Journal of Modern Accounting and Auditing, Nov.-Dec. 2022, Vol. 18, No. 6, 251-263
doi: 10.17265/1548-6583/2022.06.001

Cybersecurity and Blockchain Impacts on Value Creation Process: Empirical Evidences From Non-financial Disclosure

Manuel De Nicola, Christo Delightson David Raja
University of Teramo, Teramo, Italy

As per the current trend, the digital transformation and the elements and technologies associated with it are growing for the better defense of the company itself. As the IR reports are getting common among many in the recent years, this research would be useful to identify the fairness of the company disclosures. For this purpose, this research has adopted a methodology of content analysis focusing on the telecommunication industries that are situated in the different parts of the globe to extract the depth of disclosures made by the sampled industries in the years 2020 and 2021 focusing only on the DT dimensions namely cybersecurity and blockchain.

Keywords: cybersecurity, blockchain, value creation, non-financial disclosure, integrated report, telecommunications, International Integrated Reporting Council (IIRC)

Introduction

The International Integrated Reporting Council (IIRC) declares that the purpose of IR is to display "combinations, correlation and dependencies among the significant factors that affect the organization's potential to create value over time" in order to illustrate how corporate value is created (IIRC, 2013, p. 16). A concise explanation of how an organization's strategy, performance, governance, and prospects, in the context of its external environment, contribute to the production, conservation, or degradation of value throughout the short, medium, and long terms, can be found in an Integrated report. The IR seeks to create a method for corporate management and performance reporting that is more logical and efficient (Adams, 2015; Higgins, Stubbs, & Love, 2014). The IR provides a model whose ultimate goal is to explain how the performance dimensions connect with one another (Abeysekera, 2013; Thomson, 2015). The goal of the Integrated report (IR) is to describe how the firm operates and how decisions affect the invested resources, both financial and non-financial. The guiding principles and content elements (CE) that govern the entirety of an IR's content are defined in the IR framework, along with the fundamental notions that underlie them. The IR framework can be utilized by public sector and not-for-profit organizations with minimal adjustments, although it is primarily intended for private sector, for-profit businesses of all sizes.

This research has been realized and broadened the search of various other DT elements in order to respond to the probable comments on the future findings on DT elements suggested by De Nicola and Maurizi (in press). It is evident that the companies that disclosed their reports are aware of the DT and the components are crucial

Manuel De Nicola, Ph.D., associate professor, Department of Communication Studies, University of Teramo, Teramo, Italy. Corresponding author.
Christo Delightson David Raja, MA, project manager.

in the value creation process to be transparent in the eyes of the clients and the shareholders. Furthermore, content analysis has been used by the researches already for their studies on integrated reports (IR) (Lipunga, 2015; Kılıç Karamahmutoğlu & Kuzey, 2018; Pistoni, Songini, & Bavagnoli, 2018; Świderska & Raulinajtys-Grzybek, 2017).

The scope of this research is to investigate upon the integrated reports of the Telecommunication companies. The paper will shed the light to the information that companies belonging to this industry disclose about the impacts they get from Digital Transformation (DT). More in detail, as the impact on business environments of Cybersecurity (CY) and Blockchain (BL) is so disruptive in the current digitalized era, as suggested by previous researches (De Nicola & Maurizi, in press), the paper will speculate whether and how integrated reports dedicate attention to the impact caused by such specific smart technologies.

This study intends to analyze the information on digital transformation that is disclosed by the companies in the telecommunications sector through integrated reports (IR), while also identifying the content elements (CE) that were employed for the two DT dimensions. They are cybersecurity and blockchain.

Background Analysis

Interest in Integrated Reports and Digital Transformation

The IR is a single instrument that provides a broad picture of all the factors that affect an organization's capacity to produce value over time from a forward-looking standpoint (Liu, Jubb, & Abhayawansa, 2018; Stacchezzini, Florio, Sproviero, & Corbella, 2018; Higgins et al., 2014; Kılıç & Kuzey, 2018). It is based on the principle values and content elements in the framework published in 2013 by the International Integrated Reporting Council. The IIRC's primary goal is to provide an integrated reporting structure that is widely accepted. This framework's goal is to organize financial, environmental, social, and governance data in a style that is simple, uniform, and comparable (IIRC, 2013). By using Integrated Reporting, a business can satisfy the market's demands for transparency and reliability by externally communicating cumulative information on adding value over time (Krzus, 2011; Eccles & Serafeim, 2014). In order to be sure that the IIRC's advancements are grounded in the actual environment of businesses and concentrated on the needs of capital providers the pilot programme was launched by IIRC in 2011. Stakeholder responsiveness, materiality and conciseness, accuracy, completeness, consistency and comparability, strategic emphasis and future orientation and connectivity of information are the guiding principles for IR (IIRC, 2013).

Digitalization is creating fascinating new opportunities for innovation to the innovators, creators, and to the organizations (Yoo, Henfridsson, & Lyytinen, 2010; Nambisan, 2017; Ramaswamy & Ozcan, 2018). The realm has been broadened by the widespread use of smart and digital technologies such as social media, big data, cloud computing, industrial internet, and cybersecurity (Nambisan, 2017). According to Matt, Hess, and Benlian (2015), potential rewards in a successful DT include increment in sales and productivity, innovations in value creation, as well as new ways of interacting with the customers. As per Heavin and Power (2018), DT introduces technologies like machine learning and analytics, which can lead to countless chances for organizational solutions and improved internal efficiency. Even though the discussion regarding DT tends to be positive and has been heavily supported by major consulting firms like McKinsey and Boston Consulting, potential negative effects are also being addressed more frequently. Examples include the relevance of responsible DT management strategies or societal and ethical concerns (Royakkers, Timmer, Kool, & Est, 2018).

In recent years, research streams on corporate reporting and digital technologies have gotten a lot of attention. To the best of our knowledge, there hasn't been much research done on how smart and digital technologies could enhance and improve corporate reporting systems. Lodhia and Stone (2017) examined the use of integrated reporting in the internet and social media communication environment. The potential contribution of online communication tools, such as social media to integrated reporting was discussed by the writers. An analysis of the characteristics of internet technologies, which can help with the crucial external communication part of integrated reporting, is assisted by a media dependency framework.

Over the past few decades, the academics have extensively studied corporate reporting procedures (de Villiers & Hsiao, 2017; Guthrie, Manes Rossi, & Orelli, 2017; Lombardi & Dumay, 2017; Rinaldi, Unerman, & de Villiers, 2018). Corporate reporting procedures are used by organizations to manage and share the various types of information with stakeholders. Mandatory versus Voluntary reporting is based on the management of financial and non-financial information in accordance with the international laws, regulations, and principles (e.g., EU Directive 95/2014, environment reports by Denmark, Norway, and Sweden), best practices, and guidelines (e.g., the Global Reporting Initiative—GRI and the International Integrated Reporting Council—IIRC), which ensures fair disclosure, accountability, and stakeholder engagement. Financial information is made available to the stakeholders through mandatory reporting, primary for the purposes of establishing regulations and national legislation (Arena, Liong, & Vourvachis, 2018; Bagnoli & Watts, 2006; Vormedal & Ruud, 2009). Voluntary reports are built on non-financial data provided by the organizations that follow numerous international best practices and criteria.

The quality of financial statement information influences accountability (Dewi, Azam, & Yusof, 2019) and enhances corporate transparency (Camilleri, 2019); organizations are shifting to different corporate reporting models in order to provide more knowledge to investors and other stakeholders. Integrated reporting is the most recent advancement in emerging corporate models (Bernardi, 2020; Vitolla, Raimo, & Rubino, 2020). International Integrated Reporting Council released a principle-based reporting framework for integrated reporting in 2013 to provide an accurate guide to overcome the lack of common understanding of IR and to clear the muddled picture of IR practices around the world. The IIRC is critical in raising international awareness of IR.

One of IR's goal is to promote clarity by reducing the turbulences of the current corporate reporting (Zhou, Simnett, & Green, 2017). The benefit of integrated reporting is that it is not only a reporting tool but also an effective management tool (Setia, Abhayawansa, Joshi, & Huynh, 2015), that emerged for its organization and its stakeholders. It assists businesses in wanting to think holistically about their strategy and plans, making informed decisions, and managing key risks in order to increase investor and stakeholder confidence and improve future performance (Assurance on IR, 2015, p. 2). Integrated reporting raises the information quality to the stakeholders and investors (IIRC, 2013). Furthermore, companies that issue high-quality integrated reporting have a strong stock market performance (Lee & Yeo, 2016). Integrated reporting helps internal decision-makers by offering a comprehensive and a systematic view of the company's strategy. Both corporate and government organizations can benefit from IR (Guthrie et al., 2017). The lack of experience in disclosures, in particular, creates a gap in disclosure practices between developed and developing economies (Ali, Frynas, & Mahmood, 2017). As interest in IR grows and the number of firms adopting this type of reporting grows, many challenges emerge and additional research is required (de Villiers, Rinaldi, & Unerman, 2014).

Relationship Between Corporate Reporting and Digital Transformation

In the modern world, the quick development of digital technologies has allowed companies in all sectors the chance to break old patterns and provide value. Business executives and CIOs usually have specific goals in mind when they start a digital transformation. Since technological innovation is accelerating exponentially, it is obvious that in order to continue and remain relevant, they must constantly reinvent their business. More than 70% of CIOs claim that the COVID-19 pandemic has expedited their digital investments, according to a recent KPMG report. To transform the customer experience and generate value through products, services, and cutting-edge business models, calls for a comprehensive perspective. Large portions of our business and society are being transformed with the aid of digital technologies. The area where businesses aspire to grow is known as "Digital Transformation": it represents the degree to which businesses aim to change for the better by implementing cutting-edge tools like mobile, analytics, cloud, and the internet of things.

Although the field of information systems research has seen an increase in interest in the topic of digital transformation in businesses, there is still a scarcity of literature on this subject (Gerster, 2017). Many established businesses have started to actively improve their digital resources and skills (Sebastian et al., 2017; Svahn, Mathiassen, & Lindgren, 2017). The academic literature on digital transformation is sparse and largely focuses on publications with a practical focus (Gerster, 2017).

The constitutive role of sociotechnical arrangements, of which digital corporate reporting is an example, has long been established by broader research examining the interaction between technology and corporate practices. Scholars investigated the role of DT in corporate reporting by examining how social media platforms and Internet-based technologies are used as a repository and source of relevant information to support the reporting process (Arnaboldi, Busco, & Cuganesan, 2017; Lardo, Dumay, Trequattrini, & Russo, 2017).

According to Bughin, LaBerge, and Mellbye (2017), distant transformation is in its early stages of remodeling industries and is proven to hold even with companies that are already experiencing a high level of economic growth. The potential for digital transformation to spur greater economic growth emphasizes the significant attitudes for change that may be derived from digitalization. This includes information technology (IT), strategy, business models, goods and services, internal and external business processes, organizational structure, and corporate culture (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017). The global manufacturing sector, followed by ICT, professional services, and financial services, have been highlighted as the key beneficiaries by Schwab (2018). Industries are already feeling the need to adapt and evolve, as seen by the emergence of brand-new businesses in the recent years (Downes & Nunes, 2013).

Narrative on DT Dimensions on Digital Transformation

The core structure of businesses, including their objectives and identities, may be significantly impacted by digital transformation (Wessel et al., 2020). By frequently utilizing the affordances associated with digital technologies, the process of developing, capturing, and delivering the value from digital transformation offers an opportunity to create new processes, goods and services, and eventually new objectives. Quite few companies have successfully transformed their operations to the digital transformation. To illustrate, global research had been done in 2017 by Kane (2019), where it indicates that just 25% of enterprises had converted to digital businesses, 41% were undergoing transformations, and 34% were discussing about the trend of digital transformation than putting it into practice. The study found a notable point that 85% of executives believe that achieving digital maturity is essential for corporate performance. Although there are different ways to

conceptualize digital transformation (Vial, 2019; Wessel et al., 2020), it is generally acknowledged that digital technologies, particularly in the form of AI, have the power to drastically alter businesses (Constantinides, Henfridsson, & Parker, 2018; Davenport, 2018).

Relationship between cybersecurity and digital transformation. Every industry has begun to work remotely; even retailers are moving their operations from offline to online platforms; the health sector has begun to offer telemedicine; educational institutions have begun to offer online courses; and banking and financial institutions are also starting to offer their services online. Consequently, the use of digital technology has led to a steady expansion of the digital business landscape.

The type of changes in the current world are determined by the information and communication technologies that have been continuously developing over the past few years. One of the fundamental pillars for putting the concept of sustainable development into practice is cybersecurity. The security of data and services used in cyberspace are essential for achieving goals related to ongoing technological advancement. As per the research by European Union Agencies, national reports and publications of commercial companies proposes in regards to cybersecurity that the size of cyberspace events has a tendency to increase (e.g., ENISA, 2018; EUROPOL, 2021; WEF, 2020). The threats that exist in cyberspace are becoming increasingly complex and use a wide range of assault approaches. Some of the cybersecurity techniques have been proposed by Gade and Reddy (2014), for the industries that adopt digital means to support their businesses. They are access control and password security, authentication of data, malware scanners, firewalls, and anti-virus software.

Relationship between blockchain and digital transformation. Blockchain-based digital transformation is feasible when relevant data from many industries and successful real-world examples are gathered, technology concepts are taken into consideration, and blockchain promising spheres, types, and consensus algorithms are identified.

The rise of blockchain technologies has created high expectations regarding transformations across business and government. According to Treiblmaier (2018), blockchain can be defined as a "digital, decentralized and distributed ledger in which transactions are logged and added in chronological order with the goal of creating permanent and tamperproof records" (p. 547).

Blockchain is a public registry of all past transactions that have been passed to authorized users or a distributed database of records. A majority of participants in every transaction should confirm it, and data that have been input cannot be removed (Crosby, Pattanayak, Verma, & Kalyanaraman, 2016). Simply put, Blockchain includes a complete history of all previous digital activity. In general, a lack of trust between the parties involved in the process is the primary prerequisite for the implementation of such technologies.

A detailed categorization of potential benefits and promises of blockchain technologies for governments can be found in Ølnes, Ubacht, and Janssen (2017). The authors enumerate numerous benefits and promises across the categories of strategic, economic, organizational, informational, and technological concerns, including: increased transparency, avoidance of fraud and manipulation, reduced corruption, increased trust, better auditability, reduced costs, increased resilience, higher data quality, resilience, and security.

In most cases, a lack of trust between the people involved in the process is a necessary condition before the deployment of such technology. The use of fraudulent methods such as document forgery is eliminated by this strategy. A database called a blockchain offers long-lasting and unchangeable data recording and keeping. Participants in the decentralized system share, replicate, sync, and store all data, ensuring that each has a copy that can be checked and updated simultaneously (Chang, Iakovou, & Shi, 2020). Furthermore, data are received,

processed, saved, and displayed appropriately for all network participants thanks to software that organizes data blocks and ensures that data protection and validation do not depend on outside parties (Kamilaris, Fonts, & Prenafeta-Bold, 2019).

Purpose of the Study and Hypothesis Setting

In accordance with the previous literatures (Rivera-Arrubla et al., 2017; Tariq, Kukreja, & Hamdan, 2018; Pistoni et al., 2018), the IIRC's disclosure checklist index is used to review the disclosures for the eight elements of integrated reporting (IIRC, 2013). The Content elements (CEs) are: Organizational overview and external environment, Governance, Business model, Risk and opportunities, Performance, Outlook and Basis of presentation

The idea of IR contains flaws and experts assert that there are numerous inherent difficulties with applying the IR framework (Brown & Dillard, 2014; Lombardi & Dumay, 2017). The researches on the components of DT and IR are scares and hence there are no clear pictures of the whole story of the IR program. Thus, there are research gaps regarding the disclosure of DT in IR (IIRC, 2016; 2018).

This study aims to evaluate how fairly the reporters of the companies in the telecommunication sector disclose the data in their integrated and annual reports relating to the Digital Transformation elements such as Cybersecurity and Blockchain. From the above-mentioned theoretical focus, the aim of the paper is to critically analyze the findings of the IR reports with regard to the DT disclosures, by placing Cybersecurity and Blockchain as the fixed variables, with the aid of content analysis. That is, this research analyzes a specific DT dimension that previous studies (De Nicola & Maurizi, in press) invoked to investigate because the way in which companies report on their impacts is underexplored. Such DT dimensions are blockchain; token and cybersecurity; data breach.

In this modern age, the majority of industries are now widely embracing blockchain and cybersecurity technologies in order to speed up, make operations transparent, safe, risk-free, and secure. Security in the internal digital systems of the organization with the use of cybersecurity and secure transactions, including all types of online transactions via blockchain, is the main concern of blockchain technology. Due to a lack of proper channels, numerous illicit operations have resulted in the theft of large amounts of confidential data. The goal of the current study is to analyze all the 33 sampled integrated reports from the year 2020 and 2021 and whether and how companies report on the role that blockchain technology and cybersecurity could play in the telecommunications industry.

Methodology

The aim of the current paper has adopted the framework of procedure of content analysis associated with the locus CEs, time orientation (TO), type language (TL), presentations on visuals (VI) in addition, as this particular model has been motivated and suggested by De Nicola (in press). To address the clarity in the findings of the integrated reporting disclosures, this study is therefore timely to show how well the reporters have disclosed these DT dimensions and how well they employed the roles of cybersecurity and blockchain.

This research has been conducted only on the study only on Telecommunications Industry, which has been done with the reports disclosed in 2020 & 2021, which disclosed their integrated and annual reports in the IIRC website. The reason is because the telecom sector would be the first to innovate or handle the latest technologies or tools in their companies, which motivated the study to choose the IR reports of the telecom industries as

samples. The methods and discussions and findings of the analysis have been described in this paper. This may be an opportunity for theoretically-based study to further rationalize the various other IR components of the Telecommunication sector.

With the goal of exploring the above-mentioned aspects regarding the interest on telecom industries, the study has adopted a qualitative research approach using content analysis method, since it has been assumed it suits our aim to investigate how DT dimensions have been presented in the specific context IIRC-based reporting.

Many studies drew attention to the relationship between IR and DT discretionary disclosure theory and voluntary disclosure theory (De Nicola & Maurizi, in press). The legitimacy theory might also affect the companies to voluntarily disclose their reports in their official public portals and in IIRC platforms. The findings of the study, which used content analysis as this method were adopted by many researchers in their literature with the regard to integrated reports (Tariq et al., 2018; Rivera-Arrubla et al., 2017; Abeysekera, 2013), and suggested that disclosure levels differed in terms of CEs and years. Furthermore, the study reports the DT disclosures of the CEs from the IIRC framework that includes an organizational overview and external environment, risks and opportunities, strategy and house allocation, governance, and performance. The level of compliance for the business model, outlook, and basis of presentation is low.

With this approach, we decided to focus on the CEs of the integrated reports which is according to the IIRC framework, grouped in an order as: organizational overview and external environment, governance, business model, risk and opportunities, strategy and research allocation, performance, outlook basis of presentation (IIRC, 2021). According to IIRC, the CEs are linked to each other and are not mutually exclusive, they also provide information in a way that reflects the dynamic and systematic interactions of the activities of an organization as a whole, in compliance with the connectivity of information principle.

Sample Design and Data Collection

The study analyzed data extracted from the integrated reports, and annual reports accessible through the IIRC website of the sampled industries i.e., Telecommunications listed down for the year 2020 and 2021, with the help of maintaining content analysis. The aim of the research is to provide a complete overview of the sampled companies in the Integrated Reporting. The sample consists of all 17 companies from the year 2020 and 16 companies from the year 2021 which have been listed under the Telecommunication sector.

In light of these considerations, the study has conducted an exploratory qualitative study approach involving the companies around various continents of the world under the telecommunications industry that are present in the IIRC database. The reporters listed in this platform with a summary communication that shows how strategy, governance, performance, and prospects of an organization, in the external context in which it operates, allows the creation of value in the short, medium, and long term (Cheng, Green, Conradie, Konishi, & Romi, 2014) committed to the IR framework.

These reports were finally selected, as the reporters have mentioned “Digital Transformation” at least once in their reports, with which furtherly we aimed to extract the number of disclosures regarding cybersecurity and blockchain.

Analysis of DT Dimensions

Following the analysis, the locus of information is crucial to evaluate the relevance of the information itself. Hence, we have decided to focus on the CEs of the integrated reports that are according to the IIRC framework

tagged with the eight elements such as: organizational overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance outlook basis of presentation (IIRC, 2021).

More specifically we have evaluated occurrences of the reported data. More information distinguished by the following set of DT assets:

- DT: Broad information on DT, defined as any information on the entire DT;
- Blockchain: It denotes any information provided by the reporting company about the function that blockchain plays inside its own internal operations, business model, or even industry;
- Cybersecurity: It refers to any information given by the reporting firm concerning the role of Cybersecurity operations, internal structure, business model, or even industry.

Content analysis is broadly defined as "subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278).

Following an initial review of the reports for all the 17 and 16 companies for two consecutive years (2020 & 2021), we have examined how companies evaluated and disclosed Blockchain and Cybersecurity. In the following phase, we investigated whether the companies under investigation were aware of DT and involved in the DT process by looking for the presence of specific keywords related to the concept of DT. Furthermore, we could determine whether the integrated reports under examination contained information about Blockchain and Cybersecurity. The "Locus" of this analysis has been identified with the integrated reports' CEs for this intent. The locus indicates where the evidence is cited and more specifically, at what point in the document the reporters disclose the information we seek for. The above factor is vital for determining the effectiveness of the information and how it is likely to support the decision-making processes of the reporters' stakeholders. The next stage of the analysis centered on the information content and the noteworthiness of the two dimensions of DT which is under the analysis. The information provided by the reporters has been categorized as part of this phase based on the Time Orientation (TO) (Historical versus Forward-looking) and the Type of Information (TI) (Qualitative versus Quantitative), and the information of the results presented with the presence of visuals (Visuals) and without visuals (No visuals).

Findings on Content Analysis in the Telecommunications 2020 Regards to Cyber Security and Blockchain

In this section, the findings of the DT disclosure items are reported along with the related statistical calculations and descriptive calculations made using the content analysis approach. Analysis of all the selected 17 integrated reports from the 2020 to extract the sentences that includes Blockchain and Cybersecurity has been made. This was done for each CE defined by the IIRC framework and found 175 potential events for the year 2020.

Table 1

No. of Occurrences per DT Dimension Distinguished by Locus (2020)

DT Dimensions	1. Organizational overview and external environment	2. Governance	3. Business Model	4. Risks and opportunities	5. Strategy and resource allocation	6. Performance	7. Outlook	8. Basis of presentation	Grand Total	Percentage
Blockchain	1	0	2	2	2	3	0	0	10	6%
Cybersecurity	30	14	9	35	51	19	6	1	165	94%
Grand Total	31	14	11	37	53	22	6	1	175	100%
Percentage	18%	8%	6%	21%	30%	13%	3%	1%	100%	

Table 2

No. of Occurrences per Time Orientation (TO) Distinguished by DT Dimensions (2020)

DT Dimensions	1. Historical	2. Forward Looking	Grand Total	Percentage
Blockchain	10	0	10	**6%**
Cybersecurity	159	6	165	**94%**
Grand Total	169	6	175	**100%**
Percentage	**97%**	**3%**	**100%**	

Table 3

No. of Occurrences per Type Language (TL) Distinguished by DT Dimensions (2020)

DT Dimensions	1. Quant	2. Qual	Grand Total	Percentage
Blockchain	0	10	10	**6%**
Cybersecurity	17	148	165	**94%**
Grand Total	17	158	175	**100%**
Percentage	**10%**	**90%**	**100%**	

Table 4

No. of Occurrences per Visual (VI) Distinguished by DT dimensions (2020)

DT Dimensions	0. no visual	1. visual	Grand Total	Percentage
Blockchain	10	0	10	**6%**
Cybersecurity	147	18	165	**94%**
Grand Total	157	18	175	**100%**
Percentage	**90%**	**10%**	**100%**	

In this experiment that is made on the reports of 2020, the data about cybersecurity and blockchain together tend to be higher in the categories of "Risks and opportunity", followed by "Strategy and resource allocation". However, it is very low in the category of "Basis of Presentation".

Out of the total occurrences numbered 175, cybersecurity accounts for 165 observations which is 94% on the total observations, and blockchain serves just 6% with merely 10 occurrences. Meanwhile, on the 175 disclosed items, 169 occurrences are historical i.e., about 97%, with 158 qualitative contents which rounds up to 90% on total disclosures and, with 157 disclosures without any visual representations, whereas that makes 90% on the total. Thus, this experiment shows the highest DT disclosures on cybersecurity and very few disclosure levels on blockchain.

Findings on Content Analysis in the Telecommunications 2021 Regards to Cyber Security and Blockchain

In this section, the findings of the DT disclosure items are reported along with the related statistical calculations and descriptive calculations made using the content analysis approach. Analysis of all the selected 16 reports from the year 2021 for the sentences that included Blockchain and Cybersecurity have been made. This was done for each CE defined by the IIRC framework and found 135 potential occurrences for the year 2021.

Table 5

No. of Occurrences per DT Dimension Distinguished by Locus (2021)

DT Dimensions	1. Organizational overview and external environment	2. Governance	3. Business Model	4. Risks and opportunities	5. Strategy and resource allocation	6. Performance	7. Outlook	8. Basis of presentation	Grand Total	Percentage
Blockchain	1	2	0	1	0	4	0	0	8	6%
Cybersecurity	19	21	6	25	18	17	9	12	127	94%
Grand Total	20	23	6	26	18	21	9	12	135	100%
Percentage	**15%**	**17%**	**4%**	**19%**	**13%**	**16%**	**7%**	**9%**	**100%**	

Table 6

No. of Occurrences per Time Orientation (TO) Distinguished by DT Dimensions (2021)

DT Dimensions	1. Historical	2. Forward Looking	Grand Total	Percentage
Blockchain	8	0	8	**6%**
Cybersecurity	118	9	127	**94%**
Grand Total	126	9	135	**100%**
Percentage	**93%**	**7%**	**100%**	

Table 7

No. of Occurrences per Type Language (TL) Distinguished by DT Dimensions (2021)

DT Dimensions	1. Quant	2. Qual	Grand Total	Percentage
Blockchain	1	7	8	**6%**
Cybersecurity	10	117	127	**94%**
Grand Total	11	124	135	**100%**
Percentage	**8%**	**92%**	**100%**	

Table 8

No. of Occurrences per Visual (VI) Distinguished by DT Dimensions (2021)

DT Dimensions	0. no visual	1. visual	Grand Total	Percentage
Blockchain	8	0	8	**6%**
Cybersecurity	106	21	127	**94%**
Grand Total	114	21	135	**100%**
Percentage	**84%**	**16%**	**100%**	

With the analysis that is made on the reports of 2021, the data about cybersecurity and blockchain together tends to be higher in the categories of "Risks and opportunity", followed by "Performance". However, it is very low in the category of "Business model".

Out of the total occurrences numbered 125, cybersecurity accounts for 127 observations which is 94% on the total observations, and blockchain serves just 6% with merely 8 occurrences. Whereas, on the 135 disclosed items, 126 occurrences are historical i.e., about 94%, with 124 qualitative contents which rounds up to 92% on total disclosures and, with 114 disclosures without any visual representations, whereas that makes 84% on the total. Just as 2020, the experiment in 2021 shows the highest DT disclosures on cybersecurity and very few disclosure levels on blockchain.

That is because the studies on blockchain are in the infancy stage since its emergence, but still the studies on the cybersecurity yet have to be deepened as well. The cybersecurity tools have been widely accepted by most of the business sectors. The requirement for businesses to secure their networks, data, devices, and identities is shaping the future of cybersecurity. Adopting security frameworks like zero trust, which will aid businesses in securing internal information systems and data in the cloud, is one example of this. Communication service providers can now instantaneously disable stolen devices, notify any third party of a change in status, and maintain unique device/SIM data along with customer profiles. A FIR can also be filed and stored on the blockchain network by the customer's home country operator. Telecom companies all across the world would be able to identify stolen devices thanks to this.

Conclusion

This research explored how the Integrated report merges and connects with digital transformation and some of its dimensions namely cybersecurity and blockchain. The main aim of this research is to scrutinize how well

the telecom brands disclose their integrated reports or annual reports to the public based on the legitimacy strategy. As this research also adopted the content analysis approach with the aim to visualize how much the telecommunication talks about the above-mentioned digital elements in their Integrated reports and how much they are based on each CE.

We found that not all the integrated reports that have been submitted in the IIRC website are so transparent or of good quality disclosures in their articles which gone through our studies. Some companies were really good in their disclosure regarding the DT dimensions such as Vodafone, Telekom Malaysia, and Orange. The future of the telecommunication industry is so vital and the competition is always in hike. This would give the investors and stake holders a huge chance to visualize the channels of the competing companies, which would definitely impose a sustainable growth for the companies in the market on a long run.

Blockchain is still in its infancy, indicating that it will take some time before it becomes commonplace and extensively used. The future researches can make a model or any analysis that can forecast organizations' future intentions towards the adoption of cybersecurity and blockchain technology.

References

Abeysekera, I. (2013). A template for integrated reporting. *Journal of Intellectual Capital, 14*(2), 227-245.

Adams, C. (2015). The International Integrated Reporting Council: A call to action. *Critical Perspectives on Accounting, 27*(C), 23-28.

Ali, W., Frynas, G., & Mahmood, Z. (2017). Determinants of corporate social responsibility (CSR) disclosure in developed and developing countries: A literature review. *Corporate Social Responsibility and Environmental Management, 24*(4), 273-294.

Arena, C., Liong, R., & Vourvachis, P. (2018). Carrot or stick: CSR disclosures by Southeast Asian companies. *Sustainability Accounting, Management and Policy Journal, 9*(4), 422-454.

Arnaboldi, M., Busco, C., & Cuganesan, S. (2017). Accounting, accountability, social media and big data: Revolution or hype? *Accounting, Auditing & Accountability Journal, 30*, 762-776.

Bagnoli, M., & Watts, S. (2006). Financial reporting and supplemental voluntary disclosures. *SSRN Electronic Journal*. Retrieved from https://doi.org/10.2139/ssrn.632422

Bernardi, C. (2020). *Implementing integrated reporting lessons from the field* (1st ed. 20). Retrieved from http://lib.ugent.be/catalog/ebk01:4100000010480360

Bughin, J., LaBerge, L., & Mellbye, A. (2017). The case for digital reinvention. *McKinsey Quarterly, 2017*, 26-41.

Camilleri, M. A. (2019). *Theoretical insights on integrated reporting: Valuing the financial, social and sustainability disclosures: Antecedents and perspectives for organizations and stakeholders*.

Chang, Y., Iakovou, E., & Shi, W. (2020). Blockchain in global supply chains and cross border trade: A critical synthesis of the state-of-the-art, challenges and opportunities. *International Journal of Production Research*.

Cheng, M., Green, W., Conradie, P., Konishi, N., & Romi, A. (2014). The international integrated reporting framework: Key issues and future research opportunities. *Journal of International Financial Management & Accounting, 25*(1), 90-119.

Constantinides, P., Henfridsson, O., & Parker, G. G. (2018). Introduction—Platforms and infrastructures in the digital age. *Information Systems Research, 29*(2), 381-400.

Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. *Applied Innovation, 2*(6-10), 71.

Davenport, T. H. (2018). *The AI advantage: How to put the artificial intelligence revolution to work.* Cambridge MA: MIT Press.

De Nicola, M., & Maurizi, A. (in press). Exploring how companies disclose the digital transformation in the "content elements" of the integrated report. *International Journal of Digital Culture and Electronic Tourism, 1*, 1.

De Villiers, C., & Hsiao, P.-C. K. (2017). Integrated reporting. In C. De Villiers and W. Maroun (Eds.), *Sustainability accounting and integrated reporting.* Abingdon, UK: Routledge.

De Villiers, C., Rinaldi, L., & Unerman, J. (2014). Integrated reporting: Insights, gaps and an agenda for future research. *Accounting, Auditing & Accountability Journal, 27*(7), 1042-1067.

Dewi, N. F., Azam, S. M. F., & Yusof, S. N. M. (2019). Factors influencing the information quality of local government financial statement and financial accountability. *Management Science Letters, 9*(9), 1373-1384.

Downes, L., & Nunes, P. F. (2013). Big-bang disruption. *Harvard Business Review, 91*, 44-56.

Eccles, R. G., & Serafeim, G. (2014). Corporate and integrated reporting: A functional perspective. *Harvard Business School Working Paper*.

ENISA. (2018). *ENISA threat landscape report 2018*. Athens, Greece: ENISA.

EUROPOL. (2021). *Internet organised crime threat assessment (IOCTA) 2021*. The Hague, Netherlands: EUROPOL.

Eurostat. (2022). *Smart technologies in EU enterprises: AI and IoT*. Retrieved from https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220609-1

Gade, N. R., & Reddy, U. (2014). A study of cyber security challenges and its emerging trends on latest technologies. *International Journal of Engineering and Technology, 4*(1). Retrieved from https://arxiv.org/ftp/arxiv/papers/1402/1402.1842.pdf

Gerster, D. (2017). Digital transformation and IT: Current state of research. Presented at *PACIS*.

Guthrie, J., Manes Rossi, F., & Orelli, R. (2017). Integrated reporting and integrated thinking in Italian public sector organisations. *Meditari Accountancy Research, 25*(4), 553-573. Retrieved from https://doi.org/10.1108/MEDAR-06-2017-0155

Heavin, C. M., & Power, D. J. (2018). Challenges for digital transformation—Towards a conceptual decision support guide for managers. *Journal of Decision Systems, 27*, 38-45.

Higgins, C., Stubbs, W., & Love, T. (2014). Walking the talk(s): Organisational narratives of integrated reporting. *Accounting, 27*(7), 1090-1119.

Hsieh, H.-F., & Shannon, S. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*, 1277-1288.

IIRC. (2013). *The international <IR> framework*. Retrieved from https://www.integratedreporting.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

IIRC. (2016). *Integrated reporting <IR> framework*. Retrieved from https://www.integratedreporting.org/resource/international-ir-framework/

IIRC. (2018). *Integrated reporting framework*. Retrieved from https://www.integratedreporting.org/integratedreport2018/download/pdf/IIRC_INTEGRATED_REPORT_2018.pdf

IIRC. (2021). *Integrated reporting framework*.

Kamilaris, A., Fonts, A., & Prenafeta-Boldú, F. X. (2019). The rise of blockchain technology in agriculture and food supply chains. *Trends in Food Science and Technology, 91*, 640-652.

Kane, G. C. (2019). *Achieving digital maturity adapting your company to a changing world*. Retrieved from http://sadil.ws/bitstream/handle/123456789/1453/DUP_Achieving-digital-maturity.pdf?sequence=1&isAllowed=y

Kılıç Karamahmutoğlu, M., & Kuzey, C. (2018). Assessing current company reports according to the IIRC integrated reporting framework. *Meditari Accountancy Research, 26*, 305-333. Retrieved from https://doi.org/10.1108/MEDAR-04-2017-0138

Krzus, M. P. (2011). Integrated reporting: If not now, when? *IRZ-Zeitschrift Für Internationale Rechnungslegung, 6*, 271-276.

Lardo, A., Dumay, J., Trequattrini, R., & Russo, G. (2017). Social media networks as drivers for intellectual capital disclosure: Evidence from professional football clubs. *Journal of Intellectual Capital, 18*, 63-80.

Lee, K.-W., & Yeo, G. H.-H. (2016). The association between integrated reporting and firm valuation. *Review of Quantitative Finance and Accounting, 47*(4), 1221-1250. Retrieved from https://econpapers.repec.org/RePEc:kap:rqfnac:v:47:y:2016:i:4:d:10.1007_s11156-015-0536-y

Lipunga, A. (2015). Integrated reporting in developing countries: Evidence from Malawi. *Journal of Management Research, 7*, 130. Retrieved from https://doi.org/10.5296/jmr.v7i3.7195

Liu, Z., Jubb, C., & Abhayawansa, S. (2018). Analysing and evaluating integrated reporting: Insights from applying a normative benchmark. *Journal of Intellectual Capital, 20*, 235-263. Retrieved from https://doi.org/10.1108/JIC-02-2018-0031

Lodhia, S., & Stone, G. (2017). Integrated reporting in an internet and social media communication environment: Conceptual insights. *Australian Accounting Review, 27*, 17-33. Retrieved from https://doi.org/10.1111/auar.12143

Lombardi, R., & Dumay, J. (2017). Guest editorial: Exploring corporate disclosure and reporting of intellectual capital (IC): Emerging innovations. *Journal of Intellectual Capital, 18*, 2-8.

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering, 57*(5), 339-343. Retrieved from https://doi.org/10.1007/s12599-015-0401-5

Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship: Theory and Practice, 41*, 1029-1055. Retrieved from https://doi.org/10.1111/etap.12254

Ølnes, S., Ubacht, J., & Janssen, M. (2017). Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. *Government Information Quarterly, 34*(3), 355-364. Retrieved from https://doi.org/10.1016/j.giq.2017.09.007

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management, 5*, 63-77. Retrieved from https://doi.org/10.12821/ijispm050104

Pistoni, A., Songini, L., & Bavagnoli, F. (2018). Integrated reporting quality: An empirical analysis. *Corporate Social Responsibility and Environmental Management, 25*(4), 489-507. Retrieved from https://doi.org/https://doi.org/10.1002/csr.1474

Ramaswamy, V., & Ozcan, K. (2018). What is co-creation? An interactional creation framework and its implications for value creation. *Journal of Business Research, 84*, 196-205. Retrieved from https://doi.org/10.1016/j.jbusres.2017.11.027

Rinaldi, L., Unerman, J., & de Villiers, C. (2018). Evaluating the integrated reporting journey: Insights, gaps and agendas for future research. *Accounting, Auditing & Accountability Journal, 31*(5), 1294-1318. Retrieved from https://doi.org/10.1108/AAAJ-04-2018-3446

Royakkers, L., Timmer, J., Kool, L., & Est, R. (2018). Societal and ethical issues of digitization. *Ethics and Information Technology, 20*, 127-142. Retrieved from https://doi.org/10.1007/s10676-018-9452-x

Sebastian, I. M., Ross, J. W., Beath, C. M., Mocker, M., Moloney, K., & Fonstad, N. O. (2017). How big old companies navigate digital transformation. *MIS Quarterly Executive, 16*(3), 197-213.

Setia, N., Abhayawansa, S., Joshi, M. C., & Huynh, A. V. (2015). Integrated reporting in South Africa: Some initial evidence. *Sustainability Accounting, Management and Policy Journal, 6*, 397-424.

Stacchezzini, R., Florio, C., Sproviero, A., & Corbella, S. (2018). An intellectual capital ontology in an integrated reporting context. *Journal of Intellectual Capital, 20*(1), 83-99. Retrieved from https://doi.org/10.1108/JIC-05-2018-0090

Svahn, F., Mathiassen, L., & Lindgren, R. (2017). Embracing digital innovation in incumbent firms: How volvo cars managed competing concerns. *MIS Q., 41*(1), 239-253. Retrieved from https://doi.org/10.25300/MISQ/2017/41.1.12

Świderska, G. K., & Raulinajtys-Grzybek, M. (2017). Practical use of the integrated reporting framework—An analysis of the content of integrated reports of selected companies. *Zeszyty Teoretyczne Rachunkowości, 94*(150), 109-129.

Tariq, H., Kukreja, G., & Hamdan, A. (2018). Integrated reporting and financial performance: Empirical evidences from Bahraini listed insurance companies. *Accounting and Finance Research, 7*(3), 102-110. Retrieved from https://doi.org/10.5430/afr.v7n3p102

Thomson, I. (2014). "But does sustainability need capitalism or an integrated report": A commentary on "the International Integrated Reporting Council: A story of failure" by flower. *Critical Perspectives on Accounting, 27*, 18-22. Retrieved from https://doi.org/10.1016/j.cpa.2014.07.003

Treiblmaier, H. (2018). The impact of the blockchain on the supply chain: A theory-based research framework and a call for action. *Supply Chain Management: An International Journal, 23*(6), 545-559.

Valentinetti, D., & Michele, A. R. (2022). Blockchain and financial statements: Towards a convergence of "distributed" interests? *Management Control, 2*, 15-40. doi:10.3280/MACO2022-002002

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems, 28*(2), 118-144. Retrieved from https://doi.org/https://doi.org/10.1016/j.jsis.2019.01.003

Vitolla, F., Raimo, N., & Rubino, M. (2020). Board characteristics and integrated reporting quality: An agency theory perspective. *Corporate Social Responsibility and Environmental Management, 27*(2), 1152-1163. Retrieved from https://doi.org/https://doi.org/10.1002/csr.1879

Vormedal, I., & Ruud, A. (2009). Sustainability reporting in Norway—An assessment of performance in the context of legal demands and socio-political drivers. *Business Strategy and the Environment, 18*, 207-222. Retrieved from https://doi.org/10.1002/bse.560

WEF. (2020). *The global risks report 2020*. Retrieved from https://www.mcguinnessinstitute.org/wp-content/uploads/2020/05/WEF-2020.pdf

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind Jensen, T. (2020). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems, 22*(1), 102-129. Retrieved from https://doi.org/10.17705/1jais.00655

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research, 21*, 724-735. Retrieved from https://doi.org/10.1287/isre.1100.0322

Zhou, S., Simnett, R., & Green, W. (2017). Does integrated reporting matter to the capital market? *Abacus, 53*(1), 94-132. Retrieved from https://doi.org/https://doi.org/10.1111/abac.12104