitals. The framework has eight major content elements that have varying numbers of items and six capitals consisting of varying numbers of inputs and outcomes (García-Sánchez et al., 2020). The eight content elements are: organizational overview and external environment (six items); governance (four items); business model (six items); risks and opportunities (six items); strategy and resource allocation (two items); performance (three items); outlook (two items); and basis of preparation and presentation (one item). The six capitals are: financial (three items); manufactured (four items); intellectual (six items); human (five items); natural (three items); and social and relationship (nine items).

These items were used in this current research as index items in the development of the COVID-19 disclosure index. Consequently, the study skipped the first and second stages in the development of a disclosure index (the selection of categories and items for the index) and the classification of index items according to Hassan (2012) because these stages have already been addressed by García-Sánchez et al. (2020).

2.5. Empirical Literature

Integrated reporting is a relatively new area of policy and practice in the field of accounting which is rapidly growing (Nguyen, Nguyen, Tran, & Do, 2021). Consequently, it has attracted a lot of academic research which is fast contributing to the literature in this area. Literature has indicated that several studies were conducted around the concept of a disclosure index. Before integrated reporting was launched, some studies were conducted on the extent of disclosure on financial reporting. One example of such a study dates as far back as 1968, which was carried out by Copeland and Fredericks (1968). This study attempted to develop a measure of the extent of disclosure and relate it to conventional measures of materiality. The study examined the relationship between disclosure and materiality using data from 200 firms listed on the New York Stock Exchange. Annual reports for these firms were studied to

determine whether the criteria of disclosure were met. The results of the study indicated a positive correlation between materiality and disclosure.

Hassan (2012) also conducted a study to examine the extent of corporate governance reporting by 95 United Arab Emirates (UAE) listed firms. These firms represented the major economic sectors in the UAE, including banking, industrial, service and insurance. The study developed a corporate governance reporting index that championed the voluntary publication of corporate governance information as well as stressing its fundamental ethos of public accountability and transparency. The results of the study showed that the extent of governance disclosure was similar across the major economic sectors in the UAE. Furthermore, it was also established that the highest disclosures were those that dealt with management structure and transparency and the lowest had to do with information on external auditing and non-audit services. One of the benefits of the developed reporting index was to add a quantitative dimension to promote the voluntary publication of governance information.

Van Zijl et al. (2017) also conducted a study investigating the current extent of social-, environmental- and economic-related strategy disclosure of firms in the financial services sector that are listed on the Johannesburg Stock Exchange (JSE). The study employed the legitimacy and signaling theories to analyze the findings from a developed disclosure checklist for social, environmental, and economic strategies. Findings from this study indicated that social and environmental strategy-related disclosure were still secondary to economic strategy-related disclosure, probably due to the constant focus on financial capital providers and the need to perform financially. Furthermore, the study found that the level of interaction between the subsector with their customers as well as the business model was considered to be the impetus for social and environmental strategy-related disclosure. This was done in order to uphold their legitimacy, reduce information asymmetry and the cost of capital, and provide assurance to investors that the firm is properly managing these factors. Overall, the study established that the most strategy-related disclosure was presented by banking, real estate, and insurance subsectors as a result of their high public accountability and daily interactions with customers, a situation which necessitated the need to manage their legitimacy.

Another study in this area was conducted by Denhere (2022), in which the extent of COVID-19 reporting by the banking sector in South Africa following the 2020 experience was explored. The study focused on the 2021 top six South African banks and collected data from the banks' integrated reports for 2020/2021. This study analyzed documents and used "a technique of counting and recording the number of mentions for each mention of COVID-19 or capital disclosure element", according to the series of information that should be included in COVID-19 pandemic disclosure outlined by García-Sánchez et al. (2020). The results showed that Standard Bank, which ranked top of the six banks, led in the extent of COVID-19 disclosure. Through conducting a correlation analysis, the study also established that there was a significant positive relationship between bank size and the extent of COVID-19 disclosure. The study concluded that the sampled banks sufficiently reported on the COVID-19 pandemic despite the lack of guiding reporting standards. Realizing the paucity of studies on the measurement of the extent of disclosure, the study recommended a study to craft an index that would show levels of the disclosure extent.

Bostan et al. (2022) also conducted a study to determine if the COVID-19 crisis brought changes in the way firms conduct corporate reporting, with a focus on annual reports. The research method for this study was based on text mining with the aim of coming up with measures of readability and a tone of unreliability of annual reports, given the information published by companies listed on four European stock exchanges – the Bucharest Stock Exchange; the Athens Stock Exchange, the parent company that supports the operation of the of the Greek Capital Market; IBEX 35, the Iberian IndEx and the benchmark stock market index of the Bolsa de Madrid, Spain's principal stock exchange; and WIG 20, or 'Warszawski Indeks Gieldowy', which translates as the Warsaw Stock Index – from 2017 to 2020. Using a multivariate analysis, the results of the study emphasized that the analyzed annual reports were less extensive during the pandemic and tended to become more general.

The studies identified above explored the disclosure of different issues in firms' annual reports. However, the level or extent of disclosure also needs to be explored. With the new experience brought by the COVID-19 pandemic, there was a need for studies to develop a disclosure index to show the extent of disclosure in this area, which is what this study has done.

3. METHODOLOGY

The objective of this study was to develop a Conceptual Reference Disclosure Index for future pandemics using the COVID-19 pandemic as a baseline. This was based on the methodology employed by Hassan (2012) together with the series of information that should be incorporated in integrated reports for COVID-19 disclosure established by García-Sánchez et al. (2020). As indicated in the literature review of this current study, three stages can be followed in developing a disclosure index. However, for this study, the first and second stages were already covered by García-Sánchez et al. (2020) in their study. The current study therefore builds on the García-Sánchez et al. (2020) study. Consequently, this current study started from stage three, the weighting of index items. Deviating from Hassan (2012), we designed our own weighting method for the index items, which we called 'weighting by number of index items per each content element and per each capital'. One weighting was done for the content items and another for the capitals, since their presentation on the framework was also different. However, the weighting design was the same.

3.1. Weighting for the Content Index Items

There are eight reporting content elements, each with a different number of items, adding up to a total of 30 items. These were treated as index items, and because García-Sánchez et al. (2020) did not give them a ranking of importance, this study designed its own formula. For each of the eight reporting content elements, the number of index items were presented as a fraction of the total of all index items from the eight elements (30) then multiplied by 100% to determine a weighting contribution for each content element. Therefore, the weighting was based on the number of items under a category of reporting content elements. The percentage obtained was then used to determine the minimum number of elements that a firm should cover in their COVID-19 disclosure for each content element. This percentage was expressed as a fraction of 100% multiplied by the total number of index items per category of content elements.

3.2. Weighting for the Capitals Index Items

There is a total of six capitals, each with a different number of index items. Just like the content elements, the total number of index items from the six capitals is 30. These 30 items consist of both input and outcome index items. To avoid unnecessary complications, both the input and outcome index items were treated the same in terms of determining their weighting. Consequently, for each of the six capitals, the number of index items was presented as a fraction of the total of all index items from the six capitals then multiplied by 100% to determine a weighting contribution for each capital. Therefore, the weighting was based on the number of index items under each capital. The percentage obtained was then used to determine the minimum number of items that a firm should incorporate in their COVID-19 disclosure for each capital. This percentage was expressed as a fraction of 100% multiplied by the total number of index items per each capital.

3.3. Scoring of the Disclosure Index Items

Again, the scoring of the index items was different from Hassan (2012). The scoring in this study was based on the outcomes of the weighting. After the weighting was done, a calculation of the minimum number of index items to be incorporated in a firm's integrated report for each reporting element and reporting capital was carried out. The scoring was therefore based on 'the minimum number of disclosure index items' for each of the reporting content

elements as well as each reporting capital. To calculate this, the weighting percentage was expressed as a fraction of 100% multiplied by the number of index items in each reporting content element and each reporting capital.

4. RESULTS

This section presents the calculations that were done to determine the weightings of the disclosure index items for the eight categories of the reporting content elements and the six reporting capitals as described in the methodology section.

4.1. Weighting of Reporting Content Elements

There is a total of eight categories of reporting content elements, with a total of 30 disclosure index items. Calculations for the weightings are shown in Table 1. The following formula was used to calculate the weighting:

$$[x = \frac{y}{30}(100\%)]$$

Where:

x is the percentage weighting for each disclosure index item; y is the total number of disclosure items for each reporting content element; and 30 is the total number of all disclosure index items from all eight categories of reporting content elements.

Table 1. Weighting calculations of reporting content elements by index item number.

Reporting content element	Number of disclosure index items	Weighting of reporting content element as a %
Organizational overview and external environment	6	20.0
Governance	4	13.3
Business model	6	20.0
Risks and opportunities	6	20.0
Strategy and resource allocation	2	6.7
Performance	3	10.0
Outlook	2	6.7
Basis of preparation and presentation	1	3.3
Total	30	100.0

Source: García-Sánchez et al. (2020).

Table 1 shows the different weightings obtained for each of the reporting content elements based on the number of index items in each category. Those categories with a high number of index items have more weighting, and those with fewer index items have less weighting.

4.2. Weighting of Reporting Capitals

There is a total of six reporting capitals, with a total of 30 disclosure index items. Calculations for the weightings are shown in Table 2. The following formula was used to calculate the weighting: $[a = \frac{b}{30}(100\%)]$.

Where:

a is the percentage weighting for each disclosure index item; b is the total number of disclosure items for each reporting capital; and 30 is the total number of all disclosure index items from all six reporting capitals.

Table 2 shows the different weightings obtained for each reporting capital based on the number of index items for each capital. The capitals with a high number of index items have more weighting, and those with fewer index items have less weighting.

Table 2. Weighting calculations of reporting capitals by index item number.

Reporting capital	Number of disclosure index items	Weighting of reporting capital as a percentage
Financial capital	3	10.0
Manufactured capital	4	13.3
Intellectual capital	6	20.0
Human capital	5	16.7
Natural capital	3	10.0
Social and relationship capital	9	30.0
Total	30	100.0

Source: García-Sánchez et al. (2020).

4.3. Scoring of the Disclosure Index Items

The scoring of disclosure index items was based on the weighting calculations. This involved calculating the minimum number of disclosure index items for each reporting content element category and each reporting capital. To calculate this, the weighting percentage was expressed as a fraction of 100% multiplied by the number of index items in each reporting content element and each reporting capital. The following formula was used: $[c = \frac{d}{100}(e)]$.

Where:

c is the minimum number of disclosure index items to be incorporated in an integrated report, d is the percentage weighting for each disclosure index item, and e is the number of disclosure index items per each reporting content element or reporting capital.

Table 3. Minimum number of disclosure index items per each reporting content element and capital.

Reporting content element/capital	Number of disclosure items	% Weighting	Minimum number of disclosure index items (calculated)	Minimum number of disclosure items (rounded off to a whole number)
Content elements				
Organizational overview and external environment	6	20.0	1.20	1/6
Governance	4	13.3	0.53	1/4
Business model	6	20.0	1.20	1/6
Risks and opportunities	6	20.0	1.20	1/6
Strategy and resource allocation	2	6.7	0.13	0/2
Performance	3	10.0	0.30	0/3
Outlook	2	6.7	0.13	0/2
Basis of preparation and presentation	1	3.3	0.03	0/1
Total	30	100		4
Capitals				
Financial capital	3	10.0	0.30	0/3
Manufactured capital	4	13.3	0.53	1/4
Intellectual capital	6	20.0	1.20	1/6
Human capital	5	16.7	0.84	1/5
Natural capital	3	10.0	0.30	0/3
Social and relationship capital	9	30.0	2.70	3/9
Total	30	100		6

Source: García-Sánchez et al. (2020).

Table 3 shows that the reporting content elements or capitals with a higher number of disclosure index items had a higher weighting and also had a higher minimum number of disclosure index items to be incorporated in the integrated report, and vice versa. However, some calculations produced fractions. Since there cannot be partial index items, the calculations had to be rounded off to the nearest whole number, which saw the minimum number of some disclosure index items become zero.

5. THE CONCEPTUAL REFERENCE DISCLOSURE INDEX

The proposed Conceptual Reference Disclosure Index is meant to show the extent or level of firms' disclosure on the pandemic based on the COVID-19 reporting framework developed by García-Sánchez et al. (2020). The framework was divided into two types of information that should be incorporated into the integrated report and these are the content elements with eight categories, and six capitals. Therefore, the developed index shows the extent of disclosure for both content elements and capitals.

The developed Conceptual Reference Disclosure Index indicates six levels of disclosure, namely non-disclosure, minimum, just above minimum, sufficient (adequate), fair, and full. Meiryani (2019) indicated that the three concepts in the level of disclosure are: enough disclosure (sufficient/adequate); fair disclosure; and full disclosure. However, for this study, the weighting led to the scoring of disclosure items based on the minimum number of these items being incorporated in a firm's report. This automatically meant that the scoring was also going to have a maximum number of index items to be incorporated in a firm's report. This explains the additional 'minimum' and also the 'just above minimum' levels, which take them up to six levels instead of the three that were identified by Meiryani (2019).

Considering the six levels of disclosure employed for the developed index, a range of numbers of index items had to be developed to distinguish these levels. For the eight reporting content elements, the minimum number of items to be disclosed was four; therefore, the range of the next three levels (just above minimum, sufficient, and fair) had to be spread from five disclosure index items to 29, since 30 items would represent the full disclosure level. The same was also done for the capital disclosure index. The minimum number of disclosure index items for this category was six. Therefore, the ranges of the next three levels had to start from seven to 29, since 30 disclosure index items would represent a full disclosure level.

To create the ranges, percentiles were calculated for the content elements' index items as well as for the capital index items. A third was used to determine the three ranges, hence the first percentile was 33.33%, followed by 66.66% and 99.99%. The following formula was employed in both cases:

$$Lp = (n + 1) \frac{P}{100}$$

Where:

Lp is the position locator of the percentile within the range of numbers arranged in ascending order, n is the number of observations (numbers in the range), and P is the percentile.

5.1. Calculations for the Disclosure Extent Level Ranges for Content Elements

The following are the numbers in the range in ascending order for the content elements starting from 5, which is the minimum number of index items for this category:

5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23; 24; 25; 26; 27; 28; 29.

$$Lp = (25 + 1) \frac{33.33}{100} = 8.6658$$

This means that the 33.33 percentile will be located at the eighth number and 66% distance between the eighth and ninth numbers along the range; therefore, the 33.33 percentile will be located close to 13. This means that 'just above minimum' will range from 5 to 13. The same was repeated for the 66.66 percentile for the 'sufficient' level range and the 99.99 percentile for the 'fair' level range.

5.2. Calculations for the Disclosure Extent Level Ranges for Capitals

The following are the numbers in the range in ascending order for the capitals starting from 7, the minimum number of index items for this category:

7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23; 24; 25; 26; 27; 28; 29.

$$Lp = (23 + 1) \frac{33.33}{100} = 7.9992$$

This means that the 33.33 percentile will be located at the seventh number and 99% distance between the seventh and eighth numbers along the range; therefore, the 33.33 percentile will be located close to 14, meaning that 'just above minimum' will range from 7 to 14. The same was repeated for the 66.66 percentile for the 'sufficient' level range and the 99.99 percentile for the 'fair' level range.

In the developed index, the disclosure levels for the content elements and capital elements had to be presented separately because they had different minimum numbers of disclosure items based on their different weightings. The Conceptual Reference Disclosure Index developed in this study is shown in Table 4.

Table 4. The developed conceptual reference disclosure index.

COVID-19 Disclosure Extent	Disclosure Extent Description	Total number of disclosed index items from the 8 content elements	Total number of disclosed index items from the 6 capitals
No disclosure	Unacceptable.	0	0
Minimum disclosure	Weak disclosure with many deficiencies, less than average.	4	6
Just above minimum disclosure	Insufficient disclosure.	5–13	7–14
Sufficient disclosure	Adequate disclosure to earn legitimacy.	14–20	15–21
Fair disclosure	More than adequate, discloses almost all index items.	20–29	22–29
Full disclosure	Excellent disclosure. Discloses all index items.	30	30

Table 4 shows the developed Conceptual Reference Disclosure Index with six levels of disclosure, each level with its own color. Red is usually associated with danger, and in this case non-disclosure is unacceptable and a dangerous decision for firms since they will not attain legitimacy from their investors and other stakeholders. This has negative consequences for business. The dark amber for minimum disclosure and amber for just above minimum are transitional colors from red, implying that when firms are at these levels of disclosure, they are out of danger in terms of losing legitimacy from the investors and other stakeholders but still need to disclose more to reach a sufficient level. From sufficient to full disclosure, there is a transition of light green to dark green. The green color usually indicates life, and according to Wolchover and Dutfield (2022), it is associated with wisdom. In this study, green signals wisdom by those firms that sufficiently, fairly, and fully disclose COVID-19-related information, respectively, because they will earn their legitimacy and survive in business and continue to create value for their stakeholders. However, since the intensity of the green color is different, which implies that the level of legitimacy will also be different, with dark green being the maximum level of legitimacy.

6. CONCLUSION

The objective of this study was to develop a Conceptual Reference Disclosure Index. This was motivated by the lack of international guidelines and standards regarding the disclosure of pandemics. The COVID-19 pandemic impact on business organizations warranted information disclosure in the integrated reports for shareholders and stakeholders. Firms had to disclose in order to maintain legitimacy and reduce information asymmetry. Since this was a completely new experience, firms had to be creative in their pandemic disclosure. However, currently there is no known pandemic disclosure index, but there is a series of information outlining the content elements and capitals that ought to be incorporated in the COVID-19 disclosure developed by García-Sánchez et al. (2020). Since this new framework has not yet been contrasted by researchers, the current study developed a Conceptual Reference Disclosure Index using the COVID-19 pandemic information as a baseline. The developed index identified six COVID-19

disclosure levels namely: non-disclosure, minimum disclosure, just above minimum disclosure, sufficient disclosure, fair disclosure; and full disclosure. It is anticipated that the proposed index will be instrumental in the future for determining the extent of the pandemic disclosure by companies, which is information that is crucial for shareholders and all concerned stakeholders to guide them in decision making. The index will provide a base to allow comparison of the COVID-19 disclosure extent by firms. Furthermore, the proposed index may also be considered for the development of other frameworks in case of future pandemics.

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