Integrated Reporting as a managerial tool: The role of Integrated Thinking

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Abstract
This paper highlights how, by implementing the Integrated Thinking (IT) principle, the Integrated Report (IR) can enhance its traditional role as a disclosure mechanism by assuming a new identity as a powerful managerial tool. It also aims to identify different types of integration favored by IT and propose a comprehensive overview of their relationships and impacts. Following the call for pragmatic and interventionist research on IR and IT, we performed a qualitative case study analysis focused on a research organization that implemented IR, applying the IT principle. Our findings indicate that IT supports six distinct types of integration within the firm, each having specific managerial impacts. Moreover, IT can act as a form of interactive and cultural control. Our results are likely to be of interest to both the academic world and managerial practice. In the academic sphere, we shed light on IR's under-discussed managerial role, providing evidence from an underexplored context, the research one. In terms of managerial practice, our findings demonstrate the potential of IT as an opportunity for organizations to harness different types of integration, thereby enhancing their operations. Moreover, our findings underscore the pivotal role of the Accounting and Finance department and the Chief Financial Officer in the context of IR and IT. Finally, we advocate for a balanced approach in IT and IR, focusing not only on diagnostic control, organized according to a balanced scorecard approach, but also on interactive and cultural controls.

Keywords: Integrated Reporting, Integrated thinking, Case study, Managerial role, Forms of integration

Introduction

Integrated Reporting (IR) is one of the most discussed proposals in corporate reporting. It aims to support stakeholders in assessing the

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organization's capability to generate present and future value and pursue a sustainable strategy. To date, scholars, practitioners, and managers have primarily focused their attention on the role of IR as a disclosure tool. In contrast, even though IR could represent an opportunity to not only improve transparency but also "*decision-making for organizations of all types"* (Adams and Simnett, 2011, p. 293), lower interest has been placed on the opportunities provided by IR as a managerial tool and research on IR adopting an internal corporate perspective is limited (de Villiers et al., 2014; Dimes & de Villiers, 2021; Flower, 2020; Higgins et al., 2014). In particular, Integrated Thinking (IT), one of the fundamental principles of the IIRC framework, emphasizes the managerial role of IR (McGuigan, 2021). The success of IR depends on how companies embed IT into organizational activities (Baboukardos et al., 2021; La Torre et al., 2019; Busco et al., 2021). IT refers to "*the active consideration by an organization of the relationships between its various operating and functional units and the capital the organization uses or affects. IT leads to integrated decision-making and actions*" (IIRC, 2021, p. 3). IT's primary purpose is to support managers in identifying all the critical variables influencing the business model, thereby helping generate strategies that allow the organization to create value. If properly applied, the IT principle can contribute to the organization's cultural change, strategy sharing, and implementation, acting as a managerial mechanism. Moreover, the principle of IT will "*help catalyze behavioral change within organizations*" (Adams and Simnett, 2011, p. 293) and create a culture of increased cooperation between departments. According to Dimes and De Villiers (2024: 5, 1), IT is a "*form of management"*; IT is the management approach associated with IR, even though IT has been "*purely defined and understood*."

To understand IR in action, research needs to move from analyzing reporting outcomes to understanding IR internal practices and processes (Oliver et al., 2016) and consider how IT is implemented (O'Dwyer and Unerman, 2023). Notwithstanding its relevance and central role in IR development, IT is still unexplored. Feng et al. (2017: 330) confirmed that "*despite the centrality of integrated thinking to IR, there has been limited research to date on the concept. Clarifying what integrated thinking means in practice can improve our understanding of a key IR concept*".

Furthermore, the analysis of existing literature reveals how IT can evolve IR's role into a managerial process and tool, expressed through various forms of integration favored by IT. However, previous studies have not thoroughly analyzed them, and no reference model has been proposed to provide a comprehensive overview of these different integrations. Moreover, the operationalization of various types of integration in enterprises has not been

thoroughly explored. Thus, following the calls of Feng et al. (2017) and Dimes and De Villiers (2024), we propose that to reach a deep and clear understanding of IR's managerial role, it is necessary to grasp "what IT means in practice" by investigating the different implications of IT in terms of integration. Consequently, this paper aims to identify various types of integration underlying the IT principle in developing IR and propose a comprehensive overview of their relationships and impacts. Moreover, it aims to explore how, by implementing the IT principle, IR can add to its traditional role as a disclosure mechanism a new identity as a managerial tool.

Thus, our main research questions are as follows:

1) How, through the IT principle, can IR add a managerial role to its traditional one, as a disclosure mechanism?
2) Which types of integration can be favored by IT, and what are their relationships and impacts?

Finally, relatively little attention has been devoted to IT in an empirical setting. Following the call for more evidence on IT, particularly for pragmatic and interventionist research, raised by Al-Htaybat and von Alberti-Alhtaybat (2018), we also aim to provide relevant empirical evidence. To this end, a case study of a research organization implementing IR and applying the IT principle is thoroughly described and critically analyzed.

The paper proceeds in six sections. First, we review the literature to highlight the IT principle and its implications. Then, the research methodology is presented. The fourth and fifth sections present and discuss the case study analyzed. Finally, we provide some conclusions and discuss the study's implications and limitations.

2. Literature review

IT is a key concept within IR principles. The IIRC's 2021 (p.2) framework states that "*The IIRC's long-term vision is a world in which integrated thinking is embedded within mainstream business practice …, facilitated by integrated reporting as the corporate reporting norm. The cycle of integrated reporting and thinking, resulting in efficient and productive capital allocation, will act as a force for financial stability and sustainable development".*

In the IIRC's view, IR should lead to profound internal organizational changes, rather than simply preparing one report (Guthrie et al., 2017).

Academic and practical literature investigated the concept of IT, considering its complex and multifaceted role. La Torre et al. (2019) highlighted that IT is a concept that has been introduced previously to accounting

researchers concerned with sustainability. Gray (1992) argued that a deeper ecological approach in accounting necessitates a soft systems thinking perspective, which recognizes interdependencies, relationships, and causal linkages. The expected benefits of IT include the more effective use of available capitals and resources in business strategy, alignment of the interests of different stakeholders, and a greater awareness of sustainability concerns (Feng et al., 2017).

IT and organizational and cultural integration

Adopting IT should encourage a shift in managerial mindset from "silo thinking" to a more integrated approach between different organizational functions, making information flows smoother and more efficient, and improving internal communication. Consequently, an organization's various activities and components are considered interconnected rather than separate, thus allowing for a comprehensive planning process that encompasses external stakeholders (Vitolla et al., 2020). Introducing an IT perspective within the company means making clear to organizational units and individuals the existence of connections and impacts resulting from their own decisions that affect other departments. Awareness of this enables the organization's members to make more informed decisions and strengthens corporate strategy sharing. As a result, the interchanges and the resulting dialogue between departments create significant cultural changes in attitudes and cognitive models, which can help break down internal barriers and contribute to aligning decisions and behaviors (Dumay and Dai, 2017).

IT and company strategy and sustainability strategy

Di Vaio et al. (2021) argue that IR and IT have led to an evolution in how companies communicate and create value by facilitating process integration and better allocation of capital resources. Moreover, practicing IT allows managers and employees "*to be aware of the company's strategy to create value and how it relates to their day-to-day and evolving functions so that there is alignment between the overall strategy, available resources (capitals) and the decisions and actions made by managers and employees in the short, medium and long term"* (La Torre et al., 2019, p. 42).

Improving internal decision-making and increasing awareness in strategy formulation fosters forward-looking behavior (McNally and Maroun, 2018). The consequence is a more robust business model. Moreover, the firm's business model and strategy are better aligned with changes in the external environment and are more focused on identifying and capitalizing on risks and opportunities. IT outlines the connections among strategy, governance, past

performance, and prospects through which an organization applies the connectivity principle, explaining the interdependencies between factors that have a material effect on its ability to create value (Dumay and Dai, 2017). The literature also highlights the link between IT and sustainability strategy (Knauer and Serafeim, 2014) and proposes that IT favors integrating the business's financial perspective, the organization's socio-environmental responsibility, and the management of intangible resources (Vitolla et al., 2020; Ciccola et al., 2022; Santoni, 2023).

IT and performance measurement and management

Guthrie et al. (2017) proposed that the implementation of IT and the IR adoption can lead to changes in the reporting process and performance measurement, also expanding the scope of existing accounting, reporting, and management control processes (Stubb and Higgins, 2014; McNally and Maroun, 2018). Indeed, some scholars analyzed the relationship between management control systems (MCSs), IT, and IR production, suggesting that balancing diagnostic and social control may improve internal decision-making (Bezuidenhout et al., 2023). The existing IR and MCS literature suggests that considering formal and informal controls is critical when examining this issue (Riccaboni and Leone, 2010). Higgins et al. (2014) found that informal controls could reduce reliance on formal control mechanisms. According to this perspective, IR can be used internally as a cultural tool for facilitating management control (Dumay and Dai, 2017).

IT implementation criticalities

Despite its advantages, specific barriers have been noted that hinder the introduction of IT into organizations. Firstly, implementing IT practices is challenging, and firms may require additional competencies and resources to undertake such a project (Stubbs and Higgins, 2014). Secondly, a shareholder-centric logic can prevent the management and reporting of capitals other than financial capital (Dumay et al., 2016). Moreover, consolidated organizational structures and cultures may hinder IT (Dumay and Dai, 2017). As highlighted by Maroun et al. (2022), organizations may follow a tick-box approach to IT to manage impressions. As a result, there is no guarantee that an organization claiming to have adopted an IT mindset is making significant changes to its strategy, business processes, and governance mechanisms (Esposito et al., 2024).

Building on the cited literature, our study aims to address some of the existing gaps in the following aspects. First, although previous studies have

addressed single or a few types of integration, to our knowledge, no study has attempted to systematize all types of integration favored by IT, proposing a comprehensive overview. Furthermore, following Feng et al. (2017) and Dimes and De Villiers (2024), we propose to cope with the IR's managerial role, in particular by investigating how the various types of integration may influence the role of IR, transforming it from a mere disclosure tool to a managerial and strategic tool.

Thus, we propose the following main research questions:

1) How, through the IT principle, can IR add a managerial role to its traditional one, as a disclosure mechanism?
2) Which types of integration can be favored by IT, and what are their relationships and impacts?

Finally, following the call for pragmatic and interventionist research, raised by Al-Htaybat and von Alberti-Alhtaybat (2018), we aim to systematize the topic more effectively, providing new empirical evidence through a case study analysis.

3. Research methodology

The research methodology was grounded in qualitative, case-based analysis (Eisenhardt, 1989). This methodology allows for a clear definition of the empirical object under analysis, a wide range of information sources and survey tools, and temporary contact between the researcher and the participant, making it possible to use specific techniques, such as direct observation and in-depth interviews. Case-based analysis is also suited to answering 'how' or 'why' questions about the analyzed issues (Yin, 1994: 14). We adopted a qualitative research method based on case analysis, firstly, as the limited attention in empirical studies on IT and the managerial role of IR requires an exploratory approach, allowing for the collection of experiences and thoughts of interviewees that quantitative studies tend to constrain. Secondly, the complexity inherent in adopting IR and the relevance of soft and process variables in IT are better tackled through case study analysis, allowing for a comprehensive view and immersive understanding of the issues discussed (Ebneyamini et al., 2018).

The case study analyzed is Human Technopole, an Italian Foundation established as a research institute for life sciences. In 2021 and 2022, Human Technopole issued its first two integrated reports. The authors contributed to the development of these documents through a joint research project between the organization and the University. Moreover, in December 2024, the

Human Technopole Foundation's "Integrated Report 2023" received the "Oscar di Bilancio" in the social enterprises and nonprofit organizations category, awarded by FERPI with Borsa Italiana and Bocconi University.[1] This recognition testifies to the quality of the efforts produced by Human Technopole in implementing IR, making it an interesting case for analysis. Moreover, the research context is characterized by high complexity and limited possibility of standardization; thus, specific managerial mechanisms based on informal and cultural aspects are necessary. The methodology, data collection, and analysis process are described below, while Section 4 presents more detailed information on the Human Technopole case.

A. Data collection and analysis

Data was collected through different sources: 1) open-ended, semi-structured, in-depth interviews with Human Technopole's top management, middle management, and stakeholders; 2) direct observation; and 3) business documents. Different types of triangulations allowed for the validity and reliability of data: information was collected from different sources; different data collection techniques were used; and data analysis was based on cross-referencing the data and their interpretation by different researchers (Strauss and Corbin, 1998; Vitolla et al., 2020). The interviews and surveys were conducted from December 2020 to March 2022, during the development of the IR project and the production of the first two integrated reports. The quality of the data collected was guaranteed by a significant investment of time and effort in standardizing the research protocol.

Concerning open-ended, semi-structured, in-depth interviews, two structured interview outlines were established, respectively, for interviews with top management and members of governance bodies, and with external stakeholders. The external auditors in charge of the IR assurance process were also interviewed. The following top managers and members of governance bodies were interviewed: the Supervisory Board (President and one member), the Management Committee's Director, the Scientific Committee (one member), the Head of Operations, the Head of Strategy and Scientific Affairs, and the Head of Communication. The main aspects discussed were as follows: deliberate strategy (from a triple bottom line perspective), strategic and short-term objectives, business model (including its main elements and the relationships among them), key stakeholders, approach to sustainability, and social and environmental impacts. Moreover, the external stakeholders interviewed were representatives of three

[1] Oscar di Bilancio, created in 1954, is one of the most prestigious awards in Italy for transparency and financial communication.

founding members (Ministries of Economy and Finance, of Health, and University and Research), the research and university community and local institutions, the civil society/local communities, Industrial Associations, and the leading providers of services and equipment.

During the interviews with external stakeholders, the following topics were covered: description of the stakeholder's objectives and activities, goals and ways characterizing the relationship with Human Technopole, subjects and organizational units involved in the relationship with the Foundation, contributions given to Human Technopole as well as expectations and interests raised against the Foundation and their respective relevance, risks, opportunities, benefits, and criticalities in the reciprocal relationship. Each interview lasted approximately an hour and a half and was attended by the Human Technopole's "Risk Management & Integrated Report" team, the Chief Financial Officer (CFO), and the Institutional Relations manager. Two researchers conducted the interviews. We adopted a "localist" approach in managing interviews, as suggested by Qu and Dumay (2011), as this methodology "*enables researchers to modify interview questions according to interviewees' world-view*" (Feng et al., 2017, p. 337). The interviews were videotaped and transcribed into Word documents.

Concerning direct observation, the authors were directly involved in designing and implementing the IR. They participated in numerous meetings with Human Technopole's management, external auditors, and stakeholders, gathering relevant data on soft variables, such as people's behaviors and attitudes toward IR.

Business documents analyzed comprise the Human Technopole's strategic plan, organizational chart, and other internal documents.

Data and analyses are the results of the different perspectives of two researchers, the team "Risk Management & Integrated Report", and the CFO, thus increasing the reliability of the analysis. Following Feng et al. (2017: 338), we adopted a research analysis based on "*standard open-coding methods to identify shared themes from the interviews initially*." To address the inherent subjectivity that may limit this methodology, all researchers reviewed the shared themes, discussed, and resolved differences to minimize substantive misinterpretations of the interview transcripts (Tweedie and Martinov-Bennie, 2015).

4. Case study

4.1 Human Technopole profile

The Human Technopole project was launched in 2016 at the behest of the

Italian Government to create a new center of excellence in life sciences in Italy. Law 232 of December 11, 2016, established Human Technopole as a private Foundation to create a multidisciplinary scientific and research organization in the health, genomic data, and decision-making science sectors. The Foundation's founding members are the Italian Ministry of Economy and Finance, Health, and the University and Research. Human Technopole is a center 'open' to the national scientific community, contributing to the provision of know-how and infrastructural facilities to researchers, combined with the promotion of scientific dissemination and technology transfer. The first research activities and projects started in 2020. Between 2020 and 2023, the number of employees increased from 70 to 280. The organizational structure comprises five research centers and six core research facilities. Three staff units report to the President, and five to the Operations Manager. The CFO oversees the Administration and Finance (AF) Department.

4.2 Integrated Reporting and Integrated Thinking

Human Technopole initiated the production of its first integrated report in September 2020. The project spanned approximately two years, from Autumn 2020 to summer 2022. The CFO was responsible for overseeing the implementation of the IR project. A task force with an economic background was established, the Team “Risk Management & Integrated Report”, operating inside the AF Department, which worked full-time on the project, with the methodological support of the authors. The CFO and his team viewed IR as a tool not only for disclosing information to stakeholders but also for planning, controlling, and evaluating the Foundation’s performance. The President and the Supervisory Board strongly endorsed the adoption of IR. IR was introduced to the organization through a top-down approach. The project’s primary sponsors were the then-President and the CFO. Through the IR project, they pushed the organization to rethink its value-creation process and promote sustainability holistically. In more detail, they assigned to IR the following main objectives:

- Make explicit the links between strategy, governance, value creation model, performance, and prospects.
- Strengthen the internal decision-making process through the representation of coordinated goal-setting and outcome control.
- Give explicit evidence and make commitments on the integration of strategy, sustainability, and sustainability goals.
- Make transparent to stakeholders the Foundation’s path of responsible and sustainable growth.

- Promote an ongoing dialogue with stakeholders and maintain trust in the Foundation.

The contents of the IR have been gradually defined by the Team "Risk Management & Integrated Report" and the CFO, with the authors' support, following an incremental and iterative process that involved the Foundation's governance, management, and key stakeholders. Many meetings were organized with the Supervisory Board and top and middle management to explain IR's aims, characteristics, and role, and to gather feedback, comments, and suggestions on how to formalize Human Technopole's business model, strategy, and value generation process. Stakeholders were also involved through surveys and interviews to capture the importance they gave to strategic objectives, risks, and opportunities. A debate also ensued regarding the governance structure, strategy, critical practices, and policies, which were active throughout the value creation chain and in stakeholder engagement activities carried out by the Foundation. In this way, the organization became more conscious of the Foundation's strategy and the elements and relationships of the business model. It began to pay more attention to the forward-looking perspective and spread it across various departments. Understanding the organization's value creation process holistically and integrating it enabled the cascading of the purpose, vision, and mission into the Foundation's strategy by defining eight strategic goals. It was fundamental to transpose these goals into more specific goals for the main functional areas and to identify KPIs to monitor their achievement. The IR was developed in accordance with the IIRC Framework and GRI Standards (Core option) provisions. In addition, several performance indicators not included in the GRI Standards have been introduced to effectively represent their connection with Human Technopole's eight strategic objectives and monitor the degree of achievement of strategic objectives at different organizational levels. A typical balanced scorecard approach was followed to introduce non-financial KPIs aligned with the strategy. Some difficulties occurred in identifying the most appropriate and measurable KPIs, particularly those for research activities, which the scientists agreed on. Thus, the CFO and his team first identified KPIs. Then, the identified KPIs were presented and discussed with representatives from all functional areas and top management to reach a consensus. The active involvement of all the Foundation's departments also favored the development of new indicators. This interactive and iterative process allowed a better representation of the activities put in place by the Foundation in terms of both strategic objectives and KPIs, as well as the diffusion of a forward-looking perspective in the organization. Notably, KPIs identified for disclosure to stakeholders have also been used to monitor the achievement

of strategic goals and revise the Foundation's strategy. The introduction of IR has thus significantly impacted the evolution of managerial control systems and strategy formation and revision based on an incremental and cross-functional approach. Strictly related to the change in the approach to strategy, a risk management project was also launched, aiming to identify and manage all relevant risks. Notably, in the development of IR, the organization also started to give considerable attention to the connections between the Foundation's strategic goals and the UN 2030 Sustainable Development Goals. A particular emphasis was placed on the materiality matrix, which was developed in 2020 and subsequently updated in 2021.

Then, before starting the process of producing the 2021 Integrated Report, training activities were implemented for employees and management, with the aim of raising awareness of the characteristics and purpose of the IR. Moreover, internal guidelines for data collection and analysis were provided to all organizational units, and additional investments were made in performance measurement and managerial control mechanisms, as well as information technology and digital systems, by the AF Department.

As stated by the CFO, "*The IR project was an opportunity to support the development of the managerial control system, which was in its embryonic stage. Identifying KPIs marked essential progress regarding the higher diffusion of knowledge and awareness of the organization's strategy, as well as from a technical and administrative perspective. We invested in managerial control tools to improve the processes of data gathering and elaboration in functions, as well as in information technologies, highlighting the growth of Human Technopole's management capacity to enhance data quality, reliability, and timeliness"*. An additional step to ensure the IR's quality and credibility was to have an external assurance of the IR performed by a specialized external auditing firm. Notably, the IR project was initially viewed with distrust by the Director and managers from scientific backgrounds, who required assistance in understanding its relevance and usefulness, not only as a disclosure tool but also as a managerial mechanism. Their main criticism was related to the need for formalizing and disclosing research activities, as well as the difficulty of translating the complexity of these activities and their outputs into quantitative targets and indicators. Notably, the feared risk was to provide an inadequate representation of the activities carried out and the results achieved, which, for research, are collegial, have medium- to long-term horizons, and are characterized by high uncertainty and risk. Over time, the involvement of "scientists" in developing the IR through meetings, training activities, and stakeholder engagement activities allowed them to understand the IR goals better and appreciate its contents and benefits, with more

alignment in the organization's strategic goals, activities, and results. At the end of the first year IR round, in the 2021 document (p. 6), the role of the IR is described as it follows: "*In addition to being the result of an organizational and cultural process aimed at expanding the traditional financial reporting, IR is also a means that facilitates the coordination of internal departments in the collection and organization of information useful for decision-making. The document also clarifies how economic, social, and environmental sustainability is implemented through stakeholder interaction and involvement in decision-making processes, strategy, and governance*".

Moreover, IT has been identified as playing a relevant role in supporting IR, as explicitly stated in the 2020 Integrated Report (p. 6):

"*The IR is the information tool to describe how Human Technopole creates sustainable and long-term value. …. The IR is not just a reporting tool, but rather a way to facilitate the coordination of the internal units in collecting and organizing information to make informed decisions (which we call Integrated Thinking)".*

5. Discussion

The Human Technopole case illustrates how IR can serve as a managerial tool in addition to its traditional disclosure function. It also illustrates how IT represents the underlying process of the decision-making practice embedded within the company, while IR serves as the instrument through which this process is communicated. Moreover, the case study demonstrates how IT supports various types of integration. Concerning strategy formulation, IT supports the integration of strategic objectives, business models, performance, opportunities, and risks, and favors integrating corporate and sustainability strategies. Regarding the strategic process, IT facilitates the integration of various subjects and expectations, both internal and external, involved in defining strategic objectives. A more precise integration between strategy and organization is also supported, thanks to the dissemination of strategic goals throughout the organization, which serves as the basis for aligning behavior and decision-making processes and fostering a shared organizational culture. The various types of integration that emerge from the analysis of the case study, as favored by IT, are discussed in more detail below.

Firstly, IT favored aligning the business model and the strategic objectives. At Human Technopole, a significant effort was made to align the business model's characteristics with strategic objectives. This activity also identified possible gaps to be filled and inconsistencies to be addressed. The

awareness of managers and employees regarding the organization's strategy to create value and its impact on their day-to-day decisions and activities facilitated alignment between the overall strategy, available resources (capital), and the decisions and actions made in the short, medium, and long term.

Secondly, through interviews conducted by the research team with members of governance and top management, the IR development process facilitated discussions and debates on the Foundation's strategy. It led to a more precise and shared definition of the strategic objectives outlined in the strategic plan and their priorities. Furthermore, the involvement of management and employees made it possible to disseminate the organization's strategic objectives and to collect suggestions on strategic priorities. The entire process facilitated the adoption of an interactive and iterative strategy formation approach that alternated between top-down and bottom-up, incremental and inter-organizational initiatives. The strategy was also aligned with the risks and opportunities presented by the external environment. So, IT supported aligning business strategy, the business model, and capitals in strategy formulation and identifying connections among stores of value and capitals, favoring their more effective use and allocation. Moreover, IT fostered a strategic role for IR, favoring integration in the strategic process and, as a result, among strategic objectives, programs, and actions.

Thirdly, the IR project represented an opportunity for Human Technopole to introduce relevant changes in decision patterns and behaviors, providing several benefits for more effective management. In particular, the IT approach facilitated dialogue and collaboration between departments, albeit not always seamlessly. Thus, IT fostered cross-functional collaboration and a broader perspective on decision-making and strategy formulation. IT acted, therefore, as a stimulus for the adoption of a decision-making model that is no longer focused on a 'silo approach' but based on a horizontal perspective, making explicit the relations and connections among the different activities of the organizational units. In Human Technopole, the increasing alignment between the perspectives and approaches of the managerial staff and research staff confirms that introducing IT inside the organization means making clear to organizational units and individuals the existence of connections and impacts resulting from their own decisions that, as in a domino effect, fall on the other corporate departments.

Fourthly, IT also facilitated a cultural shift in the attitudes and cognitive models of employees working in different functions, as it connected various units and made employees more aware of the impact of their decisions on other departments. Notably, the IR development process fostered the alignment between the approach, cognitive model, and culture typical of

departments involved in research activities (e.g., Director, Head of research centers) and the approach, cognitive model, and culture typical of the administrative and operating departments. Moreover, sharing strategic priorities with all employees helped generate a consensus towards IR. At Human Technopole, it took two years of work and drafting two reports, thanks to the involvement of all managers and employees in the IR process, for the scientific team to begin to understand the IR's characteristics, role, and benefits, and to collaborate more actively. As highlighted earlier, the AF department, the owner of the IR project, and the Communication department, which promoted IR both internally and externally, played a crucial role in this internal alignment process. The cognitive alignment, in addition, enabled the execution and implementation of the strategy.

Fifthly, in Human Technopole, IT helped the organization deploy sustainability in its strategy and risk management model by identifying appropriate KPIs, enabling opportunities and risk assessment, and leading to a more efficient decision-making process. In this way, IT contributed to mitigating the dualism between business and sustainability strategies, thereby favoring the integration of the two perspectives. Human Technopole's IT process also enabled the organization to emphasize sustainability and disseminate this topic throughout the Foundation, highlighting its more critical aspects. Explicit reference to the 17 UN's SDGs in the report also placed the Foundation in a privileged position concerning recent regulatory changes in reporting and accountability. Moreover, IT supported the integration between the company and its stakeholders. To develop its first two integrated reports, Human Technopole began engaging with stakeholders through strong stakeholder involvement, focusing on dialogue to align the interests of different stakeholders, including them in strategic planning, and enhancing accountability and external communication. At Human Technopole, IT was crucial for communicating with stakeholders and promoting their engagement. During the interviews, the strategic objectives defined by top management were shared with stakeholders and updated based on their comments, allowing for a better prioritization.

Finally, at Human Technopole, the IT process also played a central role in managerial control. It paved the way for revising the entire control model following the typical logic of the balanced scorecard. The development of KPIs consistent with the identified and communicated strategic objectives presented an opportunity to address the shortcomings of managerial reporting, which was still underdeveloped in 2020, as the Foundation was in its early-stage phase. However, the approach was much more flexible and

consistent with the Foundation's research and innovation activities, which, being challenging to measure, required better alignment with rigid diagnostic tools.

6. Conclusion

This paper aims to explore how the IT principle can transform IR into a powerful managerial tool, in addition to its traditional role as a disclosure mechanism. It also aims to categorize the diverse forms of integration that the IT principle enables in the development of IR. In response to the call for more practical and interventionist research that could address the challenges of IT and IR internal practice (La Torre et al., 2019), a qualitative case-based analysis was conducted (Eisenhardt, 1989). This involved a detailed examination of the various forms of integration that IT facilitates within an organization, culminating in a comprehensive overview of the subject. While empirical research on IT and IR is on the rise, many studies are disjointed, often neglecting practitioner targets and lacking a critical review of guidelines or practices. Furthermore, as highlighted in the Section on Literature Review, previous studies have suggested some types of integration favored by IT; however, a comprehensive overview of all such kinds of integration has yet to be developed. Our research findings show that IR, in addition to a disclosure role, can support strategy development, communication, and sharing within the organization and with stakeholders. IR and IT can contribute to organizational and cultural integration. Starting from our findings and considering also the literature review, we may propose the following different levels of integration supported and facilitated by IT, which are discussed below:

1) *Integration between strategy, business model, and capitals, as well as in the process of strategy definition.*
2) *Integration between corporate and sustainability strategy.*
3) *Integration among organizational units.*
4) *Integration among internal cultures, values, and cognitive models.*
5) *Integration between the organization and its stakeholders.*
6) *Integration between external disclosure and managerial control systems.*

Integration between strategy, business model, and capitals, as well as in the process of strategy definition

The Human Technopole case study highlights the role of IR as a mechanism supporting strategy development and its formalization. Elaborating an

integrated report requires organizational actors to identify strategic goals, programs, and actions. In this process, the role of IT emerges in favoring strategy formation through an incremental, interactive, and iterative approach typical of emerging strategies (Mintzberg, 1978). IT also plays a vital role in sharing and communicating the deliberate strategy internally and externally to stakeholders. At Human Technopole, the IR development process, through both interviews with members of governance and management and a survey addressed to employees, facilitated discussion and debate on the Foundation's strategy, leading to a more precise and shared definition of the strategic objectives outlined in the strategic plan and their priorities. This made managers and employees aware of the organization's strategy for creating value and its impact on their day-to-day decisions and activities. Such findings confirm that, whether fully internalized, IT should lead to more effective business strategies, risk identification, and internal management, allowing organizations to generate value for investors and other stakeholders (Stubbs and Higgins, 2014). Moreover, the case study demonstrates that IT favors aligning the business model with strategic objectives and adopting a forward-looking approach (McNally and Maroun, 2018).

Integration between corporate and sustainability strategy

Our findings support the notion that IT helps an organization integrate sustainability into its corporate strategy and risk management, thereby favoring the integration of these two perspectives and enhancing sustainability consciousness (Feng et al., 2017). At Human Technopole, IT enabled us to emphasize sustainability and disseminate this topic throughout the organization. Explicit reference to the 17 UN's SDGs in the IR also identifies the Human Technopole as a benchmark concerning recent regulatory changes in reporting and accountability, as also certified by the 2024 award "Oscar di Bilancio."

Integration among organizational units

IT plays a crucial role in promoting cross-functional collaboration within an organization. Our research findings confirm that IT can support strategy development, communication, and sharing within the organization thanks to a collaborative and cross-functional approach (La Torre et al., 2019). They also support the idea that IT acts as a stimulus for the adoption of a decision-making model, one that is no longer focused on a 'silo approach' but instead based on a horizontal perspective and connectivity principle. At Human Technopole, this is demonstrated by the increasing alignment between the

perspectives and approaches of the managerial and research staff, facilitated by IT.

Integration among internal cultures, values, and cognitive models

Thanks to cross-functional collaboration, IT and IR become enablers for aligning the values and cognitive models of people and organizational units toward a common organizational culture. This also contributes to organizational and cultural integration. More specifically, IT serves as a basis for IR development, not an isolated event within an organization, but instead influences behaviors, attitudes, and culture, which are integral to its social structure. At Human Technopole, the IR development process, facilitated through IT, fostered alignment between the approach, cognitive model, and culture typical of departments involved in research activities and administrative and operational units. As highlighted earlier, the AF and Communication departments played a crucial role in this internal alignment process, facilitating the execution and implementation of the strategy.

Integration between the organization and its stakeholders

At Human Technopole, the roles of IR and IT as tools for stakeholder engagement are also evident. IT has been instrumental in communicating with stakeholders and fostering their engagement. Through interviews and surveys, the strategic objectives defined by top management were shared with stakeholders, updated based on their feedback, and their prioritization was better defined. This active involvement of stakeholders through IT makes them feel valued and integral to the organization's strategy. Thus, our findings support that the basis of IT is strong stakeholder involvement and dialogue with them. IT can benefit from building a solid and long-lasting relationship of trust and transparency with stakeholders, enabling the organization to accurately and comprehensively address their requests. Stakeholder engagement can be conducted through various modes, including focus groups, meetings, interviews, and surveys. The mode chosen depends on the desired depth, the number of subjects in various stakeholder categories, and the results of the cost-benefit analysis.

Integration between external disclosure and managerial control systems

Our analysis reveals further integration related to performance measurement systems (PMSs). Indeed, IT promotes the alignment between managerial control systems (MCSs) and external disclosure so that the same KPIs monitored inside the organization are also communicated to the stakeholders. This type of integration demonstrates how adopting a managerial

perspective, as a disclosure tool, can also play a significant role in supporting the managerial control process (Simons, 1995). The role of IT mainly ensures that the organization monitors its business activities by considering both financial and non-financial aspects of the value creation process in an integrated way. To this purpose, Knauer and Serafeim (2014) suggested that an IT mindset is similar to adopting a balanced scorecard approach (Kaplan and Norton, 1992). Performance measurement in IR and IT cannot be limited to considering the indicators provided only by the GRI, a common practice even among IR auditors. However, it must also consider indicators representative of strategic goals for IR and IT to facilitate the implementation of the strategy. Dimes and De Villiers (2021) have well-researched the impact of IT on MCSs. They emphasized how an MCS based on a perspective not exclusively financial can facilitate the development of IT and better support the IR process. This facilitates the intentional combination of information from various internal sources, managed by MCSs, to be used for external disclosure. Instead, our analysis supports that the relationship between IR and MCSs can also be inverse. The case study demonstrates how information required for external disclosure (i.e., for IR) influenced the development and improvement of MCSs. An example of this is the KPIs connected to strategic goals, which were first developed to be included in the IR. At the same time, they were incorporated into MCS only after the involvement of middle and top management, employees, and stakeholders. As shown by the case, the design of the IR, particularly in terms of defining KPIs aligned with strategic and non-financial objectives, led to the implementation of a scorecard of indicators that also guided performance measurement from a managerial perspective. According to the well-known approach of "what you measure is what you get", such a maneuver also impacts behaviors. It thus enables overall alignment on the value creation drivers that are the very essence of IR.

The forward-looking orientation also represents a perspective that takes its starting point in IR and transfers it to MCS. This finding is consistent with the proposal by accounting scholars, who found that future-oriented, forward-looking information is increasingly required to support strategic planning and decision-making in business environments characterized by globalized competition and the growing importance of financial markets as allocation mechanisms for financial resources. Furthermore, the literature highlights that business organizations integrate and align MCS and external disclosure, where external corporate reporting creates the basis for management reports (Nathan et al., 1996). Moreover, it is noteworthy that the literature has considered the convergence between performance measurement for external disclosure and MCSs as a way to reduce the information asymmetry

between external stakeholders and managers. Without the fundamental connections between MCS and external reporting, disclosure is merely "window dressing" without providing any meaningful information to stakeholders.

Table 1 presents the various and multifaceted integration opportunities favored by IT, highlighting the interconnected managerial impacts and how IT can support the role of IR as a managerial tool.

Ultimately, our analysis demonstrates how IT can serve as a managerial control mechanism. In particular, IT has been highlighted as a form of cultural control (Dumay and Dai, 2017) that triggers essential change processes. At Human Technopole, IT and the subsequent alignment of vision, goals, and values between the core groups (scientists and administrative staff) and stakeholders served as a cultural control tool (Ouchi, 1979). The approach to performance measurement adopted was much more flexible and consistent with the Foundation's research activities, which, being challenging to measure, are better suited to a cultural and interactive control form than a rigid diagnostic tool (Simons, 1995). In fact, through IT, the diagnostic control activity, which focuses on assessing the achievement of planned targets and analyzing variances, can be replaced by a control form that highlights strategic opportunities, threats, uncertainties, and the organization's strengths and weaknesses. According to Dimes and De Villiers (2021), our findings indicate the need for an appropriate balance between informal and formal MCSs to achieve IT's benefits. They also support the evidence that informal controls, such as improved employee understanding and socialization, can reduce reliance on formal control mechanisms (Higgins et al., 2014; Dimes and De Villiers, 2021).

7. Implications and limits

Our results are likely to be of interest to both the academic world and managerial practice. Regarding the former, we demonstrated how IT can support the role of IR as a managerial tool by facilitating various types of integration.

We identified six kinds of integration supported by IT and proposed a comprehensive overview of their relationships and managerial impacts. Future research should investigate more in-depth the types of integration we identified and the related IR managerial impacts to support our findings, also through quantitative research methods. Particularly, through questionnaires surveys some practical issues could be analyzed related to the managerial impacts of each of the six types of integration such as: the business model changes linked to the IR adoption, the ways how to integrate sustainability

into strategy and organization, the cultural changes, the revision of the managerial control systems with particular reference to the use of the Balanced Scorecard and the relationship between formal and informal mechanisms. These aspects can also be analyzed in various types of business contexts (e.g., family businesses, nonprofit organizations).

Table 1 - Types of integration and IR managerial impacts

IT Integration type	IR Managerial impact
1. *Integration between strategy, business model, and capitals, as well in the process of strategy definition*	• Sharing and communication of strategic objectives • Incremental and iterative strategic process • Alignment between strategy and business model
2. *Integration between corporate and sustainability strategy*	• Deployment of sustainability inside the organization • Commitment towards sustainability objectives achievement
3. *Integration among organizational units*	• Cross-functional collaboration • Implementation of the connectivity principles in decisions and actions • Organizational effectiveness and efficiency
4. *Integration among internal cultures, values, and cognitive models*	• Diffusion of common and shared values, visions and mindsets in the organization • Alignment of behaviors and decisions • Cultural control
5. *Integration between the organization and its stakeholders*	• Stakeholder engagement • Stakeholder expectation relevance
6. *Integration between external disclosure and managerial control systems*	• Strong relationship between performance measurement for disclosure and for managerial control • Adoption of a BSC approach in MCS • Adoption of a system of informal and formal MCSs; diagnostic, interactive and cultural controls.

Moreover, we responded to the call for pragmatic and interventionist research on IR and IT by conducting a qualitative case study analysis. It is noteworthy that the case study was conducted in an organization operating in an underexplored sector, namely the research sector. This could represent an opportunity and a starting point for future research on IR and IT, which can consider different organizations in terms of mission (profit and nonprofit organizations), ownership (public companies, state-owned firms, family firms), size (large, medium and small sized companies), national and sectoral contexts, and the stage in the organization's life cycle (i.e., start-ups). In particular, future research could address the question of how different approaches to implementing IR and IT should be adopted in various types of organizations and in which aspects they should differ. Moreover, it would be interesting to understand if the proposed types of integration can play different roles in various organizations.

Regarding the impact of our research on managerial practice, our findings shed light on IR as a managerial tool and demonstrate that IT presents an opportunity for organizations to leverage different types of integration. Moreover, IT presents an opportunity for organizations to focus on diagnostic control, as well as interactive and cultural controls. Furthermore, regarding MCS and their role in IR, our findings suggest that the Accounting and Finance department, as well as the CFO, play a significant role in IR and IT. However, they should focus on diagnostic control, organized according to a BSC approach, as well as interactive and cultural controls.

The primary limitation of this work is that it is based on a single case study, which restricts generalizability. However, this limitation can be partly unavoidable due to the exploratory nature of this work on a subject that still requires analysis and understanding. As described in the Methods section, we employed various methods to mitigate the potential for interviewer bias. Moreover, different types of triangulations were employed to enhance the validity and reliability of the data. Another limitation is related to the fact that we analyzed a start-up where the benefits of IR and IT cannot be fully assessed. Future research could focus on established organizations and develop longitudinal research to go deeper into IT and the role of IR. Finally, the Corporate Sustainability Reporting Directive (CSRD) could render the theme of IR as a disclosure mechanism less attractive in favor of other reporting forms, such as sustainability reporting. However, thanks to its managerial role, IR could also represent a relevant change mechanism in organizations in the future.

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