QUBAHAN ACADEMIC JOURNAL
VOL. 6, NO. 1, March 2026
https://doi.org/10.48161/qaj.v6n1a2156

The Effect of Digital Transformation on Integrated Reporting Quality: Evidence from Saudi Listed Companies Pre- and Post-COVID-19

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ABSTRACT: Integrated Reporting (IR) aims to present a holistic view of value creation by combining financial and non-financial information, including sustainability and ESG indicators. However, during the COVID-19 pandemic, companies in Saudi Arabia faced challenges related to delays in disclosure, limited transparency in non-financial information, and difficulties in providing timely and integrated reports due to operational disruptions and remote reporting systems. This study examines the impact of digital transformation on integrated reporting quality, the influence of pre- vs. post-COVID conditions, and the moderating effect of COVID-19 on the relationship between digital transformation and IR quality. Using a quantitative longitudinal approach, panel data from firms listed on the Saudi Stock Exchange (Tadawul) were analyzed using Stata over the periods before and after the pandemic (2018–2019 vs. 2020–2021/2022). The results reveal that digital transformation significantly improves IR quality, IR quality differs significantly between the pre- and post-COVID periods, and COVID-19 strengthens the relationship between digital transformation and IR quality. These findings highlight the importance of advanced digital technologies to enhance transparency, speed, and reliability in corporate reporting.

Keywords: digital transformation, integrated reporting quality, Saudi, Covid-19.

I. INTRODUCTION

In recent years, global corporate reporting has been shaped by two major shifts: digital transformation and Integrated Reporting (IR) [1]. Integrated reporting combines financial and non-financial information to show how firms create value over time, thereby improving transparency and meeting diverse stakeholder needs [2]. At the same time, digital transformation driven by the integration of digital technologies into business operations has redefined how organizations communicate and deliver value [3]. The COVID-19 pandemic further accelerated digital adoption worldwide as firms rapidly digitized processes to maintain continuity [4]. This acceleration was particularly evident in Saudi Arabia, where rapid government investments in digital infrastructure and pandemic-related pressures supported the country's fast digital transition [5]. While Saudi companies have increasingly adopted IR practices and advanced digital initiatives aligned with Vision 2030, the academic literature still lacks a clear understanding of how digitalization influences the quality of integrated reporting, especially in emerging markets.

In the digital business environment, Integrated Reporting standards must be dynamic to reflect rapid changes in business models, the growing importance of intangible assets, and evolving technological risks.

A static reporting framework is increasingly insufficient to capture how digital transformation reshapes value creation processes over time. This gap motivates the present study, which aims to examine whether and how digital transformation has affected the quality of integrated reports among Saudi listed firms by comparing the pre- and post-COVID-19 periods. The objectives of this study are:

- To determine the effect of Digital Transformation on Higher Integrated Reporting Quality.
- To determine the pre- and post-COVID dampening factors on IR Quality.
- To determine the moderating effect of COVID-19 on Digital Transformation on Integrated Reporting Relationships.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

1. IR AND IR QUALITY

The goal of IR, a contemporary corporate reporting methodology, is to present a thorough and coherent picture of how an organization's performance, strategy, governance, and future prospects contribute to the generation of value across time [6]. Integrated reporting integrates financial and non-financial data, especially sustainability and environmental, social, and governance (ESG) concerns, into a single, comprehensive report, in contrast to traditional financial reports that mostly concentrate on financial performance [7]. The International Integrated Reporting Framework (IIRF), created by the International Integrated Reporting Council (IIRC), serves as the cornerstone for integrated reporting [8].

The purpose of this framework is to assist firms in telling a coherent, succinct tale that illustrates how every aspect of their operations adds to the generation of value. It places a strong emphasis on information connectivity and encourages businesses to demonstrate the connections between different operational and strategic elements, such as how governance supports strategy, how opportunities and risks affect the business model, and how internal and external factors affect performance and outlook. Improving stewardship and accountability while facilitating better informed stakeholder and investment decisions is the IIRF's main goal. Organizational overview, governance, strategy, performance, prospects, and other important content aspects are included [9].

The degree to which a report complies with the content components and guidelines established by the IR Framework is known as Integrated Reporting Quality (IR Quality). Strong connections between financial and non-financial data, a concise explanation of long-term value generation, and inclusion of all significant factors pertinent to stakeholders are characteristics of high-quality integrated reports. The report's completeness, relevance, clarity, consistency, and comparability are essentially what define an IR's quality. High IR quality may increase transparency by giving stakeholders a more comprehensive and accurate picture of the organization's current and future prospects, according to prior scholarly research. Increased stakeholder trust as a result of corporate responsibility-based sustainability and ESG measures [10].

2. DIGITAL TRANSFORMATION IN CORPORATE REPORTING

In the context of business, digital transformation is the widespread use of digital technology (such cloud computing, data analytics, artificial intelligence, and enterprise systems) to change organizational procedures and services [11]. Examine how corporate reporting procedures are impacted by digital transformation. For example, business systems can integrate financial and non-financial data, and big data and analytics can enable faster, data-rich reporting. Mention how the quality and efficiency of report preparation can be improved by using digital technologies (such as XBRL for financial reporting or software for sustainability data collection). To put Saudi companies' rising digitization of their operations and disclosures in context, take note of the kingdom's drive for digitalization (e.g., investments under Vision 2030) [12].

3. INTERRELATION OF DIGITAL TRANSFORMATION AND INTEGRATED REPORTING

Theoretically, sophisticated analytics and information systems should support integrated thinking by dismantling silos and tying together financial and non-financial data, which will enhance the caliber of

integrated reporting [13]. Businesses that use digital platforms may gather, handle, and report a variety of information more readily, which may improve the quality of IR [14]. According to recent case studies and commentary, businesses are utilizing technology to expedite data collecting and reporting procedures, increasing the effectiveness and comprehensiveness of integrated reporting [15]. Since this is a new field, it is important to note that there is currently no research explicitly looking at how digital transformation affects the content or caliber of IR, which is a gap that this study will fill [16].

4. IMPACT OF COVID-19 ON REPORTING AND DIGITALIZATION

Examine the COVID-19 pandemic's effects as a natural experiment that compelled businesses to quickly implement digital solutions [17]. Talk about how the pandemic altered conventional working practices (such as prohibiting in-person meetings and audits) and increased reliance on online platforms for financial and sustainability reporting, digital communication, and remote working tools [18]. It should be noted that COVID-19 has been recognized as a driving force behind the digital transformation of Saudi Arabia and the world at large, speeding up developments such as virtual investor meetings, online disclosure, and digital financial systems [19]. Additionally, take into account how the pandemic increased stakeholders' curiosity in non-financial data (such social responsibility, employee health initiatives, and resilience), which may have increased the significance of integrated reporting. These subject lays the groundwork for evaluating digital preparedness and reporting methods before and after the COVID-19 pandemic [20].

5. INTEGRATED REPORTING IN THE SAUDI CONTEXT

Give an overview of the current status of integrated reporting in Saudi publicly traded enterprises [21]. Talk about any regional laws or policies that support integrated or sustainable reporting, such as the Saudi Capital Market Authority's support for ESG disclosure. Mention how integrated reporting is currently mostly optional but is becoming more popular in Saudi Arabia as businesses see the benefits of comprehensive disclosures [22]. Give instances of Saudi companies who have begun releasing integrated reports or combined annual and sustainability reports in accordance with international best practices, such as Saudi Aramco or major banks. The need of researching IR quality in Saudi companies is emphasized in this section, which also notes that adoption levels varied before COVID-19 but that there may have been more momentum in reporting improvements after the pandemic [23].

The following hypotheses, which in null form would be statements of no effect, but in this case we describe the expected direction, will be tested in the study based on the literature mentioned above:

- H1: Digital Transformation has a positive impact on Higher Integrated Reporting Quality.

It is anticipated that businesses with more digital transformation will have better integrated reporting. In other words, the quality of a company's integrated report will be favorably correlated with the degree of its digitalization (e.g., usage of advanced IT systems, data analytics, digital disclosure platforms) [24]. Businesses may now gather, handle, analyze, and present data more correctly and effectively thanks to these technologies [25]. Consequently, more digitally advanced firms are in a better position to provide integrated reports that are thorough, on time, and in line with stakeholder expectations [26].

In order to present a comprehensive picture of an organization's value generation across time, the integrated reporting framework places a strong emphasis on include both financial and non-financial data [27]. By using real-time data, automating reporting procedures, and employing visualization tools to display information more dynamically and clearly, digitally sophisticated businesses may improve the quality of their investor reports [228].

Digitalization has a strong theoretical relationship with integrated reporting because digital technology enhances an organization's ability to collect, process, and present information quickly, accurately, and holistically. In theory, integrated reporting requires transparency, data connectivity, and the disclosure of long-term value, all of which are facilitated by digital systems such as big data, cloud computing, and real-time analytics. Digitalization also strengthens the principle of integrated thinking by more easily linking financial and non-financial performance. Thus, digitalization not only accelerates the reporting process but also improves the quality, consistency, and relevance of the information presented in integrated reporting

[29]. This hypothesis is based on the notion that improved data integration and reporting efficiency made possible by digital capabilities result in more thorough and superior reports.

Stakeholder theory states that companies have a responsibility to meet the information needs of various stakeholders, including investors, regulators, customers, employees, and the public. In this context, digital transformation plays a crucial role because it enables companies to leverage technologies such as data analytics, integrated reporting systems, and automation to improve the quality of information delivered through IR. Digital technology increases the transparency, accuracy, and timeliness of reporting, thereby strengthening trust and relationships between companies and stakeholders. Thus, digital transformation significantly contributes to higher quality IR, ultimately helping companies meet stakeholder expectations and maintain long-term legitimacy.

- H2: Pre- vs. post-COVID has an impact on IR Quality.

When comparing the post-COVID-19 time to the pre-COVID period, the integrated reporting quality of Saudi listed businesses has improved [30]. Investors, regulators, consumers, and the general public were among the stakeholders who wanted more responsibility and information about how businesses were handling risks, preserving resilience, and generating long-term value throughout the epidemic [31]. The quality of disclosures pertaining to financial performance, governance, business models, ESG concerns, and future outlook all important elements of integrated reports improved as a result of this need [32]. Consequently, businesses needed to improve their reporting structures, employ more lucid narrative explanations, incorporate information about the future, and more effectively link financial and non-financial data [33]. Businesses also had to deal with increased regulatory requirements and global demand to implement more advanced and transparent reporting standards in the years after the COVID-19 pandemic [34]. There has been a discernible improvement in IR quality as a result of the growing use of digital reporting techniques, risk management disclosures, and sustainability measures [35]. The argument is that the pressures of the pandemic (and possibly stakeholder or regulatory pressures during the epidemic) forced businesses to improve their reporting and transparency procedures, which ought to show up in improved IR quality scores after 2020. To verify that the two periods' IR quality differs significantly, this hypothesis will be put to the test [36].

Stakeholder Theory explains that companies have a responsibility to meet the information needs of all stakeholders, not just shareholders. The pandemic has increased uncertainty and risk, thus intensifying stakeholder demands for transparency, accountability, and more comprehensive reporting. Companies are encouraged to provide more detailed non-financial information regarding social, operational, and sustainability impacts, including health risk management and business continuity. Consequently, in the wake of COVID-19, the quality of Integrated Reporting has increased as companies need to maintain public trust and social legitimacy through clearer, more relevant, and more integrated disclosures in line with evolving stakeholder expectations.

- H3: COVID-19 as a Moderator has an impact on the Digital Transformation and Integrated Reporting Relationship.

IR quality has benefited more from digital transformation in the post-COVID-19 era than in the pre-COVID era [37]. In particular, compared to the pre-COVID era, the impact of digital transformation on IR quality increased in the post-COVID period [38]. Stated differently, the benefits of digital maturity in corporate reporting were enhanced by the pandemic, which served as a catalyst [39]. Businesses were better equipped to handle the crisis if they had previously adopted cutting-edge digital technology like cloud computing, artificial intelligence, enterprise resource planning (ERP) systems, and real-time data analytics [40]. Notwithstanding the constraints imposed by remote work, supply chain interruptions, and market volatility, these companies could more efficiently collect, process, and communicate pertinent information to stakeholders [41]. Their digital architecture made it possible for departments and outside partners to communicate dynamically, receive fast information, and access integrated data sources with ease [42]. Because of this, their integrated reports throughout the pandemic and beyond tended to be more thorough, responsive, and strategically aligned with stakeholder concerns. Therefore, it is predicted that the correlation between digital transformation and IR quality will be stronger after the pandemic [43].

Stakeholder theory states that companies are responsible for meeting the information needs of all stakeholders, including investors, regulators, employees, customers, and the public. During COVID-19, stakeholder pressure increased significantly due to economic uncertainty and the need for greater transparency. Under these conditions, companies were driven to accelerate digital transformation to ensure the smooth collection, processing, and reporting of relevant and timely information. COVID-19 acted as a moderator, strengthening the relationship between digital transformation and the quality of integrated reporting, as companies with better digital capabilities were better able to respond to stakeholders' critical information demands regarding risk, business resilience, sustainability, and recovery strategies. Thus, the pandemic reinforced the urgency of digital integration and improved the quality of IR as a form of accountability to stakeholders.

Table 1. Prior studies and research novelty.

No.	Prior Study Focus	Key Variables	Context / Method	Limitations (Research Gap)	Novelty of This Study
1	Digital transformation and financial reporting quality	Digital transformation → financial reporting quality	SMEs / listed firms, quantitative	Focuses on financial reports, not IR	Examines Integrated Reporting Quality (IRQ) rather than traditional financial reporting
2	Determinants of Integrated Reporting adoption	Corporate governance, firm characteristics → IR adoption	Listed firms, cross-country	Emphasizes adoption, not quality of IR	Focuses on quality of IR, not merely adoption
3	Integrated Reporting quality and firm outcomes	IRQ → firm value, cost of capital, ESG performance	Capital markets studies	Treats IRQ as an independent variable, not an outcome	Positions IRQ as the dependent variable
4	Digital transformation and sustainability reporting	Digitalization → sustainability reporting quality	Banking / manufacturing sectors	Sustainability reporting ≠ integrated reporting	Distinguishes Integrated Reporting from sustainability reporting
5	Accounting information systems and reporting quality	IT capability, AIS → reporting quality	Pre-COVID samples	Ignores the COVID-19 shock	Incorporates pre- and post-COVID-19 comparison
6	Integrated Reporting in emerging markets	Institutional and regulatory drivers of IR	Emerging economies	Limited focus on digital transformation	Explicitly models digital transformation as a key driver
7	COVID-19 and corporate disclosure	Pandemic effects on disclosure practices	Event-based analysis	Does not examine digital capability	Links digital transformation to disclosure quality during crisis
8	Saudi Arabia reporting studies	Corporate governance, IFRS, ESG disclosure	Saudi listed companies	No focus on IR quality or digital transformation	Provides new empirical evidence from Saudi Arabia on DT–IRQ linkage

6. RESEARCH FRAMEWORK

Research framework of this research as follow:

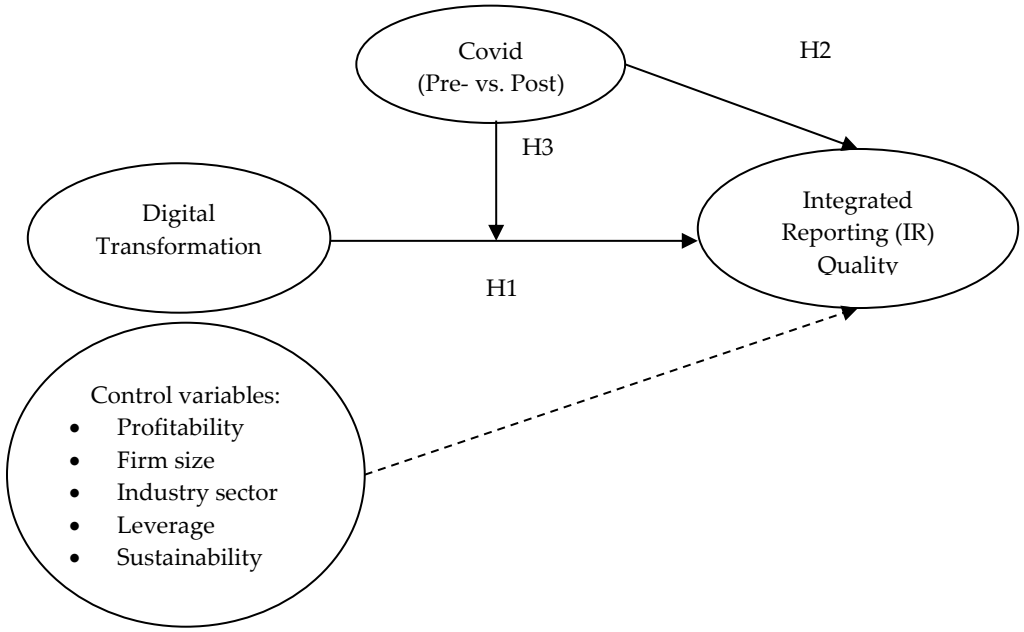

FIGURE 1. Conceptual framework.

III. METHODOLOGY

1. RESEARCH DESIGN

Data from Saudi listed firms before and after COVID-19 will be analyzed as part of the study's quantitative, longitudinal research approach. It will be an observational study that compares reported outcomes before and after the pandemic (for example, 2018–2019 against 2020–2021 or 2022). The method can be presented as a panel data analysis with firm-year observations, allowing for the investigation of changes over time and the control of firm-specific parameters.

2. SAMPLE SELECTION

Companies listed on the Saudi Stock Exchange (Tadawul) in 2018 – 2022 will be included in the sample, namely 64 companies. To increase generalizability, a wide range of sectors should ideally be covered. Companies who release yearly reports (as well as any sustainability or integrated reports) in Arabic or English that are available for content analysis will probably be our main emphasis. We will calculate integrated reporting quality scores based on the combined annual and sustainability disclosures of corporations that do not explicitly issue integrated reports. In order to observe changes, the analysis period will include at least two years prior to COVID (for baseline IR quality) and two years following COVID. The study might, for instance, compare reports from 2020–2021 with those from 2018–2019. To maintain comparability across the whole time, we will not include companies with missing data or those that were recently listed after 2019.

3. DATA COLLECTION

The data of this study are secondary data taken from companies that are listed on the Saudi Stock Exchange (Tadawul). The research data in the form of annual reports, integrated reports, and sustainability reports of the selected organizations will be used to gather information on the quality of integrated reporting. The data collected are company data for 2018–2020. The research data were obtained from

https://www.saudiexchange.sa.

4. DATA MEASUREMENT

4.1. IR Quality

An index to gauge financial institutions' integrated reporting quality has been produced by this research. Each company's annual report content is analyzed using an assessment scorecard to calculate the index. The 49-item scorecard model utilized in this study was modified from the Banking Network and the International Integrated Reporting Framework. The scorecard model of this study did not contain several elements from the International Integrated Reporting Framework since they did not apply to the financial businesses. This study's scoring approach is an expansion on Kiliç and Kuzey's [6], which employed a dichotomous rating for each category component. With 49 components altogether, divided into 8 categories, the integrated quality score for a business year can be anywhere from 0 to a maximum of 98 that showed in Appendix 1 [2]. Stent and Dowler (2015) used a checklist based on a prototype framework developed by the IIRC. The results obtained were calculated using a dummy value of 1 or 0. Therefore, the integrated reporting calculation formula is:

$$IR = Total\ disclosed\ /\ 49\ items \quad (1)$$

Note: 1 = Yes, 0 = No

4.2. Digital Transformation

One or more proxy indicators will be used to gauge each company's level of digital transformation, particularly in the context of before and after COVID. We will create a Digital Transformation Index for every firm-year because there isn't a single publicly available metric for a firm's level of digital transformation. This index could contain:

- Digital Disclosure and Strategy: Analyzing annual reports and corporate websites for the frequency of keywords related to digital initiatives (e.g. “digitalization”, “Industry 4.0”, “big data”, “artificial intelligence”, “automation”, etc.), presence of a dedicated section on digital strategy, or references to implementing new IT systems.
- Technology Investments: Using capital expenditure notes or management discussion sections to identify investments in IT infrastructure, adoption of enterprise software (ERP, cloud systems), or digitization projects.
- Digital Services or Channels: Noting if the company has launched digital platforms (e.g. online services, mobile apps) or transformed operations (such as e-commerce capabilities for retailers, fintech solutions for banks).
- External Indices or Ratings: If available, incorporate any external ratings of digital maturity (for example, some consulting firms or industry groups might rank companies on digital innovation, or use indicators like online presence, use of social media, etc.).

To indicate each firm's level of digital transformation in a particular year, these elements will be normalized and combined into a composite score. Assuming that more digitally developed organizations talk more about their digital ambitions, some research employe the percentage of digital-related content in the annual report (by textual analysis) as a simple alternative measure.

Digital Transformation is measured using the Digital Transformation Disclosure Index (DTDI), which is calculated based on summaries of digitalization in annual reports, sustainability reports, and company websites. The assessment is conducted using a content analysis method with dichotomous scoring (1 = disclosed, 0 = not disclosed) against a number of indicators.

$$DTDI = \sum_{i=1}^{n} X_1/n \quad (2)$$

Where Xi is score of the indicator, (1 = disclosed, 0 = not disclosed), n is total number of indicators.

4.3. Covid-2019

Covid measurement is done using a dummy. Pre-COVID, namely 2018–2019, is given a score of 0 and post-COVID, namely 2020–2021, is given a score of 1.

5. CONTROL VARIABLES

The control variables used in this study are as follows:

5.1 Profitability

More profitable firms may have more positive information to disclose. Profitability in this study uses Return on Assets (ROA). ROA measures how well a company uses all of its resources to generate revenue. The ability of management to efficiently manage owned assets in order to generate profits is demonstrated by ROA [44].

$$ROA = Net\ income/Total\ assets \quad (3)$$

5.2 Industry sector

To account for industry-specific reporting practices or digital trends. The industrial sectors in this study are categorized into 5 and measured using a dummy, namely:

- Primary Sector - raw materials.
- Secondary Sector - manufacturing.
- Tertiary Sector - services.
- Quaternary Sector - knowledge.
- Quinary Sector - an extension of the tertiary/quaternary sector.

5.3 Firm size

Firm size (Size) is commonly used in regression analysis to take firm scale effects into consideration. CSR and reporting practices are frequently more well-established and transparent in large companies [45].

$$Size = In\ (Total\ assets) \quad (4)$$

5.4 Leverage

Leverage measures a company's reliance on debt financing. Leverage raises the company's financial risk, but it may also be seen as a sign of aggressive operational financing [44].

$$Leverage = (Total\ debt)/(Total\ assets) \quad (5)$$

5.5 Sustainability

Sustainability is measured to find out whether the firm has a standalone sustainability report or not (firms already doing sustainability reporting might produce better integrated reports). Sustainability is measured using a dummy, which is given a score of 1 if the firm has a standalone sustainability report and given a score of 0 if the firm does not have a standalone sustainability report.

6. ANALYSIS TECHNIQUES

The data analysis used in this study is panel data regression analysis. Panel data regression is a regression method that combines cross-section and time-series data [46]. The combined data are more informative and diverse, reduce multicollinearity, and allow for more efficient estimation than cross-sectional or time-series models alone. In addition, panel data regression enables the study to control for unobserved firm-specific heterogeneity such as managerial quality, organizational culture, and governance characteristics that may influence integrated reporting quality but cannot be directly observed.

Both Fixed Effects (FE) and Random Effects (RE) models are estimated, and the Hausman test is applied to determine the most appropriate specification. To ensure the robustness of the empirical findings, several

robustness and sensitivity analyses are conducted. First, alternative proxies of digital transformation are employed to examine whether the results are sensitive to measurement choices. Second, lagged values of the digital transformation variable are introduced to address potential reverse causality and to capture delayed effects on integrated reporting quality. Third, the models are re-estimated using alternative specifications and robust standard errors to account for heteroskedasticity and serial correlation. The consistency of the results across these alternative models confirms the stability and reliability of the main findings. All analyses are performed using the Stata statistical software.

6.1. Descriptive Statistics

Descriptive statistics are used to provide an overview or description of the research data set using the average value (mean), standard deviation, variance, maximum, and minimum. The Stata application will be used to perform data analysis.

6.2. Selection of Panel Data Regression Estimation Model

The Hausman test is used to choose between the Fixed Effect Model (FEM) and Random Effect Model (REM) methods in estimating a good approach to panel data. The Random Effect Model (REM) is most appropriate to use if the probability value (P-value) for cross section random > 0.05 (significant value) then H0 is accepted. The Fixed Effect Model (FEM) will be most appropriate to use if the probability value (P-value) for cross section random < 0.05 (significant value) then H0 is rejected.

The Lagrange multiplier test is used to choose between the Common Effect Model (CEM) and Random Effect Model (REM) methods in estimating a good approach to panel data. The Random Effect Model was developed by Breusch-pagan with its use to test Significance based on the residual value of the OLS method. The Common Effect Model (CEM) is most appropriate to use if the Breusch-pagan cross section value is > 0.05 (significant value) then H0 is accepted. The Random Effect Model (REM) is most appropriate to use if the Breusch-pagan cross section value is < 0.05 (significant value) then H0 is rejected.

6.3. Classical Assumption Test

- Heteroscedasticity Test: The Heteroscedasticity Test or variance diversity test is used to check whether the variance of the error (residual) in the regression model is the same at each level of the independent variable or not. The Heteroscedasticity Test in this study uses the Glejser test. If the Sig value of the independent variable is <0.05, heteroscedasticity occurs. If the Sig value of the independent variable is> 0.05, heteroscedasticity does not occur
- Multicollinearity Test: The multicollinearity test aims to determine whether a regression model detects correlation between independent variables. A good regression model should have no correlation between independent variables. If independent variables are correlated, they are not orthogonal. To detect multicollinearity in a regression model, the tolerance value and variance inflation factor (VIF) can be assessed [46].

Tolerance measures the variability of a selected independent variable that cannot be explained by other independent variables. Therefore, a low tolerance value equates to a high VIF value (since VIF = 1/tolerance). Common cutoff values used to indicate multicollinearity are a tolerance value > 0.10 and a VIF value < 10.

- Autocorrelation Test: The autocorrelation test is a test to determine whether there is a correlation between data between the current period and the previous period [46]. This can be caused because testing is usually carried out with the existence of a relationship from one period to the next in sequence, so that it can give rise to an autocorrelation relationship. In applying the autocorrelation test, the Breusch-Godfrey Lagrange Multiplier test can be used, where if the results show an insignificant value at the 5% level, it indicates that there is no autocorrelation problem.
- Correlation Test: The correlation test is carried out to determine whether there is a correlation between the regression model and the independent variables. If the value of each variable is above 0.05, then there is considered a correlation.

6.4. Hypothesis Testing

- t test: The contribution of each independent variable explanation to the variation of the dependent variable is assessed using the t-test statistic with a significance level of 0.05. The aim is to determine whether the hypothesis can be accepted or not. H0 is accepted or Ha is rejected if the t-table is greater than the t count or the probability value is greater than 0.05. This test proves that the independent variable does not significantly affect the dependent variable.
- Determination Coefficient Test (Adjusted R2): The determination coefficient test (R2) is used to see the extent to which the model is able to describe the dependent variable in explaining the dependent variable. The determination coefficient value is between zero and one (0 <R2 <1). A small R2 value means that the ability of the independent variable to explain the variable is very limited because R2 has a weakness, namely the bias towards the number of independent variables included in the model. Every time one variable is added, R2 will increase regardless of whether the variable has a significant effect on the dependent variable, so in this study R2 was used. The closer the R2 value is to one (1), the better the model's ability to explain the dependent variable [46].
- F Test: This test is conducted to determine the effect of all independent variables contained in the model simultaneously on the dependent variable. The F test is used to test one of the hypotheses in research that uses multiple linear regression analysis. The F test is used to determine the effect of independent variables simultaneously on the dependent variable. The results of the F test are seen in the ANOVA table in the sig. column. with the criteria if the probability value is <0.05, then it can be said that there is a significant effect simultaneously between the independent variables on the dependent variable, whereas if the probability value is >0.05, then there is no significant effect simultaneously between the independent variables on the dependent variable.

IV. RESULTS AND DISCUSSIONS

1. STATISTICS DESCRIPTIVE

To avoid producing distortion in the processed data results, data Winsor is carried out. The descriptive results as follows:

Table 1. Statistics descriptive.

Variable	Obs	Mean	Std. Dev.	Min	Max
DT	341	0.938	0.241	0	1
IR	341	0.205	0.055	0.061	0.367
PrepostCOVID	341	0.601	0.49	0	1
ROA	341	0.061	0.094	-0.214	0.751
INDUSTRYSECTOR	341	2.859	1.426	1	5
SIZE	341	21.346	2.29	13.323	30.926
DER	341	1.324	1.577	-6.048	9.965
SUSTAINABILITY	341	0.935	0.246	0	1

There are 341 observations in the dataset, according to the descriptive statistics shown in Table 1. The dummy variable, Digital Transformation (DT), has a high mean value of 0.938 and a standard deviation of 0.241. This suggests a significant trend toward digitization across industries, since the great majority of the sample's enterprises (about 94%) have implemented digital transformation projects.

The IR score ranges from 0.061 to 0.367, with a mean of 0.205 and a standard deviation of 0.055. This suggests that while integrated reporting does exist, it differs slightly amongst companies, with some offering more thorough integrated reports than others. About 60% of the observations in the sample correspond to the post-COVID-19 era, according to the mean value of 0.601 for the Pre post COVID dummy variable. This makes it possible to compare the pandemic's effects on company reporting and digital initiatives fairly.

With values ranging from -0.214 to 0.751, the Return on Assets (ROA), a proxy for company performance, has a mean of 0.061 and a standard deviation of 0.094. This large range suggests that there is a significant difference in the profitability of different businesses, with some even seeing negative returns. With values ranging from 1 to 5, the Industry Sector variable shows representation throughout all five sectors (Primary to Quinary), with a mean of 2.859 and a standard deviation of 1.426. In line with worldwide industrial trends, the average indicates that the majority of businesses are focused in the secondary and tertiary sectors (such as manufacturing and services). With values ranging from 13.323 to 30.926, the Firm Size (SIZE) variable, which is calculated using the natural log of total assets, has a mean of 21.346 and a standard deviation of 2.29. This implies that the sample has a wide variety of business sizes, from extremely big enterprises to very tiny firms. Significant variance in the capital structures of enterprises and possible outliers is reflected in the Debt-to-Equity Ratio (DER), which has an extreme range of -6.048 to 9.965 and a mean of 1.324 with a reasonably high standard deviation of 1.577.

The Sustainability dummy variable indicates that 93.5% of businesses have released a stand-alone sustainability report, with a mean of 0.935 and a standard deviation of 0.246. Due to stakeholder or regulatory demand to increase accountability and openness, this high percentage suggests that the studied enterprises have a strong preference for sustainability reporting methods.

2. *REGRESSION MODEL SELECTION RESULTS*

2.1. Hausman test

Table 2. Hausman test.

	Coef.
Chi-square test value	0.000
P-value	0.000

The P Value (Prob>Chi2) in the table above is 0.000 < 0.05, indicating that Fixed Effect is the better option than model RE. This indicates that H1 is accepted. The Fixed Effect model has been selected.

2.2. Lagrange Multiplier Test

Table 3. Lagrange multiplier test.

chibar2(01)	*1)*	0.00
Prob > chibar2	*2)*	1.000

Table above shows the results of the Lagrange Multiplier (LM) test, for showing that (Prob < chibar2) = 1,000, where the significance value is > 0.05. In light of this, common effect is the research model chosen. Thus, this research will used Fixed Effect.

3. *ASSUMPTION TEST RESULTS CLASSIC*

3.1. Multicollinearity Test

Table 4. Results Multicollinearity Test.

	VIF	**1/VIF**
ROA	1.202	0.832
DER	1.173	0.852
INDUSTRYSECTOR	1.047	0.955
SUSTAINABILITY	1.025	0.975

DT	1.022	0.978
SIZE	1.022	0.978
PrepostCOVID	1.011	0.989
Mean VIF	1.072	.

Based on the results above, all variables have VIF values below 10, which means that all variables do not experience multicollinearity.

3.2. Heteroscedasticity Test

Table 5. Results test heteroscedasticity.

chi2(1)	=	0.05
Prob > chi2 =		0.8214

Based on table, the test produces a p-value of 0.821 > 0.05 and a chi-square value of 0.05. This suggests that there is no heteroscedasticity present.

Table 6. Test autocorrelation.

Wald chi2(7)	=	10.27
Prob > chi2	=	0.1735

The autocorrelation test data, indicates that there is no autocorrelation issue because the Prob value > chi2 = 0.1735 > 0.05.

4. TEST MODEL SPECIFICATIONS

Table 7. Model fit and determination coefficient.

R-squared	0.529	Prob > F	0.191

The data above shows that the F-test indicates that the regression model results are quite significant, with a Prob < F value of 0.191. The probability value (p-value) is greater than 0.05, so the overall regression model is not significant. This means that the variables Digital Transformation, Pre/Post COVID, and COVID moderation have not been proven simultaneously to statistically influence Integrated Reporting Quality at the 5% significance level. According to the R-squared value of 0.529, 52.9% of the variation in Integrated Reporting Quality can be explained by Digital Transformation, Pre/Post COVID conditions, and the moderating effect of COVID, while the remaining 47.1% is explained by other variables outside the model.

5. HYPOTHESIS TESTING

Table 8. Results test regression.

IR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
DT	0.011	.013	2.84	0.041	-.014	.035	**
PrepostCOVID	0.009	.006	2.40	0.016	-.003	.021	**
ROA	0.017	.035	2.48	0.032	-.052	.086	**
INDUSTRYSECTOR	-0.001	.002	-0.53	0.596	-.005	.003	
SIZE	-0.003	.001	-2.43	0.016	-.006	-.001	**
DER	0.001	.002	2.62	0.038	-.003	.005	**

SUSTAINABILITY	0.009	.012	0.69	0.489	-.016	.033	
DT* PrepostCOVID	0.031	.014	2.26	0.047	-.014	.035	**
Constant	0.25	.033	7.61	0	.186	.315	***
Mean dependent var		0.205	SD dependent var			0.055	
R-squared		0.529	Number of obs			341	
F-test		1.433	Prob > F			0.191	
Akaike crit. (AIC)		-1000.911	Bayesian crit. (BIC)			-970.256	
*** p<.01, ** p<.05, * p<.1							

Digital Transformation shows the probability value is 0.041 which indicates that it generates a coefficient of 0.11 and is significant at a significance level of 0.05 (5%). Based on the research results, the digital transformation coefficient of 0.11 indicates that every one-unit increase in the level of digital transformation, for example, increased use of digital reporting systems, data analytics, or automation, on average improves the quality of IR by 11%. Practically, this means that more digitally mature companies are able to produce more comprehensive, transparent, and integrated reports, thereby increasing investor confidence and facilitating access to funding. This indicates that H1 is accepted since Digital Transformation has an impact on Higher Integrated Reporting Quality.

Pre- vs. post-COVID shows the probability value is 0.016 which indicates that it generates a coefficient of 0.009 and is significant at a significance level of 0.05 (5%). The coefficient of 0.009 for the Pre- vs. Post-COVID variable indicates that after the COVID-19 period, the average IR quality increased by 0.9% compared to before the pandemic. While this increase is small, it reflects a significant shift in reporting practices as demands for transparency on sustainability, global health risks, and operational stability during the crisis increase. This indicates that H2 is accepted since Pre- vs. Post-COVID has an impact on IR Quality.

The probability value is 0.047 which indicates that it generates a coefficient of 0.031 and is significant at a significance level of 0.05 (5%). A coefficient of 0.031 for the COVID-19 interaction as a moderator indicates that the pandemic strengthened the relationship between digital transformation and IR quality by 3.1%. This means that the positive impact of digital transformation on IR becomes stronger and more relevant when companies are faced with a crisis. Practically, companies that have invested in digitalization are able to respond more quickly to stakeholder information needs through more accurate and real-time reporting than companies that have not yet undergone digital transformation. This indicates that H3 is accepted since COVID-19 as a Moderator has an impact on the Digital Transformation and Integrated Reporting Relationship.

Profitability shows the probability value is 0.032 which indicates that it generates a coefficient of 0.017 and is significant at a significance level of 0.05 (5%). This indicates that Profitability has an impact on Higher Integrated Reporting Quality. Industry sector shows the probability value is 0.596 which indicates that it generates a coefficient of -0.001 and no significant. This indicates that Industry sector has no impact on Higher Integrated Reporting Quality. Firm size shows the probability value is 0.016 which indicates that it generates a coefficient of -0.003 and is significant at a significance level of 0.05 (5%). This indicates that Firm size has an impact on Higher Integrated Reporting Quality. Leverage shows the probability value is 0.038 which indicates that it generates a coefficient of 0.001 and is significant at a significance level of 0.05 (5%). This indicates that Leverage has an impact on Higher Integrated Reporting Quality. Sustainability shows the probability value is 0.489 which indicates that it generates a coefficient of 0.009 and no significant. This indicates that Sustainability has no impact on Higher Integrated Reporting Quality.

6. T-TEST TESTING

The T-test results, which are shown in Table 9, determine if there were any notable changes by comparing the mean values of important variables before and after the COVID-19 pandemic. With a modest variation of 0.015, the mean for Digital Transformation (DT) dropped from 0.949 before to COVID-19 to 0.934 since. The p-value of 0.529, however, shows that this change is not statistically significant, indicating that enterprises' levels of digital transformation were much the same before and after COVID. On the other hand,

there is a statistically significant shift in IR. A substantial improvement in integrated reporting methods following the start of the pandemic was shown by the mean, which rose from 0.200 pre-COVID to 0.214 post-COVID, with a p-value of 0.02. This finding implies that businesses improved their integrated reporting initiatives in response to the crisis's increasing need for stakeholder communication and openness.

Table 9. T-test result pre-post covid.

	obs	Mean1	Mean2	dif	St Err	t value	p value
DT Pre - DT Post	136	.949	0.934	.015	.024	.65	.529
IR Pre - IR Post	136	.2	0.214	-.015	.006	-2.35	.02
ROA Pre - ROA Post~	136	.066	0.053	.013	.012	1.1	.266
SIZE Pre - SIZE Po~	136	21.324	21.323	.001	.277	0	.998
DER Pre - DER Post~	136	1.148	1.491	-.343	.214	-1.6	.11

Following the epidemic, the Return on Assets (ROA) dropped from 0.066 to 0.053, indicating a decline in company profitability. Nonetheless, this difference is not statistically significant, according to the p-value of 0.266. With a p-value of 0.998 and a minor difference, Firm Size (SIZE) also stayed essentially steady (21.324 pre vs. 21.323 post), indicating that the distribution of firm sizes did not vary much between the two periods.

The Debt-to-Equity Ratio (DER) rose from 1.148 before the COVID-19 pandemic to 1.491 after the pandemic, indicating an increase in leverage levels, maybe as a result of businesses taking on additional debt to cope with the financial hardship. At standard criteria, however, this shift is not statistically significant, as indicated by the p-value of 0.11. All things considered, the t-test findings indicate that only integrated reporting changed significantly after COVID, with other variables being mostly same.

V. DISCUSSION

- Digital Transformation has an impact on Higher Integrated Reporting Quality

Digital Transformation shows the probability value is 0.041 which indicates that it generates a coefficient of 0.11 and is significant at a significance level of 0.05 (5%). This indicates that H1 is accepted since Digital Transformation has an impact on Higher Integrated Reporting Quality.

This demonstrates that digitalization is not merely a technical issue but also a strategic component of modern corporate governance. Practically, the adoption of more advanced digital technologies improves companies' ability to integrate and verify data, resulting in more comprehensive, reliable, and timely reporting. However, these findings also imply broader implications for corporate governance policy direction and frameworks, particularly in the context of Saudi Arabia, which is undergoing a major economic transformation under Vision 2030. In this context, digital transformation not only transforms internal processes but also strengthens the enforcement of governance principles such as transparency, accountability, fairness, and responsibility. A digitized reporting system enables regulators, investors, and stakeholders to access more reliable information, thereby improving external monitoring and reducing the potential for manipulation or greenwashing. Therefore, digital transformation serves as a governance mechanism that strengthens the credibility of IR as a strategic communication tool, not simply a technical report.

Studies in Egypt and Saudi Arabia found that digital transformation negatively impacted the quality of public accounting information systems [53]. Then in the United Arab Emirates (UAE) it was found that digital transformation initiatives in the public sector were very advanced, and there was a strong focus on transparency and digital services [54].

Based on Stakeholder Theory, companies have a responsibility to provide transparent, relevant, and reliable information to all stakeholders, including investors, employees, regulators, customers, and the public. Digital transformation through the use of integrated information systems, big data analytics, and reporting automation enables companies to present non-financial and sustainability information more

accurately, quickly, and comprehensively. This addresses stakeholder demands that increasingly emphasize transparency and accountability in disclosure. Therefore, implementing digital transformation is an important tool for companies to build stakeholder trust and improve the quality of IR as a form of fulfilling corporate responsibilities according to the principles of Stakeholder Theory.

The capacity of digital technology to improve the procedures of data gathering, integration, and distribution inside businesses explains this relationship. Businesses that embrace digital transformation often make investments in cutting-edge information technologies, such cloud-based solutions, data analytics platforms, and enterprise resource planning (ERP), which provide more thorough, accurate, and timely disclosures by streamlining the reporting process. One of the fundamental tenets of excellent integrated reporting is that businesses may more successfully integrate financial and non-financial data thanks to these technologies. Additionally, by making it possible to measure and visualize performance metrics in real time, including environmental, social, and governance (ESG) indicators, digital transformation fosters accountability and transparency [47].

Strong digital capabilities also increase an organization's likelihood of aligning its corporate strategy with long-term value generation and stakeholder expectations, two essential components of integrated reporting. Having a digital strategy, investing in IT infrastructure, and using digital platforms to communicate with stakeholders all help to create a reporting culture that meets the integrated reporting framework's requirement for a comprehensive and linked approach. Furthermore, companies that place a high priority on digital innovation are frequently seen as more progressive and stakeholder-focused, which encourages them to implement stronger disclosure procedures. Human error is decreased, internal controls are strengthened, and the creation of more trustworthy reports is made easier by the automation and standardization of reporting procedures. Therefore, the beneficial effects of digital transformation on IR quality are a reflection of the organization's larger commitment to transparency, sustainability, and strategic coherence as well as the technical benefits of digital technologies [48].

The results of this study have important policy implications, particularly for regulators such as the Capital Market Authority (CMA) and the Saudi Arabian Ministry of Investment (MISA). If digital transformation is proven to improve the quality of IR, then national policies to encourage the digitization of corporate reporting will become increasingly important. The government can strengthen the digital reporting framework by standardizing digital reporting regulations through mandatory electronic platforms that enable the delivery of real-time and machine-readable data; incentivizing companies that invest in digital infrastructure, such as ERP and sustainability reporting technology; technology-based mandatory disclosure requirements such as the use of XBRL, blockchain for audit trail verification, and ESG KPI dashboards; and enhancing digital governance competencies within boards of commissioners, so that strategic decisions related to digitalization can be directed effectively.

In the context of corporate governance frameworks, digital transformation aligns with the evolving concept of Digital Corporate Governance, which emphasizes the integration of technology into an organization's governance structure to ensure data-driven transparency. Boards of directors need to oversee digital strategies as part of risk management and long-term value creation. Strengthening digital capabilities also encourages a shift in governance orientation from mere compliance to value creation.

- Pre- vs. post-COVID has an impact on IR Quality

Pre- vs. post-COVID shows the probability value is 0.016 which indicates that it generates a coefficient of 0.009 and is significant at a significance level of 0.05 (5%). This indicates that H2 is accepted since Pre- vs. Post-COVID has an impact on IR Quality.

The findings of this study indicate that the Pre- vs. Post-COVID variables significantly influence the quality of IR, with a significance value of 0.016. This confirms that the COVID-19 pandemic has become a significant turning point in the reporting practices of companies listed on the Saudi Stock Exchange (Tadawul).

More and more stakeholders are becoming aware of the importance of integrating reporting especially when it comes to such crisis periods like the Covid-19 pandemic. This study highlights the company's interest in disclosing Covid-19 information is increasing and as time passes by, they try to incorporate more

relevant information [55]. COVID-19 has inflicted havoc in the almost everyone's lives across the globe, and MENA region is not an exception. It has created damage to the individuals and organization in the region that will require substantial time and resources to recover the economy [56].

Based on Stakeholder Theory, companies must provide relevant, transparent, and reliable information to meet the needs of stakeholders such as investors, regulators, employees, and the public. Research findings indicate that the pre- versus post-COVID periods significantly impact the quality of IR. This reflects that after COVID-19, stakeholder pressure for transparency, risk disclosure, and sustainability strategies has increased sharply. Companies are required to explain the impact of the pandemic, mitigation measures, and operational resilience more comprehensively through integrated reporting. Thus, the pandemic has become a catalyst for improving IR quality as a form of accountability response to stakeholders.

The global crisis highlighted the significance of integrated reporting's main components of sustainability, risk management, and long-term value development. Organizations increased the scope and depth of their disclosures in response to stakeholder demands for greater visibility on how businesses were handling operational uncertainty, health hazards, and economic disruptions. Following COVID, businesses realized that it was essential to convey not just financial results but also the social and environmental effects of their operations in order to preserve credibility and confidence during difficult times [49].

Consequently, digital transformation became a catalyst for improved integrated reporting as well as a driver of operational resiliency. The notion that the external environment influences the usefulness of internal capabilities is further supported by this moderating impact. Digital transformation may boost productivity or creativity during stable times, but it becomes crucial for survival and stakeholder participation during emergencies like a worldwide epidemic. The strategic impact of digital investments in creating integrated, transparent narratives that address both financial and non-financial performance was therefore increased by COVID-19, which served as an amplifier. In the end, the pandemic highlights how reactivity to external shocks and digital maturity work together to affect the caliber and applicability of corporate reporting [50].

These findings reinforce the view that the pandemic has magnified the role of digital transformation as a driver of operational resilience and reporting quality. While digital transformation may only serve to improve efficiency under stable conditions, in extreme situations like COVID-19, digital technology becomes a prerequisite for business continuity and stakeholder engagement. COVID-19's moderating effect on the relationship between digital transformation and IR quality confirms that internal digital capacity will only deliver maximum value when supported by external pressures that demand rapid response and comprehensive transparency. Therefore, digital maturity is not merely a technological issue, but a governance strategy that determines a company's ability to adapt to external shocks while maintaining long-term accountability. This provides a crucial foundation for governments, regulators, and companies to integrate digital governance frameworks into future sustainability policies, audits, and corporate reporting.

- COVID-19 as a Moderator has an impact on the Digital Transformation and Integrated Reporting Relationship

The probability value is 0.047 which indicates that it generates a coefficient of 0.031 and is significant at a significance level of 0.05 (5%). This indicates that H3 is accepted since COVID-19 as a Moderator has an impact on the Digital Transformation and Integrated Reporting Relationship.

In the wake of COVID-19, digital transformation is no longer a strategic option but a fundamental component of modern corporate governance, particularly in the context of cross-functional and multi-dimensional reporting. Companies that have implemented digital systems, including cloud reporting, real-time data automation, analytics, and AI-for-reporting, demonstrate greater capability in delivering transparent, timely, and comprehensive reports in line with the principles of the IR Framework. In times of crisis, stakeholders' need for non-financial information increases, particularly regarding operational resilience, risk, sustainability, and long-term strategy. This is where the pandemic serves as an amplifier, reinforcing the benefits of digitalization in delivering value-oriented corporate communications.

COVID-19 may moderate the relationship between digital transformation and IR quality. This finding aligns with stakeholder theory, which emphasizes that companies must meet the information needs of

stakeholders, especially during a crisis. During the pandemic, the need for transparency, accountability, and more comprehensive performance reporting increased due to increased uncertainty and risk. This situation prompted companies to accelerate digital transformation to produce integrated reports that were faster, more relevant, and more reliable. Thus, COVID-19 strengthened the positive relationship between digital transformation and IR quality as companies were encouraged to respond more effectively to stakeholder pressures and expectations.

According to the data, digital transformation had a greater influence on IR quality in the years following COVID-19, suggesting that the pandemic increased the efficacy and applicability of digital efforts aimed at enhancing corporate reporting standards. Organizations that had started or accelerated their digital transformation initiatives, such as deploying cloud-based systems, sophisticated data analytics, and automated reporting tools, were better able to adjust to stakeholder communication, remote operations, and changing disclosure requirements during the crisis. COVID-19 increased the demand for multifaceted, transparent, and timely reporting, which made digital capabilities more valuable. Businesses that used digital technologies were better able to collect and combine data from many departments, meet the increasing needs of stakeholders for information on sustainability and risk, and match their reporting to the integrated reporting framework [51]

Consequently, digital transformation became a catalyst for improved integrated reporting as well as a driver of operational resiliency. The notion that the external environment influences the usefulness of internal capabilities is further supported by this moderating impact. Digital transformation may boost productivity or creativity during stable times, but it becomes crucial for survival and stakeholder participation during emergencies like a worldwide epidemic. The strategic impact of digital investments in creating integrated, transparent narratives that address both financial and non-financial performance was therefore increased by COVID-19, which served as an amplifier. In the end, the pandemic highlights how reactivity to external shocks and digital maturity work together to affect the caliber and applicability of corporate reporting [52].

These findings reinforce the view that digital transformation not only increases efficiency but also drives value creation and corporate legitimacy in the eyes of stakeholders. In the context of Tadawul and Vision 2030, which promote transparency, the digital economy, and sustainability, these research findings practically support the implementation of the national digital strategy and strengthen companies' capacity to face global uncertainty. The pandemic has demonstrated that a company's digital capabilities directly impact the quality of its Integrated Reporting. Therefore, the combination of responsiveness to external shocks and digital governance maturity determines a company's ability to deliver relevant, credible, and future-oriented integrated reporting.

VI. CONCLUSION

Based on the empirical analysis of companies listed on the Saudi Stock Exchange (Tadawul), this study concludes that digital transformation has a significant positive effect on IR quality, as evidenced by a probability value of 0.041 and a coefficient of 0.11, indicating the acceptance of H1. Similarly, the results show that the difference between the pre- and post-COVID-19 periods significantly influences IR quality, with a probability value of 0.016 and a coefficient of 0.009, supporting H2. Furthermore, COVID-19 is found to significantly moderate the relationship between digital transformation and IR quality, confirmed by a probability value of 0.047 and a coefficient of 0.031, leading to the acceptance of H3. These findings collectively demonstrate that the pandemic strengthened the effectiveness and relevance of digital transformation initiatives in improving corporate reporting standards.

This research contributes to the literature by providing empirical evidence from an emerging market context that digital transformation serves not merely as an operational tool but as a strategic driver of transparency, accountability, and stakeholder engagement within integrated reporting frameworks. Academically, the study expands theoretical perspectives by confirming COVID-19 as a significant moderating factor, highlighting how external crises amplify the value of internal technological capabilities.

Practically, the study emphasizes the importance for organizations to invest in advanced digital technologies and adopt governance structures that integrate digital resilience and sustainability within corporate reporting processes.

However, the study is constrained by several limitations. The use of secondary data restricted to Tadawul-listed companies may limit the generalizability of findings to other regulatory or economic settings. Additionally, the research focuses primarily on digital transformation and COVID-19, while other relevant factors, such as corporate governance mechanisms, ownership structure, or ESG performance, were not included in the analysis. The research timeframe may also not fully capture long-term post-pandemic effects as digital adoption evolves progressively. The results of this study are also expected to serve as a reference for management, regulators, and policymakers in developing digital-based reporting regulations and encouraging companies to improve the quality of IR as a strategic tool, not just a compliance obligation.

Future research could expand the scope by comparing findings across multiple countries or regions, such as GCC or ASEAN markets, to enhance external validity. Researchers are also encouraged to integrate additional explanatory variables and adopt longitudinal or mixed-methods approaches to explore the dynamics of digital transformation maturity over time. Further studies may also investigate the influence of national digital governance frameworks and alignment with ISSB/IFRS sustainability standards in shaping reporting behaviors. Overall, this research highlights the strategic importance of developing digitally resilient and governance-driven reporting systems capable of supporting transparency and stakeholder trust during both stable and uncertain conditions.

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Conceptualization, M. A. and A. A.; methodology, M. A. and A. A.; software, M. A.; validation, A. A.; formal analysis, M. A.; resources, A. A.; data curation, M. A.; writing—original draft preparation, M. A.; writing—review and editing, A. A.; visualization, M. A.; supervision, A. A.; project administration, A. A.; funding acquisition, M. A. All authors have read and agreed to the published version of the manuscript and contributed equally to the development and planning of the study.

Funding Statement

This study not supported with any external funding.

Data Availability Statement

Data are available from the authors upon request.

Acknowledgments

Not applicable.

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APPENDIX: INTEGRATED REPORTING QUALITY INDEX

Content element group		Disclosure items
Organizational overview and External environment	1	Mission and vision statement
	2	General explanations about the organization's culture, ethics, values, or principles
	3	Ownership or operating structure
	4	Competitive landscape/ market positioning (for example, strength, weakness, brands, ranks, awards, or accolades)
	5	Key quantitative information (e.g., Number of employees, revenue)
	6	Countries/regions where the org operates
	7	Legal factors (legislative or regulatory environment)
	8	Political factors
	9	Technological factors/issues
	10	Social factors /issues
	11	Micro and macro-economic conditions
	12	Market forces
	13	Environmental factors/challenges
	14	Key stakeholders and their needs
Governance	15	Board of Directors list
	16	Board experience or skills, diversity
	17	Culture, ethics, and values are reflected in the use of and effects on capital.
	18	Actions were taken to monitor strategic decisions and risk management.
	19	Remuneration policies
Business model	20	Key inputs (key elements of the business model)
	21	Product differentiation
	22	Delivery channels and marketing (branches, ATM, touchpoints)
	23	Innovation (investment in IT, development of new technologies, online platforms)
	24	Employee training (training hours per employee, number of training courses)
	25	Key products and services
	26	GHG emissions (carbon footprints, CO2 emissions)
	27	Waste water/Waste use, energy consumption, green investment
	28	Employee morale (grievance, engagement score, productivity, employee tenure, employee satisfaction, occupational health and safety statistics)
	29	Organizational reputation (brand, brand value, affiliation, awards)
	30	Revenue, cash flows (KPIs such as return on equity, efficiency ratio, earnings per share, market share, customer deposits)
	31	Customer satisfaction (complaints mechanism, complaint response time, customer growth rate)
	32	Increase or decrease in capitals (create or diminish value)
	33	Specific sources of internal or external risks and opportunities

Content element group		Disclosure items
Risk and opportunities and controls	34	Details on internal controls in place and risk management report
Strategy and resource allocation	35	Short, medium, and long-term strategic objectives (with and without time frames)
	36	Strategies in place/intend to implement to achieve objectives
	37	Measurement of achievements and target outcomes
	38	Understanding of organization's ability to adapt to change to achieve goals
	39	The link between strategies and key capital
	40	Key Performance Indicators (KPIs) present financial measures
	41	KPIs combining financial measures with other non-financial components
	42	The linkage between past and current performance
	43	Comparison between regional/industry benchmarks
	44	The financial implication of significant effects on capital or other causal relationship
Outlook	45	Expectations about the future or explanations about uncertainties/challenges
	46	Potential implications for future performance
	47	Forecasts about KPIs and assumptions
	48	The linkage between current performance and the organization's outlook
Basis of presentation	49	Determination of materiality and framework used for evaluation

Source: Pillai & Seetah (2022)