أثر الإفصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على ملاءمة القيمة: دراسة تطبيقية

The Impact of Climate Change disclosure in Integrated Reports on Value Relevance: An Applied Study

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يوليو ٢٠٢٤م

رابط المجلة : **https://csj.journals.ekb.eg**

Abstract:

The main objective of this research is studying the impact of climate change disclosure in Integrated Reports (IRs) on value relevance in the Egyptian environment and revealing IR importance for all stakeholders. The researcher used Ohlson's (1995) model to measure the value relevance of 25 non-financial listed firms in EGX30 for the period between (2017-2021), also the research illustrated the climate change disclosure way in IRs and its value relevance. The researcher depended on STATA program in executing the applied study depending on OLS regression model to test the hypotheses.

The findings revealed that there are positive significant impact of climate change disclosure in IRs on value relevance, positive non-significant impact of climate change disclosure in IRs on BV, positive significant impact of climate change disclosure in IRs on E and positive significant accumulated impact of climate change disclosure in IRs on both BV and E.

Keywords: Integrated reporting, value relevance, climate change, IR score.

مستخلص البحث:

هدف البحث الى دراسة أثر الإفصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على ملاءمة القيمة وبيان أهمية تقارير الأعمال المتكاملة لأصحاب المصالح بالتطبيق على عدد ٢٥ شركه مدرجه فى مؤشر البورصه المصرية EGX 30 خلال الفترة (٢٠١٧- ٢٠٢١) باستخدام نموج اولسون (١٩٩٥)، وأوضح البحث كيفية الافصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة وملاءمتة للقيمة. اعتمد الباحث على برنامج ستاتا فى تنفيذ الدراسة التطبيقة بالاعتماد على نموذج انحدار المربعات الصغرى العادية لاختبار الفروض.

توصلت النتائج الى وجود تأثير ايجابى معنوى للافصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على ملاءمة القيمة، تأثير ايجابى غير معنوى للافصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على القيمة الدفترية، تأثير ايجابى معنوى للافصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على الأرباح، تأثيرمتراكم ايجابى معنوى للافصاح عن معلومات تغير المناخ فى تقارير الأعمال المتكاملة على كل من القيمة الدفترية والأرباح.

الكلمات المفتاحية: تقارير الاعمال المتكاملة، ملاءمة القيمة، تغير المناخ، مستوى الافصاح عن تقارير الاعمال المتكاملة.

The General Framework of Research

1-1 Introduction

Due to developing capital market and increasing the number of multinational firms the need for non-financial information increased and integrating it with financial information in one report called Integrated Report (IR). Moreover, investors pay great attention to firm’s environmental practices particularly related to greenhouse gas emissions and its risks and strategies related to climate change.

So, IR has been promoted as a solution for the shortcomings of financial reporting (Eurosif, 2013). The IR journey began in 1994 in South Africa with the release of South Africa's first king Code of Corporate Governance principles, known as ‘King 1’ (Gleeson- White, 2014). And the International Integrated Reporting Council (IIRC) has been founded in 2010 with the goal of founding a new approach for preparing financial statement that reflects the integration among environmental, social, economic, and governance fields in one report called Integrated Report to meet stakeholder's different needs of information (Eccles & Saltzman, 2011).

According to International Accounting Standards Board, accounting information has two main qualitative characteristics are the relevance and the faithful representation. The Board’s objective is to maximize those qualities to the extent possible” (IASB, 2010). SFAC No. 5, (2021) added that value relevance contains the two main qualitative characteristics.

Through reviewing literature, the researchers find some of IR research focusing on IR adoption, its determinants and consequences on firm valuation (García-Sánchez et al., 2013; Frías-Aceituno et al., 2013; Jensen& and Berg, 2012) also some of climate change research focus on its definition, consequences and impacts (Rahman, 2013; Elnaggar, 2021) . Studies related to value relevance examine stock market reactions to accounting information assuming that the relevant accounting information is that causes difference in investors decisions (Ohlson, 1995; Kaid et al., 2018; Zain & Mardijuwono, 2020).

According to the researchers’ best knowledge, few studies were conducted in the Egyptian environment about climate change disclosure and also few studies contain both the two variables climate change disclosure in IRs and value relevance. So, this research seeks to investigate the impact of climate change disclosure in IRs on value relevance.

1-2 Research problem

Despite the diversity of reporting tools, including leading methods as the Global Reporting Initiative (GRI), there are some firms preparing an integrated report one of them is a mandatory disclosure in South Africa and others are a discretionary disclosure as in Egypt, in order to improve firm transparency and giving investors more reliable, and accurate information.

Concerning value relevance approach studies have no longer been concentrating only on testing if an accounting number is value relevant or not, or specific accounting standard but it extended to studying the relevance of the financial reports. Since IR is the most modern disclosing report for firms, this study tests the relevance of IR disclosure. Moreover, climate change information is a vital information nowadays and investors need it in their decision making process.

According to the supporters of the IR trend, the IR disclosure is expected to enhance information quality for stakeholders and to create an efficient approach for corporate reporting through connecting disconnected pieces of information (Cho et al., 2013; Middleton, 2015) one of them is the climate change information related to the environmental information, then it could affect the value relevance of accounting information which means the disclosed information's ability to reflect the events and the fluctuations in the stock market subsequently the investment decision becomes easier (Khurana& Kim , 2003; Barth et al., 2022).

1-3 Research Questions

The researchers will depend on Ohlson's (1995) model as a measurement tool for value relevance of accounting information and this model contains two basic financial variables: book value and earnings.

So, the research problem can be summarized in the following main question:

What is the impact of climate change disclosure in integrated reports on value relevance?

In order to answer this question, the following sub-questions should be answered:

1- What are IR concepts, characteristics, content, structure, climate change definition and impacts on financial reporting?

2- What is the impact of climate change disclosure in IR on book value (BV)?

3- What is the accumulated impact of climate change disclosure in IR on both book value and earnings?

1-4 Research Objectives

The main objective of this research is **studying the effect of climate change disclosure in IRs on value relevance**. In order to achieve this objective, the following sub-objectives should be achieved:

1- Explaining IR concepts, characteristics, content, structure, climate change definition and impacts on financial reporting.

2- Investigating the impact of climate change disclosure in IRs on book value.

3- Analyzing the impact of climate change disclosure in IRs on earnings.

1-5 Research Importance

The research can be significant in several aspects and contributes to the literature in terms of theory and practice.

1-5-1 Theoretical Importance

A. The IR is a pivotal subject that the researchers pay attention in addition to the worldwide professional organizations.

B. Lack of studies related to both IR and climate change disclosure according to researcher’s best knowledge.

C. Studying the impact of climate change disclosure in IRs on value relevance.

1-5-2 Practical Importance

A. It is anticipated that the results of this research would enhance the understanding of the importance of IRs and climate change.

B. Rationalizing stakeholders' decisions.

1-6 Research Hypotheses

In the context of the research problem and its objectives, the following main hypothesis can be formulated as follow:

There is a significant impact of climate change disclosure in IRs on value relevance.

This main hypothesis can be divided into the following sub-hypotheses:

1- There is a significant impact of climate change disclosure in IRs on book value.

2- There is a significant impact of climate change disclosure in IRs on earnings.

1-7 Research Methodology

In the context of research objectives and research questions that the researcher tries to answer about the impact of integrated reporting disclosure on value relevance, the current research relied on both deductive and inductive approaches.

1-7-1 Deductive Approach

This approach will be used to identify ideas and theories from reviewing the prior literature relevant to the research in order to build a theoretical framework about integrated reports containing climate change information and its impact on value relevance, the research process under such approach will move from general to specific and deducing hypotheses.

1-7-2 Inductive Approach

This approach will be used to conduct the practical side through an applied study that requires collecting the required data for research from Egyptian listed firms' reports. Applied side depends on Ohlson (1995) model to measure the level of value relevance before and after IR disclosure. Therefore, the inductive approach moves from particular to general.

1-8 Limitations of Research

The following points represent the limitations of the research:

1- The research doesn’t expose to unlisted firms in Egyptian stock market.

2- The research doesn’t expose to financial& insurance firms and banks because of their special nature.

1-9 Research Scope

The research analyzed the impact of IR disclosure on BV and EPS only as elements of Ohlson’s (1995) model for measuring value relevance.

1-10 Organization of Research

This research is divided into seven parts as follows:

Part One: The General Framework of Research.

Part Two: Overview on climate change.

Part Three: Theories explaining climate change disclosure in integrated reporting and its relationship with value relevance.

Part Four: Literature Review.

Part Five: The Applied Study.

Part Six: Conclusions, Results, and Recommendations.

2- Overview on climate change

In this section the author outlines the main issues related to climate change containing its definition, its impacts on financial reporting and its impacts on IR as follows:

2.1 Climate change definition

There are various definitions for climate change that can be stated as following:

The Intergovernmental Panel on Climate Change (IPCC) defined climate change as: A change in the state of the climate that can be known through changes in the rate or changes in long lasting properties that lasts for long periods usually decades or more, and it refer to any change in climate over time, whether it is a result of natural changes or activity-induced human changes (Pielke Jr, 2004).

Also, climate change is defined for a region on the Earth's surface in general, as stated in the environment’s state report in Egypt 2008 is an imbalance prevailing climatic conditions such as temperature, wind patterns, and distinctive rain distributions for regions, which will have a long-term impact on the existing bio systems (Egypt State of The Environment Report, 2008).

Moreover, United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change in climate that is directly or indirectly attributable to human activity, which leads to a change in the composition of the Earth’s atmosphere (Rahman, 2013).

Finally, the researchers can define climate change as small change in the temperature (about 1 degree Fahrenheit) caused mainly by industrial activities but unfortunately this small change has severe impacts on all the human beings threatening its existence and affecting all their activities and because accounting is related to those, climate change has an impact on the accounting practices.

Moreover, the researchers can define **climate change disclosure** as a method or tool the firm can use to report its stakeholders with climate change impacts on its activities, financial position and continuity, moreover it also include the impacts of the firm on climate change, so climate change disclosure is presenting the qualitative and quantitative information related to climate change in the financial statements and reports which is relevant for its users in making their investment decision. Climate change disclosure is important for accounting especially green accounting in order to cope with economic and environmental developments and also sustainability practices.

2.2 Climate change impacts on IR

Sustain (2009) pointed that the relationship between global warming emissions and climate change will result in value redistribution from highly polluting firms to less polluting firms, moreover Elnaggar (2021) stated that stakeholders of polluting firms demand from those firms to disclose information related to global warming gases and firms that reduced their emissions.

So, it is become a necessity to disclose information related to climate change for stakeholders in order to satisfy their needs and so on this information is expected to be value relevant. Where carbon footprint is a quantitative expression for CO_2 and global warming gasses produced as a result of firm's activities it will help in the disclosure process, furthermore firms that reduce greenhouse emissions will improve their environmental performance, reduce its costs, increase its market value and achieve competitive advantage and so on avoid risks and losses, on contrast highly polluting firms may lose their market share subsequently their products will disappear (Panedy, 2011; Yahyawy& Abdelsamad, 2012). Subsequently, the firm must disclose key facts in order to provide real vision of firm's performance, and also risks and opportunities concerning climate change facing polluting firms are of key information that must be disclosed in financial statements (Elnaggar, 2021).

Through the previous information and presentation concerning climate change and also the IR the researchers can conclude that climate change can affect the IR inputs and its structure. These impacts can be stated in the following points depending on the researcher's point of view.

<u>2.2.1 The impacts related to the IR inputs:</u>

- The representative who is responsible for the sustainability department should has a great knowledge about climate change concerning its impacts and adaptation activities that the firm does or can do.
- The consultants that the firm get from outside should be knowledgeable about climate change.
- The activities related to climate change should be included in the integrated information system.
- In the training courses that are prepared for the workers the trainer should be knowledgeable about this phenomenon and talk about it and pass his knowledge related to it to the trainees.
- Integrating main climate change activities into sustainability activities that is Integrated into the firm's value chain.
- Making control over climate change activities and integrating it with the control over sustainability activities in the internal control systems.
- Recognizing its risks within the classification of risks that the firm exposes.

- Investigating stakeholders' opinions about climate change activities that the firm do.

2.2.2 The impacts related to IR structure:

- Disclosing the assurance methods used in assuring the information related to climate change that is disclosed in the IR.

- Disclosing the energy consumed, water consumption, environmental pollution, current and potential negative climate change impacts.

- Disclosing the financial and economic impacts of climate change on the firm's sources of capital.

Furthermore, Ding (2019) mentioned that investors aren't able to get or acquire consistent information about climate change that will help them in their evaluations this is because of the lack of standards concerning climate change disclosure.

So, in 2010 The U.S. Securities and Exchange Commission (SEC) released a guidance for firms in order to disclose material information that is related to climate change and to put standard for climate change disclosure in the SEC requires from all its registrants which are affected by climate change to disclose this impact's nature in accordance with the SEC (Cong et al., 2020). Also, there are projects concerned with carbon and climate change stated in the following:

- Carbon Disclosure Project (CDP):

It is a global non-profit organization, founded in 2000 and headquartered in London. The project collects climate-related data on behalf of investors from establishments and companies and discloses them with the aim of rationalizing investor decisions related to climate (https://www.cdp.net).

- Climate Disclosure Standards Board (CDSB):

The CDSB is a group of commercial and environmental organizations formed with the goal of developing a generally accepted global framework that companies can use to disclose information about opportunities and risks associated with climate change, carbon reduction strategies, and their impacts on shareholder value creation (Ernst & Young, 2009).

Moreover, both Liesen et al., (2017) and Okonewa (2023) investigated the relevance of climate change disclosure and found that this information is value relevant and advised investors to consider climate change information when making their investment decisions. Furthermore, Okonewa (2023) added that disclosing information related to carbon emission is value relevant for investors but increases firm's risk and subsequently decreases its value.

From the above lines the researchers can conclude that climate change including all its reasons and consequences lead firms to pay more attention and commitment to sustainability practices and disclosure as climate change has an impact on its dimensions and also will lead firms to adopt IR disclosure, moreover the relevance of the IR will be affected positively as it included additional information that affect stock prices and investors' decisions furthermore there is a need in the Egyptian environment for a guidance that guides firms in disclosing information related to climate change.

3- Theories explaining climate change disclosure in integrated reporting and its relationship with value relevance

The researchers can define value relevance as the correlation between accounting numbers disclosed in financial statements and firm's value and it addresses the degree that accounting information summarize and reflect firm's value. So, a value relevant variable can be described as the disclosure that help current and potential investors in making their investment decisions properly and it guides investors in stock's pricing. Moreover, Uyar& Kılıc (2012) concluded that voluntary disclosure is value relevant and stakeholders value voluntarily disclosed information as this type of disclosure enables stakeholders to know what managers do and also the way they manage the firm. The theories are discussed as follows:

a) Legitimacy Theory

Legitimacy has been defined as the realization or general assumption that the firm's actions are desirable or relevant within the framework of some social systems that are built on the basis of rules, values and beliefs (Reverte, 2009).

The legitimacy theory is based on the idea of the existence of social contract between firms and society, and thus if the firm has violated this contract, its existence becomes threatened. Where the society can cancel firm's continuation contract in its operations through many procedures.

According to Stubbs& Higgins, (2018) there is a movement to replace sustainability reporting with IR, so IR will be widely used all over the world then it may be captured by firms seeking for using it as a new medium for legitimation.

It becomes clear to the researchers that disclosure through integrated reports will contribute to face the pressures and requirements imposed on the firm, as this disclosure will lead to enhance the image of the firm, in order to gain its legitimacy in order to survive and continue in a rapidly developing business world. So, the author can state that through IR firms can disclose information that help them keep their legitimacy, this information explains the extent to which the firm is committed with its implicit contract with society and its rules, values and also beliefs.

b) Stakeholder Theory

Stakeholder can be defined as a group of individuals that can affect or be affected by achieving firm’s objectives. Stakeholders are divided into primary stakeholders such as investors, employees and customers as well as secondary stakeholders such as competitors and the local community (Van der Laan, 2009).

So, the main motive behind firm's response to stakeholders different and renewable needs is the existence of a general direction for firm’s management to commit with a moral or ethical obligation to meet stakeholder’s needs when exercising their various activities, this help the firm to appear to the community, including its stakeholders that it operates within the framework of social principles that serve the society as a whole and its stakeholders in particular, it is reflected positively at the end on its reputation and legitimacy.

It becomes clear that a clear identification of the stakeholders will contribute to the realization of the information that is required to be disclosed in the integrated report for stakeholders to assess the firm's ability to create value.

According to stakeholder theory the firm manages the different needs of stakeholders and meets their different and renewable needs, this can be easily and perfectly done through IR disclosure, because of the various information that can be disclosed using it.

Moreover, Vitolla et al., (2019) concluded that the stakeholder perspective is critical in the point of understanding the incentives leading firms to prepare IRs that integrate financial, social, environmental and governance information.

When the information disclosed in a manner that is beneficial to stakeholders such as disclosing it in an IR, it is expected to be value relevant as the management can disclose information that affect or be affected by their decisions, this information is considered value relevant.

Al-Khayal, (2009) considered that the use of previous theories as inputs to justify firms' voluntary disclosure does not add value to this concept unless the information disclosed voluntarily is characterized by quality and materiality for external users in making their economic decisions, and the benefits can be maximized from the expansion of disclosure through referring to investors and stakeholders in determining the quantity and quality of information required to be disclosed by firms, and not leave the voluntary disclosure decision in its entirety to the wishes of the firms' management.

The researchers can conclude that, the concentration in determining the information that is disclosed in IRs is on the users' needs in order to satisfy their needs of information and help them make their investment decisions properly. Since the concentration of information is on its quality and materiality this information will be value relevant for the users of IRs.

From the above lines the researchers can conclude that IR is an important way for disclosing information for different stakeholder groups as it contains useful information for all of them this information helps them in making their different decisions with more meaningful and helpful information. In other words, the IR approach aims to improve the quality of the disclosed information to the providers of financial capital in order to help them make more efficient allocation of their capital. This can be interpreted in an expectation of IR disclosure to increase the value relevance of the disclosed accounting information.

4- Literature review

The issue of IR has recently received a great attention from researchers as a result of the inability of the financial reports to disclose information that is sufficient to stakeholders to make precise decisions. So, the IR disclosure may affect the value relevance for stakeholders' decisions. Therefore, this section overviews the previous studies related to the research topic as follows:

The global economy has tended in the current century towards the globalization of production and markets, and this trend has affected the production environment and made it have characteristics that differ from what it has in the traditional environment. The transition to a modern manufacturing environment that reflects and responds to external competition and customer requirements has led to some shortcomings in the traditional financial statements especially during climate change and the increasing need for disclosing all information relating to it and affecting investors' decisions.

The majority of the previous studies Krzus (2011), Eurosif (2013), Churet and Eccles, (2014), Havlová (2015), Esmail (2016), Hoque (2017), Shahin et al., (2019a), Albitar et al., (2020), Hammoda et al., (2021), Nishitani et al., (2021), Hamad et al., (2022) and Wagenhofer (2023) indicated that the IR disclosure increases disclosure and transparency levels which limits information asymmetry and leads to better analyzers' expectations also, IR enhances sustainability reporting including climate change information and is helpful in doing better evaluation for firm's performance and it's going concern ability. As well as, IR disclosure results in better financial performance than environmental, social and governance reporting each one in a separated report.

IASB (2010) mentioned that in order to financial information be useful, it must be relevant and faithfully represents the event. Also, added that there are four supplementary characteristics that can enhance or support the usefulness of financial information those are comparability, verifiability, timeliness, and understandability.

Barth et al., (2001) mentioned that value relevance research assesses how well accounting amounts reflect information used by equity investors, and provides insights into questions of interest to standard setters as well as they presented a view regarding the relevance of value relevance research for financial accounting standard setting that differs from that presented in Holthausen & Watts (2001). As active participants in Barth et al., (2001) research and standard setting, researchers clarified the relevance of the value relevance literature to financial accounting standard setting. A key conclusion is that the value relevance literature provides fruitful insights for standard setting. Also, value relevance studies are designed to assess whether particular accounting amounts reflect information that is used by investors in valuing firms' equity, not to estimate firm value.

Moreover, Giner et al., (2020); Hassan & Mohd-Saleh (2010); Osman & Ameer (2009) concluded that financial instruments disclosure is value relevant to stakeholders relying on this disclosure and that compliance with instruments risk disclosure ensures more transparency, gains confidence and reduces information asymmetry.

Additionally, Aureli et al., (2020); Zuraida et al., (2018) and Bernardi & Stark (2018) agreed on the relevance of environmental and social activities disclosures including climate change disclosures. Where Bernardi & Stark, (2018) first studied and analysed the relationship between the level of both environmental and social disclosure and performance the results revealed that environmental and social information including climate change information is value relevant for informed market participants then investigated the relationship of those disclosure levels and performance and found that there is a positive relationship between the levels of those disclosures and performance.

From the previous the researcher can conclude that almost there is an agreement among researchers on the value relevance of ESG disclosure including climate change disclosure.

Moreover, concerning governance disclosures and regulators both Krismiaji & Surifah (2020) and Chauhan & Kumar (2019) agreed on the relevance of IFRS disclosures and Krismiaji & Surifah (2020) illustrated that the compliance level of IFRS disclosure has value relevance for both EPS and book value per share (BVS), the independence of the board and the board size have a relevant value of BVS, and the board size has relevant value for EPS. It also indicated that the independence of the audit committee has value relevance for BVS, the size of the audit committee positively affects the value relevance of EPS, managerial ownership has a negative effect on the value relevance of EPS but has a positive effect on the relevant value of BVS.

The researchers can conclude that increasing firms' compliance to IFRS achieve and enhance better information value relevance. And most of governance mechanisms enhance the value relevance of BV and/or earnings except managerial ownership that has a negative effect on the value relevance of earnings.

Both Roslender & Nielsen (2021) and Albasyoni (2018) concluded that integrated reporting approach leads to better analyzers' expectations, delivery of customer value expectations as well as integrated reports support financial reports.

Shahin et al., (2019a) and Shahin et al., (2019b) agreed in the point that IR disclosure affects investors' decisions. Where Shahin et al., (2019a) aimed at investigating the impact of compliance with the IIRC framework and the global reporting initiative guidelines on investors' decision making. The results revealed that there is a significant difference between the content of the firm's annual reports and the content elements of the integrated business report and found that there is a significant relationship between firms' compliance with the framework of the content elements of IR and the investors' decisions indicators.

Furthermore, Shahin et al., (2019b) concluded that there is significant difference between investors' opinions about the extent to which the integrated report components provide better understanding for investors about firm's ability to continue and create value in the future, and stated that this may be due to the high awareness of institutional investors about the importance of these components and its effect on the risks that might face the firm in long term due to their looking for long-term investment on contrary of the individual investors who seek to short-term investment to achieve fast profits so they are more interested in financial indicators than non-financial indicators.

It can be noticed that most prior studies studied the relationship between the independent components of IR and value relevance, and most of them were conducted in foreign environments but this research will be conducted to investigate the impact of climate change disclosure in IR as a unified report on value relevance in order to fill the research gap in the Egyptian environment.

- **Hypotheses development**

The previous lines illustrate the IR importance, the need for the Egyptian stock market for applying it in addition to its convenience for the Egyptian firms (Abd Almotaleb, 2018; Shahin et al., 2019a). This is because IR is able to reduce information asymmetry, and this will increase firm's market value. Also, in the case of the benefits of adopting and preparing the IR exceeds its costs, it can increase firm's market value (Hail, 2011; Cortesi& Vena, 2019).

Climate change disclosure in integrated reports refers to the inclusion of information related to firm's impact on and response to climate change within their integrated reporting framework. Integrated reports aim to provide stakeholders with a holistic view of firm's performance, including its financial, environmental, social, and governance aspects. Climate change disclosure within these reports has become increasingly important due to the growing recognition of climate change as a material risk and the need for transparency. To create effective climate change disclosure in integrated reports, firms often seek the guidance of sustainability experts and use established reporting frameworks like the TCFD recommendations to ensure consistency and comparability of their disclosures (Velte, 2022).

According to SFAC No. 5, (2021) value relevance studies tests both the relevance and reliability of accounting information, this means that proofing the value relevance of accounting information justifies that the accounting amount both affects investors and capital providers' investment decisions and is documented. Furthermore, Veltri& Silvestri (2020) Concluded that IRs able to provide both reliable and credible image of the firms' performance.

Since IR adoption is voluntary in Egypt, the researcher tries to investigate its relevance depending on the alternative hypothesis.

The main hypothesis is:

H1: There is a significant impact of climate change disclosure in IRs on value relevance.

Both Krzus (2011), Esmail (2016) and Albitar et al., (2020) agreed that the IR including climate change information helps in reflecting both accurate information and accounting numbers, also it helps in improving the transparency and quality of accounting information.

Also, Samy (2019) added that the gap between book and market values is a result of unrecognizing intangible resources and externalities in the traditional financial reports. IR contributes to decrease this gap through recognizing and disclosing intangible properties and externalities and also assessing their monetary benefits and costs.

Besides that, Lourenço et al., (2014) mentioned that the large difference between the book value of a firm and its market value originated researchers' need to study and test the non- financial information value relevance. So, the researcher tries to investigate the impact of IR disclosure on book value.

So, the first sub-hypothesis is:

H11: There is a significant impact of climate change disclosure in IRs on book value.

Loprevite et al., (2018) concluded that IR disclosure increases investor's ability to interpret earrings. Moreover, Cortesi& Vena (2019) added that IR it can increase the quality of reported earnings. Furthermore, Obeng et al., (2020) found that there is a positive relationship between the voluntary IR disclosure and the quality of firm’s earnings

Additionally, IR connects financial information with non-financial information and contains more information about firm's strategy, performance, risks and governance including climate change information (Eccles & Saltzman, 2011) and Wu & Zhou (2022) found that the mandatory implementation of IRs limits earnings management in the developed capital markets. But, in Egypt IR implementation is still discretionary, so, the researcher will study the relationship between IR disclosure and earnings, and it's expected that the value relevance of earnings be affected by IR disclosure.

So, the second sub-hypothesis is:

H12: There is a significant impact of climate change disclosure in IRs on earnings.

5- The Applied Study

This section addresses the applied study that the researcher done in order to test the impact of integrated reporting disclosure on value relevance.

5.1 Data sample selection and data collection

- The population of our study is the (EGX30) in the Egyptian stock exchange market; EGX30 Tracks the top 30 firms in terms of liquidity and activity because those firms disclose sustainability reports and have the highest score and degree of disclosure In Environmental, Social and Governance (ESG) aspects and represents the benchmark in disclosing ESG aspects for the Egyptian listed firms. Those firms are more relevant for our study's subject.
- Our sample is the 25 nonfinancial firms in the ESG Index. The sample was 25 firms for five Years (2017–2021), representing 125 observations.

The researcher didn't include 2022 year in the applied study because of Russo-Ukrainian War and its impacts on economy including exchange rates and price fluctuations.

5.2 Variables definitions and measurements

In this section the researcher illustrates the dependent, independent and control variables and the measurement tool for each of them

<u>5.2.1 Dependent variable (value relevance):</u> Regarding the dependent variable, we used Ohlson's model as a proxy for firm value. This measure is considered an ideal proxy for value relevance because it is considered as one of the most important models presented by accounting studies in the context of the research purpose in the field of capital markets, especially in the field of stockholders' equity valuation and it is considered as the most important measurement for value relevance. Because the accounting number is value-relevant if it has a significant relationship with market value, Ohlson used market value as an indicator for value relevance as follows:

$$MV = \beta_0 + \beta_1 E + \beta_2 BV$$

<u>5.2.2 Independent variable (climate change disclosure in IRs):</u> The independent variable in this study is the disclosure level of climate change in IRs. Our study measured to what extent Egyptian firms in the selected sample disclose nonfinancial information, including financial, governance, social, economic and environmental aspects, compared to the content of IR. The researcher followed Abogazia et al., (2022) and their index that was developed according to IIRC (2013) and the study of Lee and Yeo (2016) as a measurement for IR disclosure level that was determined based on content

analysis of the eight elements. The researcher constructed the score by assigning each element in the IR framework importance and weights to each of the eight content elements, particularly for each firm and each year in the selected sample. The IR is equal to the weighted average of the disclosed points about:

Organizational overview and external environment, Governance, Business model, Risks and opportunities, Strategy and resource allocation, Performance, Outlook, Basis of preparation and presentation.

Each element in the content involves several items to assess the level of compliance of the IR disclosure. Abogazia et al., (2022) assigns a score for each item ranging from 0 (noncompliance to disclose IR) to 5 (strong compliance to IR disclosure). The result will be between 0 as the minimum IRSCORE and 225 as the maximum IRSCORE (8 main content elements have 45 sub-components multiplied by the range from 0 to 5 points per each item). The higher IR refers to a high level of disclosure of IR in line with the guidelines and principles of the IR framework.

5.2.3 Control variables: The study control firm size (LNASSET), profitability (ROA) and leverage were included in the regression model. According to Crisóstomo et al. (2011), Lee & Yeo (2016), Hussainey et al., (2019), Munawar (2019), Vitolla et al., (2020), Zuhroh (2019) and Abogazia et al., (2022).

Firm size is considered an important control variable that significantly influences the firm's capacity and attractiveness to different investors and stockholders. The size was measured by the natural logarithm of book assets (LNASSET). Then, the researcher controlled profitability as variable also represents a predictor for the value relevance. The researcher used Return on Assets (ROA) as a proxy to measure profitability, which equals net income after tax divided by total assets. Finally, this study includes leverage as another control variable, the researcher used the debt to total equity ratio (DTE) as a proxy to measure leverage. Below is the summary of the study variable measurements (Table 5-1).

Table (5-1)
The Study Variables and Measurements

Variable	Symbol	Measurement
Independent variable:		
IR disclosure	IR	Content analysis from the index (Abogazia et al., 2022)
Dependent variables:		
Value relevance	MV	Market value of stocks at the end of the fiscal year.
Book value	BV	Book value of stocks at the issuance date.
Earnings	E	The disclosed earnings or losses in the financial reports at the end of the fiscal year.
Control variables		
Firm size	Size	The natural logarithm of book assets
Profitability	ROA	The ratio of net income to total assets
Leverage	LEV	Debt to total equity ratio

To empirically assess the impact of the variables mentioned above on value relevance, the following regression models were used to test the study hypotheses:

$$MV = \beta_0 + \beta_1 IR + \beta_2 SIZE + \beta_3 ROA + \beta_4 LEVERAGE + \in$$

$$BV = \beta_0 + \beta_1 IR + \beta_2 SIZE + \beta_3 ROA + \beta_4 LEVERAGE + \in$$

$$E = \beta_0 + \beta_1 IR + \beta_2 SIZE + \beta_3 ROA + \beta_4 LEVERAGE + \in$$

5.3 Descriptive statistics

Table 5-2 presents a summary of descriptive statistics of the sample that consisted of 125 observations for all the study variables (dependent, independent and control).

Table (5-2)

Descriptive statistics

	N	Mean	Std. Dev.	min	p25	Median	p75	max	t-value
IR	125	.007	0.986	-1.857	-.809	.239	.742	1.79	.076
MV	125	22.309	1.214	19.854	21.724	22.44	23.017	24.02	205.51
BV	125	20.562	0.986	18.896	19.91	20.663	21.057	22.24	233.08
E	125	.081	0.670	-1.202	-.342	.102	.487	1.301	1.296
Size	125	-.002	0.993	-1.84	-.682	-.19	.839	2.002	-.02
Lev	125	-.094	0.689	-.794	-.682	-.268	.248	1.353	-1.528
ROA	125	.008	0.977	-2.242	-.518	.163	.644	1.532	.088

The table shows the following:

- Because of existing outliers in IR the researcher took the standard deviation of IR to ensure that the data meet the normality condition and its symbol after modifications become IR.
- Concerning MV, BV, E, SIZE, LEVERAGE and ROA the researcher took the log then winsorized each variable to ensure that the data meet the normality condition. Then the researcher tested the normality of the models and ensured their normality.

5.4 Statistical techniques and hypotheses testing

For each model the researcher conducted some statistical techniques using STATA program in order to finally test the hypotheses

5.4.1 The first sub-hypothesis:

Its objective is testing the impact of climate change disclosure in IRs on BV.

Using STATA program the researcher found that there are no problems in the normality, skewness/kurtosis, linearity, multicollinearity and autocorrelation tests in the tested model but there are some problems in heteroskedasiticity that appears in the results of the tests.

The results of Skewness/ Kurtosis test between -1.96 and +1.96, so there is no Skewness/ Kurtosis problems

Mean VIF 1.466

Mean VIF< 10, so there are no multicollineraty problems.

The results of Prob > chi2 > 10% which means that there are some heteroskedasticity problems.

- The previous results clarify that the Ordinary Least Squares regression (OLS) model is best fitted to test the first sub-hypotheses and its results as follows:

Table (5-3)

Linear regression for first sub-hypothesis

BV	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
IR	.011	.057	0.20	.844	-.101	.123	
Size	.852	.054	15.92	0	.746	.958	***
Lev	-.348	.087	-4.00	0	-.52	-.176	***
ROA	-.069	.068	-1.00	.317	-.204	.067	
Constant	20.531	.049	416.49	0	20.434	20.629	***
Mean dependent var	20.562		SD dependent var		0.986		
R-squared	0.706		Number of obs		125		
F-test	71.933		Prob > F		0.000		
Akaike crit. (AIC)	207.398		Bayesian crit. (BIC)		221.540		

**** p<.01, ** p<.05, * p<.1*

The results illustrate that the coefficient of IR5 is positive and the p-value > 0.1 hence, we can accept the hypothesis stating that there is a positive non-significant impact of IR disclosure on BV. This result is in agree with the previous literature of Samy (2019) and Lourenco etal., (2014) that supposed that IR can decrease the gap between BV and MV that is because of undisclosed nonfinancial information.

5.4.2 The second sub-hypothesis:

Its objective is testing the impact of climate change disclosure in IRs on E.

Using STATA program the researcher found that there are no problems in the normality, skewness/kurtosis, linearity, multicollinearity, autocorrelation and heteroskedasiticity tests in the tested model that appears in the results of the tests.

The results of Skewness/ Kurtosis test between -1.96 and +1.96, so there is no Skewness/ Kurtosis problems.

Mean VIF	1.401

Mean VIF< 10 , so there are no multicollineraty problems.

The results of Prob > chi2 < 5% which means that there are no heteroskedasticity problems.

- The previous results clarify that the OLS model is best fitted to test the first sub-hypotheses and its results as follows:

Table (5-4)

Linear regression for second sub-hypothesis

E	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
IR	.209	.056	3.73	0	.098	.32	***
Size	.403	.053	7.63	0	.299	.508	***
Lev	.016	.095	0.16	.869	-.173	.204	
ROA	.175	.069	2.52	.013	.037	.312	**
Constant	.074	.052	1.44	.151	-.028	.177	
Mean dependent var	0.081		SD dependent var			0.670	
R-squared	0.398		Number of obs			115	
F-test	18.147		Prob > F			0.000	
Akaike crit. (AIC)	184.909		Bayesian crit. (BIC)			198.634	
*** *p<.01*, ** *p<.05*, * *p<.1*							

The results illustrate that the coefficient of IR5 is positive and the p-value < 0.01 hence, we can accept the hypothesis stating that there is a positive significant impact of IR disclosure on E. This result is in agree with the previous literature of Loprevite et al., (2018); Cortesi& Vena (2019); Obeng etal., (2020) and Wu& Zhou (2022) that supposed that IR can increase the quality of reported earnings and also limit earnings management.

5.4.3 The main hypothesis:

Its objective is testing the impact of IR disclosure on value relevance.

Using STATA program the researcher found that there are no problems in the normality, skewness/kurtosis, multicollinearity and heteroskedasiticity tests in the tested model that appears in the results of the tests.

The results of Skewness/ Kurtosis test between -1.96 and +1.96, so there is no Skewness/ Kurtosis problems

Mean VIF	1.466

Mean VIF< 10 , so there are no multicollineraty problems.

The results of Prob > F > 5% which means that there are no autocorrelation problems.

The results of Prob > chi2 <5% which means that there are no heteroskedasticity problems.

- The previous results clarify that the OLS model is best fitted to test the first sub-hypotheses and its results as follows:

Table (5-5)

Linear regression for the main hypothesis

MV	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
IR	.221	.088	2.52	.013	.048	.394	**
Size	.909	.083	10.99	0	.745	1.073	***
Lev	-.088	.135	-0.66	.512	-.355	.178	
ROA	.512	.106	4.85	0	.303	.721	***
Constant	22.296	.076	292.64	0	22.146	22.447	***
Mean dependent var	22.309	SD dependent var	1.214				
R-squared	0.536	Number of obs	125				
F-test	34.602	Prob > F	0.000				
Akaike crit. (AIC)	316.253	Bayesian crit. (BIC)	330.394				

*** *p<.01*, ** *p<.05*, * *p<.1*

The results illustrate that the coefficient of IR is positive and the p-value < 0.05 hence, we can accept the hypothesis stating that there is a positive significant impact of IR disclosure on value relevance. This result is in agree with the previous literature of Abd Almotaleb (2018) that stated that IR is convenient for Egyptian listed firms and Shahin et al., (2019a) that concluded that IR can increase firm's MV. Since the accounting number is value relevant if it has an expected correlation with stock market values and the statistics revealed a positive significant relationship between IR and MV, it can be concluded that the IR disclosure is value relevant.

Furthermore, the results illustrate that the coefficient of size is positive and the p-value < 0.01 hence, we can state that there is a positive significant impact of firm's size on value relevance. Also, the coefficient of Lev is negative and the p-value > 0.1 hence, we can state that there is a negative insignificant impact of firm's leverage on value relevance. Moreover, the coefficient of ROA is positive and the p-value < 0.01 hence, we can state that there is a positive significant impact of firm's ROA on value relevance.

6- Conclusion, Results, Recommendations and Suggestions for Future Research

6.1 Conclusion of Research

This research intends to explore the impact of IR disclosure on value relevance with an applied study on a sample of listed firms in the Egyptian stock market and also studying the impact of climate change circumstances on the IR and its relationship with the relevance of the disclosed information. In order to achieve this objective, the research was divided into seven main chapters. The first five chapters covered the theoretical framework while the practical part and the research conclusions, results, recommendations and suggestions for future research were covered in the last two sections.

6.2 Results of the Research

The current research provided some theoretical and practical results that can be discussed as follows:

7.2.1 Theoretical Findings:

- Voluntary disclosure is the practical and logical solution to address the deficiencies in financial reports in the modern business environment and the integrated reports are the latest model of accounting disclosure in the modern business environment, as they provide a comprehensive picture of the firm's performance to the stakeholders in order to help them evaluate the firm's ability to create value at all short, medium and long terms.

- IR enables firms to disclose the information revealing its strategies and performance clearly as IR connects environmental, social, economic and governance information in one report.
- IRs give more attention to the firm's performance more than the traditional financial statements as IRs reflect the extent of the firm's usage of its available resources and its relationship with the invested capital.
- There is a difference between IRs and sustainability reports. One of the most important points of difference is the focus of IRs on financial and non-financial information represented by the six capitals in addition to the business model, while sustainability reports focus on non-financial information represented in the economic, social and environmental aspects of firm.
- The use of IR achieves important benefits in the business environment, including making improvements in operations, increasing the possibility of obtaining capital at a reasonable cost, guaranteeing a commercial license, and better management for the reputation risks, in addition to enhancing transparency.
- The value is not created from within the enterprise alone through its own financial information only, but rather through the influence of the external environment, including economic, social and environmental conditions and its integration into the firm's strategy, as the ability of the establishment to create value is closely linked to supply chains, society and consumers that may participate in or be affected by value creation or destroy it.
- IRs provide a comprehensive view of firms regarding to their operations, the risks surrounding them and the opportunities available to them in order to create value in short, medium and long terms.
- The IR preparation process is about looking into the future in the context of the insights that are gained from past performance, and aims to help firms identify the basic components for creating value in the future.
- The need for a gradual shift by firms in adopting IRs in the next stage through the development of current reports that disclose social, environmental and governance issues instead of shifting immediately and suddenly to IRs.

- The future of practice in Egypt regarding accounting disclosure through IRs is a promising future, as there is an interest of the listed firms in the Stock Exchange to disclose sustainability reports and therefore it is considered a step on the right path to start disclosure through IRs.
- Value relevance of accounting information includes both relevance and faithful representation of the characteristics of accounting information quality.
- IR can illustrate the impact of climate change and other factors on firms' strategies and business models and make it more transparent to investors and capital providers.
- Climate change has impacts on financial reporting including IR inputs and its structure.
- The researcher can conclude that IR positively affects the value relevance of the disclosed information.

6.2.2 Practical Findings:

- With respect to the main hypothesis there is a positive significant impact of climate change disclosure in IRs, firm size and ROA on value relevance. However, there is a negative non-significant impact of firm's leverage on value relevance.
- With respect to the first sub-hypothesis there is a positive non-significant impact of climate change disclosure in IRs on book value. However, there is a positive significant impact of firm size on book value, there is a negative significant impact of firm's leverage on book value, but there is a negative non-significant impact of ROA on book value.
- With respect to the second sub-hypothesis there is a positive significant impact of climate change disclosure in IRs, firm size and ROA on earnings. However, there is a positive non-significant impact of firm's leverage on earnings.
- With respect to the third sub-hypothesis there is a positive significant accumulated impact of climate change disclosure in IRs and firm size on both book value and earnings, there is a negative significant accumulated impact of firm's leverage on both book value and earnings, but there is positive non-significant accumulated impact of ROA on both book value and earnings.

6.3 Recommendations for Research

Based on the research's theoretical and practical results, the researchers recommends the following:

- The IIRC should develop a unified model for firms to use it in the IR disclosure process.
- The Egyptian legislation should develop Egyptian standards that guides IR disclosure in the Egyptian environment including climate change impacts.
- The Egyptian legislation should develop Egyptian standards that guides disclosing climate change impacts in its reports on the firm, in the research the researcher developed a model that can be used.
- The Egyptian stock market should mandate the listed firms to adopt IRs.

6.4 Suggestions for Future Research

The followings are some ideas for future research:

- The impact of IR disclosure on the supplementary characteristics of financial information's quality.
- The relationship between IR and climate change disclosure.
- The relevance of climate change disclosure and its impact on investors' decisions.
- The impact of IR disclosure on earnings quality.
- The relationship between IR adoption and firm size.
- Constructing an index or any other measurement tool to measure climate change disclosure level in reports.

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