Received: 10 May 2021 | Revised: 3 September 2021 | Accepted: 15 September 2021

DOI: 10.1002/csr.2211

RESEARCH ARTICLE

Corporate Social Responsibility and Environmental Management

WILEY

Conceptualizing and enabling circular economy through integrated thinking

Federico Barnabè[1] | Sarfraz Nazir[2]

[1]Department of Business and Law, University of Siena, Siena, Italy

[2]Department of Economics and Management, University of Pisa, Pisa, Italy

Correspondence
Federico Barnabè, Department of Business and Law, University of Siena, P.za S. Francesco 7, 53100 Siena, Italy.
Email: federico.barnabe@unisi.it

Abstract

This study investigates how companies can conceptualize and enable circular economy (CE) principles and opportunities through integrated reporting (IR) practices and, specifically, the principle of integrated thinking (IT). To this aim, the study carries out an interventionist research-based case study about a small-sized agri-food company and applies Systems Thinking tools (namely a sub-system diagram and a stock and flow diagram). The findings demonstrate that IR concepts played a performative role, favoring a better understanding of the business domain and of CE-related activities and opportunities, also in the perspective of developing future strategies. Overall, the research suggests that IR and CE may be jointly used but more research and emphasis on the principle of IT, particularly to facilitate decision-making, are recommended.

KEYWORDS

circular economy, feedback loop, integrated thinking, integrated reporting, strategies of value creation, Systems Thinking

1 | INTRODUCTION AND BACKGROUND TO THE RESEARCH

Many reports account that our world is on the shrink of a huge collapse. Scarcity and overexploitation of resources, climate change, pollution, famine, and poverty are phenomena frequently cited as the results (or side-effects) of the business activities carried out by organizations in the modern economy and across the world (e.g., Brown, 2012; FAO, 2019; UN - United Nations, 2015). In this context, calls from several parts are pointing toward more responsible management of resources, at the same time emphasizing the need for organizations across the world to better conceptualize the opportunities given by sustainability and, subsequently, to embed sustainable strategies within their internal decision-making systems (e.g., Vitale et al., 2019). At the same time, companies all over the world are stimulated by their stakeholders to increase the level of transparency in reporting and disclosing their strategies, actions, and the results consequently generated in terms of economic, social, and environmental impacts (e.g., de Villiers et al., 2014; Eccles & Krzus, 2011; Gray et al., 1996).

A lively debate has subsequently characterized the scenario at different levels (e.g., political, academic, operational) thereby leading to the emergence of many proposals and many innovations in the field of sustainability management and reporting. As an example, we could point to the Agenda 2030 promoted by the United Nations and the related definition of the 17 Sustainable Development Goals, to be achieved by 2030 (UN - United Nations, 2015). Overall, organizations are progressively pushed toward the adoption of more responsible behavior, with the ultimate goal of saving resources and mitigating the consequences and the side-effects of their actions, at the same time finding and applying solutions profitable for their shareholders (Riccaboni & Leone, 2010), if and when possible (e.g., Hussain et al., 2018). Business organizations have certainly embraced the challenges aforementioned over the last few years, in order to not only address market's and customers' needs in a very dynamic context but also ensure the sustainability of their business model *and* the

sustainability of their actions—in terms of the impacts and effects generated internally and externally. Stated differently, business organizations are said to look more and more at the broad field of sustainability no longer as an environmental and communication-related domain, but as a core part of their business model, to be exploited to increase performance over time (e.g., Bernal-Conesa et al., 2017; Stubbs & Cocklin, 2008).

With specific reference to this study, the focus is primarily placed on the concept of circular economy (hereafter CE), the principles it entails from an operational point of view, and the tools that might be used to create awareness and understanding within teams of managers, and with the ultimate goal to assist decision-making and influence future strategy development.

Although differently defined (e.g., Kirchherr et al., 2017 and Moraga et al., 2019), in broad terms, a CE can be viewed as an economic system where products and services are traded in closed-loop cycles. As emphasized by its label, a CE is a system in contrast with the linear-oriented system that has traditionally characterized our production processes (so-called "linear economy," Millar et al., 2019). Indeed, a CE is seen as an economy that is regenerative by design, to retain as much value as possible of products, parts, and materials (EMF, 2013a) thereby reducing or eliminating waste.

Although this approach can generate an array of short- and long-term benefits (e.g., Park et al., 2010), its ultimate goal and strength are to create a system that allows for longer life of resources and a decrease in the waste generated by our activities (EMF, 2013a; EMF, 2015; Kraaijenhagen et al., 2016) through an integrative approach of a few core principles based on a functioning of *circularity* expressed by the concept of "feedback loop" (or "closed-loop," see Richardson, 1999 and Sterman, 2000).

Particularly, several studies (e.g., Jawahir & Bradley, 2016; Reike et al., 2018) advocate designing CE systems relying on the so-called "6Rs of CE," that is, Reduce, Reuse, Recycle, Reproduce, Redesign, Recover. The identification of the 6Rs of CE has certainly offered an opportunity to organizations across the world and from various industries not only to investigate their operations and eventually rethink their processes but also to engage in a discussion—internally within the team of owners/managers and/or externally, with their stakeholders—relying on a more established set of CE-related concepts and terms (i.e., using a shared meaningful glossary and a common representation). This is fundamental for companies and managers operating in various geographical areas of the world and in different industries and previous research witnesses the increasing relevance gained by CE in this regard (e.g., Dossa et al., 2020; Greer et al., 2020; Ki et al., 2020).

However, extant literature also emphasizes that there are several gaps still under-researched. In detail, previous research underlines the opportunities as well as the difficulties related to the full implementation of CE principles within organizations (e.g., Kirchherr et al., 2018), especially if they are small-sized (e.g., Prieto-Sandoval et al., 2019) and/or family-owned ones (e.g., Núñez-Cacho et al., 2018).

In this context, this study looks at accounting- and reporting-based practices as tools able to play a performative role, that is, assisting companies to conceptualize and exploit CE terms and opportunities, and develop future sustainable strategies.

If, on one hand, extant literature already emphasized that accounting-based corporate reporting practices and logic could offer powerful support to organize and disclose effectively data and information about CE-related activities (e.g., Stewart & Niero, 2018) as well as systemic and sustainable value-creation processes (e.g., Kunc et al., 2021), on the other hand, further evidence of how those principles and reports may be used in practice to support companies *internally* to discuss strategies and actions, and subsequently account for them, is still lagging and advocated (e.g., Geissdoerfer et al., 2017; Kunc et al., 2020). About this study, such a performative role of accounting-based tools would eventually not only facilitate dialog and discussion within companies but also foster sustainable business practices (Brown & Dillard, 2014).

In addition to these considerations, we underline that previous studies (e.g., Barnabè & Nazir, 2020) advocated that a more general principle of integration and connection should guide organizations in applying the "R-principles of CE" aforementioned, thereby allowing the identification and management of the hierarchy of interrelationships existing among business units, functions, and resources within a specific business environment. Notably, the integration mentioned above also refers to the necessity of embedding CE concepts into a company's decision-making and policy analysis processes, thereby increasing its performance and competitive advantage (e.g., Pieroni et al., 2019) and going beyond the "mere" consideration of more established and already in place CE-related activities (Chen, 2009 and Reike et al., 2018).

Particularly, this study focuses on integrated reporting practices (IR) and the principle of integrated thinking (IT) which represents the underlying guide of the IR approach.

Based on the integrated reporting framework (IIRC, 2013a, 2021), IR has emerged not only as one of the latest innovations in the field of corporate and sustainability reporting (e.g., Adams, 2015; Atkins et al., 2015; Busco et al., 2018; Dumay et al., 2016; Eccles & Krzus, 2011; Pistoni et al., 2018) but also as a potentially good fit for organizations interested in managing holistically and sustainably their strategies (Brown & Dillard, 2014; Kunc et al., 2020) and, subsequently, monitoring and representing comprehensively CE-related data and information (Stewart & Niero, 2018). If on one side, extant literature witnesses that companies worldwide and across several industries are engaging with IR practices (e.g., de Villiers et al., 2020; Gibassier et al., 2019) and with CE-related measuring and reporting procedures (e.g., Elia et al., 2017; Geissdoerfer et al., 2017; Gunarathne et al., 2021), on the other side, the interplays between IR and CE seem to be still under-researched, with a few exceptions (e.g., Barnabè & Nazir, 2020). In detail, the performative role of IR principles and tools to support the development of sustainable CE-related strategies is yet missing, to our knowledge. Specifically, several calls for more insights about the modalities through which companies experience IR to and CE emphasize this gap (e.g., Kunc et al., 2020; Stewart & Niero, 2018).

With this said, the research question addressed in this study is the following one: how can companies conceptualize and enable CE principles and opportunities through IR practices and, specifically, the principle of IT?

This research question is addressed with the development and presentation of a case study (Ryan et al., 2002; Yin, 1994) about a

family-owned small-sized company operating in the agri-food sector. The case study was developed according to an interventionist approach (Dumay, 2010; Dumay & Baard, 2017; Jakkula et al., 2006; Suomala, 2009), relying substantially on the principle of IT, and through the use of Systems Thinking tools (Meadows, 2008; Senge, 1990), namely, a sub-system diagram and a stock and flow diagram (Sterman, 2000).

The article is structured as follows. Section 2 presents the concept of CE and the so-called 6R principles of CE. Section 3 illustrates the key concepts of the IR Framework and presents the principle of IT. Section 4 describes the research design, while Section 5 reports the results of the case study. Section 6 provides our discussion, followed by some limitations to this study and ideas for future research.

2 | KEY CONCEPTS AND THE 6RS OF THE CIRCULAR ECONOMY

Moving away from traditional linear oriented economic systems (Millar et al., 2019) organized on the basis of the "take-make-use-dispose" paradigm (EU - European Union, 2014a), a CE looks to design and apply a model where unused does not exist and waste is reduced and treated to generate new value. Although differently defined (e.g., Kirchherr et al., 2017 considered 114 definitions of CE while Moraga et al., 2019 discussed the concept of CE both sensu stricto and sensu *latu*), a CE can be viewed as an economic system where products and services are traded in closed-loop cycles, thereby increasing their usage and reducing waste. A CE system is therefore restorative and regenerative by design, with resources kept in function longer and with the ultimate benefit of increasing the degree of resilience of our economic, natural, and social systems (EMF, 2013a). However, "CE" is a label that not only considers production processes and flows of materials but also entails the presence of various dimensions of the operations and the performance which are interconnected circularly (e.g., see Murray et al., 2017 when discussing the social and ethical dimensions of a CE).

The fundamental idea underlying a CE is conveyed through the concept of *feedback loop* (Richardson, 1999; Sterman, 2000) that makes circularity visible, manageable, and operating in practice. A "feedback loop" is generated when two or more variables are circularly connected, thereby creating a closed-chain of cause and effect relationships among such variables: for example, X affects Y, then Y affects Z and ultimately Z affects X, thereby closing the loop and determining a circular relationship between X-Y-Z.

Consequently, a CE is no more viewed and "perceived" as an open-ended system (Kunc et al., 2020); instead, it is viewed, thought of, and managed as a circular framework dependent on a few fundamental loops, which are interconnected and dependent on one upon the other.

Previous literature provided several frameworks devoted to representing the loops involved in a CE system as well as their interplays. For instance: both the European Commission (EU - European Union, 2014a, p. 5) and the Ellen MacArthur Foundation (EMF, 2013a, 2013b) theorized frameworks where patterns of feedback processes are represented and interlinked to form the architecture of a CE-based economic system. Digging back in previous literature, Stahel (1982) developed a framework based on four main exercises, that is, Reusing, Repairing, Remanufacturing, and Recycling. Other authors subsequently expanded this original proposition elaborating more complex frameworks. As an example, Govindan and Hasanagic (2018) present a 6R representation of a CE that adds the processes of Recovering and Redesigning to the previous ones; additionally, 9R, 10R, or 11R approaches are also presented by previous studies (see Reike et al., 2018 for a review).

Notably, in this study, we will refer to the 6R of CE framework, whereby the concepts of the 6R exercises can be explained as portrayed by Figure 1 and described by Table 1. Specifically, the label "6Rs" refers to six main principles that are at the basis of the organization and management of a CE (EMF, 2013a; Reike et al., 2018) that is, Reduce (R1), Reuse (R2), Recycle (R3), Reproduce/Remanufacture (R4), Redesign/Repurpose (R5), and Recover (R6).

As a whole, the 6Rs of CE provide an integrative framework to organize and manage circularly business operations, at the same time providing several inputs to disclose information and measures related to such activities. In more detail, Table 1 describes each of the 6Rs of CE:

Previous literature already listed and spotted the numerous benefits of a CE-based system which could be even seen as intuitive and clear (Kunc et al., 2020) such as the minimization of the use of virgin materials for economic activity (Andersen, 2007), material cost savings, reduced price volatility, improved security of supply, potential employment benefits, as well as reduced environmental pressures and impacts (EU - European Union, 2014a). Additionally, from an organizational and management point of view, previous literature also emphasized that the 6R framework can assist organizations in reflecting about CE-related data and information (Govindan & Hasanagic, 2018) thereby favoring a better conceptualization of the business domain under analysis (e.g., Reike et al., 2018).

Subsequently, this framework can be regarded as an integrative approach able to support organizations in conceptualizing, designing, and carrying out their CE-related strategies and actions and to ultimately ensure "sustainable value creation in the economy, society, and the environment" (Jawahir & Bradley, 2016, p. 108). In this regard and contrariwise, previous studies (e.g., DeLorenzo et al., 2019; Ieng Chu et al., 2013; Korhonen et al., 2018; Murray et al., 2017; Park et al., 2010) underlined that companies across the world engage with CE and CE-related reporting practices for several different reasons, such as: establishing legitimacy, adopting isomorphic behaviors (e.g., if compared to the competitors or the global context), adhering to institutional regulations, and providing an increased disclosure to specific categories of stakeholders.

It is the authors' opinion that all the considerations aforementioned open and fuel the debate about a twofold goal to be assigned to analyses in the field of CE: first, the complex hierarchy of R-processes active in a CE-oriented system should be rigorously identified and taken into account; second, data and information

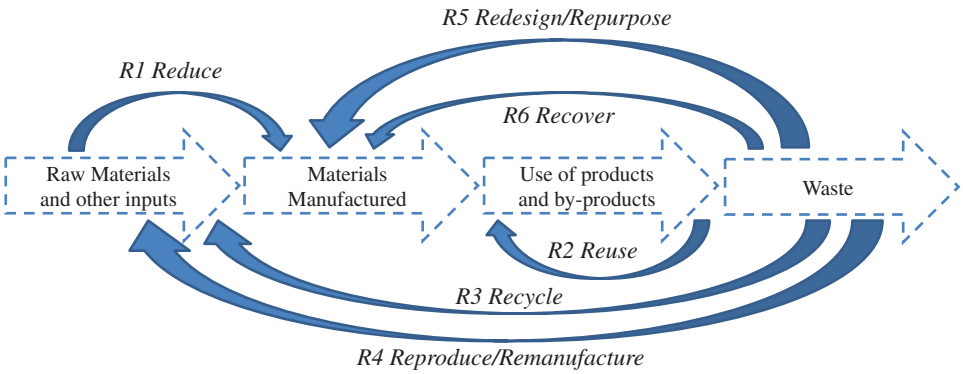

FIGURE 1 Representation of the 6Rs of the circular economy framework [Colour figure can be viewed at wileyonlinelibrary.com]

about such loops and their interrelationships should be not only transparently and adequately communicated to relevant stakeholders through an organization's reports but also used to increase understanding and awareness within the organization about value creation processes, thereby steering decision-making and informing strategy development toward sustainable paths of value creation.

Within this context, we look at the performative role that might be played by accounting-based tools and, in detail, we focus on the Integrated Reporting framework (promoted by the International Integrated Reporting Council - IIRC) and its underlying principle of IT as a viable solution for organizations interested in identifying their CE activities and R-loops, and subsequently, managing and disclosing data and information.

3 | INTEGRATED REPORTING AND THE PRINCIPLE OF INTEGRATING THINKING

3.1 | An overview of integrated reporting principles and concepts

There has been increasing concern that conventional corporate reporting is insufficient for providing information to the stakeholders (Adams et al., 2011; Cohen et al., 2012; Gray et al., 2014) specifically when the activities carried out generate impacts and consequences that go beyond the economic dimension of affairs, and when organizations have to manage a complex system of resources and activities within their business domain (e.g., Eccles & Krzus, 2011).

Acknowledging such factors, several frameworks, regulations, and methodological proposals have been created, launched, and analyzed over the last few years with the ultimate goal not only to stimulate and sustain organizations across industries and regions all over the world to make financial as well as non-financial data and information accessible for the stakeholders (e.g., see the European Union's Directive 2014/95/ about the disclosure of non-financial information; EU - European Union, 2014b), but also to use them internally, to support decision-making and the development of sustainable strategies, particularly Circular Economy ones (e.g., EU - European Union, 2020).

Within this debate, and with the ultimate goals of focusing on Circular Economy, we point to the experience and the work in the domain of corporate reporting promoted by the International Integrated Reporting Council (IIRC). As stated by its official website (https://integratedreporting.org/the-iirc-2/), IIRC is "a global coalition of regulators, investors, companies, standard setters, the accounting profession, academia and NGOs," engaged with corporate reporting to "promote communication about value creation, preservation, and erosion as the next step in the evolution of corporate reporting." One of the main results of its activities so far has been the predisposition of a practical "framework" meant to support organizations to disclose financial and non-financial information through one single report. In detail, IIRC has produced a reference Framework for Integrated Reporting (IIRC, 2013a, updated recently—IIRC, 2021) and several background papers devoted to providing key information and insights into the process of representing key concepts and principles underlying the Framework (e.g., IIRC, 2013b, 2013c).

The Framework is rooted in the consideration, representation, and communication of data and information pertaining to four categories of elements: inputs, business activities, outputs, and outcomes. These elements are the building blocks for an organization's business model and its value-creation system, as portrayed by Figure 2.

The *capitals* are the resources at an organization's disposal and represent the main *inputs* to the business model, thereby being transformed into *outputs* and *outcomes* through the *business activities* that are carried out. The IR Framework categorizes the capitals into six main categories, as follows: financial; manufactured; intellectual; human; social and relationship; natural. As mentioned, the business activities turn the inputs into outputs (i.e., products, by-products, services, and waste) and outcomes (in terms of the effects of the capitals, and also internal and external impacts, such as externalities).

To function properly and smoothly, the IR approach needs to be effectively based on a few key principles. Whereas the IR framework itself describes a set of core "guiding principles" that provides organizations with the theoretical and operational instructions to prepare and present their integrated report in the specific context of analysis (i.e., strategic focus and future orientation; connectivity of information; stakeholder relationships; materiality; conciseness; reliability and completeness; consistency and comparability—see IIRC, 2021), a more general principle underpins the whole integrated approach, that is IT, as we will describe in Section 3.2. For the moment, it is fundamental to underline that value creation is represented (Figure 2) as happening

TABLE 1 The 6Rs of CE: Description

Typology of R-process	Description
Reduce (R1)	It mostly focuses on the initial phases of the product life-cycle, and points to the reduced utilization of resources in pre-manufacturing, energy-materials and other resources during the manufacturing stage, as well as to decreased emissions and waste during the utilization phase (Jawahir & Bradley, 2016; Reike et al., 2018).
Reuse (R2)	It indicates the reuse of the product many times, as a whole or about its parts after its first life cycle is completed, thereby reducing the use of virgin materials and favoring the manufacturing of newer products or components (Kirchherr et al., 2017).
Recycle (R3)	It is the ability to convert materials that would be considered waste into new materials or products (Kirchherr et al., 2017, Reike et al., 2018).
Reproduce/ Remanufacture (R4)	It entails reprocessing products that have been already used, thereby bringing them back to their original state using as many components as possible without loss of functionality (EMF, 2015; Jawahir & Bradley, 2016).
Redesign/Repurpose (R5)	It includes updating product design for the next generation of products, however utilizing to this aim components, materials, and resources from the previous generation of products (Morseletto, 2020).
Recover (R6)	It is the process through which products at the end of their utilization are collected, disassembled, and cleaned to be used subsequently again in new product life cycles (Gray & Charter, 2007).

Abbreviations: CE, circular economy; IR, integrated reporting.

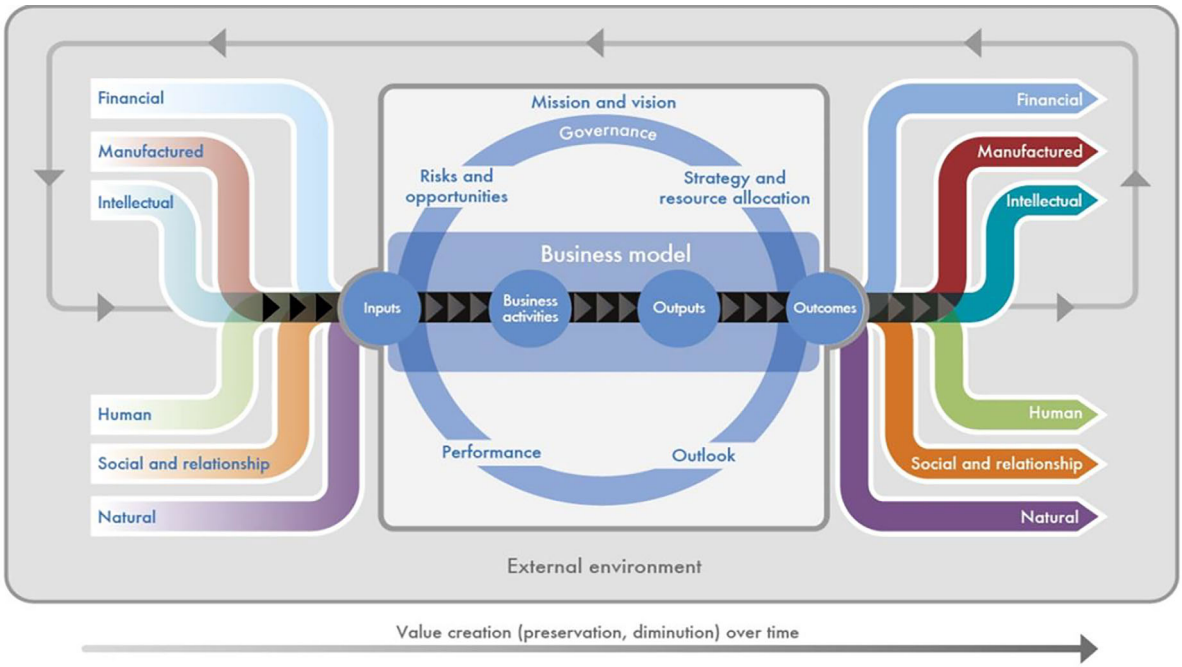

FIGURE 2 Integrated reporting framework. *Source*: IIRC (2013a, p. 13)—"With permission from the International Integrated Reporting Council 2020 (C)" [Colour figure can be viewed at wileyonlinelibrary.com]

through all the stages of the process and is managed as a circular and dynamic feedback-oriented loop, whereby the capitals are continuously organized and exploited to create value over the short-, medium- and long-term for the financial investors and a range of other stakeholders.

Previous research already witnessed that IR is not only a widespread innovation in the field of corporate and sustainability reporting (e.g., Adams, 2015; Atkins et al., 2015; Busco et al., 2013, 2018; Dumay et al., 2016; Eccles & Krzus, 2011; Pistoni et al., 2018) but it is also widely and increasingly applied in the business world by organizations from various industries and geographical areas to report their performance holistically (e.g., de Villiers et al., 2020; Gibassier et al., 2019). In this context, a growing body of literature is pointing out some of the key strengths of this approach. For example, IR is said to help organizations create value, by better understanding their business domain and identifying the drivers of long-term value (Adams, 2015). Previous research also found out a positive correlation between IR practices and environmental performance (e.g., Omran

et al., 2021), as well as a reduction in information asymmetries with the stakeholders and a decrease in a firm's cost of debt (e.g., Gerwanski, 2020). Subsequently, IR is said to support the efficient and productive allocation of capitals by investors (Beck et al., 2017; Giorgino et al., 2017; Melloni et al., 2016) and, overall, improve stakeholders' engagement (e.g., Sierra-García et al., 2015; Torelli et al., 2020). Moreover and more recently, extant literature emphasized that IR may have the potential to play a relevant role not only for the external disclosure of CE information but also, *internally*, as a support for the analysis and management of the scarce resources at disposal (Kunc et al., 2020; McNally et al., 2017) and operating as a mechanism of change (Stubbs & Higgins, 2014). In this context, IR would play a fundamental performative role enabling dialog and discussion within teams of owners and managers, thereby also fostering sustainable business practices (Brown & Dillard, 2014). Last, and with reference to this study, IR is recognized as a potentially good fit for organizations interested in representing holistically and comprehensively their activities and strategies in a CE-oriented perspective (Barnabè & Nazir, 2020; Stewart & Niero, 2018).

Key to its successful implementation and use is the principle of IT, which underpins the IR framework and represents its core assumption.

3.2 | The principle of integrated thinking

The main managerial principle underpinning the IR framework is IT which can be described as "the active consideration by an organization of the relationships between its various operating and functional units and the capitals that the organization uses or affects" (IIRC, 2021, p. 3).

This principle, to effectively support decision-makers, entails considering not only the connectivity among an organization's business units, functions, and resources but also the interdependencies and the trade-offs existing among the factors affecting value creation in that context. Last, IT entails considering:

- the capitals used by an organization;
- the capacity of the organization to respond to stakeholders' needs;
- the changes made by an organization to cope with the external environment and the risks and opportunities it is presented with;
- the organization's activities, performance, and outcomes in terms of impacts on the capitals (past, present, and future).

Notably, the principle of IT stated in the IR framework is not strictly related to the pursuit of *one* dimension of value creation (e.g., the financial rather than the social or the environmental one), but to the necessity of establishing connectivity among all of the factors at the organization's disposal and contributing to generate value over time. Stated differently, IT is to be regarded as a fundamental managerial principle favoring integrated decision-making and actions that "consider the creation, preservation or erosion of value over the short, medium and long term" (IIRC, 2021, p. 3).

If effectively applied, IT is said to facilitate a thorough and rigorous representation of the key resources, processes, and results of an organization (IIRC, 2016), thereby increasing its disclosure toward—and the engagement of—relevant stakeholders (Rinaldi, 2020) and aligning the organization's purpose and business model to market opportunities, in a sustainable perspective (Busco et al., 2017). To reach the aims aforementioned, however, IT cannot remain a "nice" theoretical principle; rather it has to be interiorized and become part of the internal culture of an organization (Dumay & Dai, 2017; Feng et al., 2017) and of its way of thinking, making decisions, and acting (La Torre et al., 2019). In this way, IT would help organizations to conceptualize not only the complex pattern of relationships within the organization's business domain but even the unobservable (Malafronte et al., 2020; Malafronte & Pereira, 2021). In the end, as argued by IIRC (IIRC, 2021, p. 3) "the more that integrated thinking is embedded into an organization's activities, the more naturally will the connectivity of information flow into management reporting, analysis and decision-making."

Whereas on one side previous research extensively discussed the potentials of this principle and defined its meaning and theoretical boundaries (e.g., Adams, 2017; Busco et al., 2021; Feng et al., 2017; Guthrie et al., 2017; Oliver et al., 2016), on the other side further research is needed to understand how IT may actually be operationalized when applied in practice to support an organization in investigating its business domain and conceptualize its value creation processes, also in CE terms.

4 | RESEARCH DESIGN

This study investigates how companies can conceptualize and enable CE principles and opportunities through IR practices and, more specifically, the principle of IT.

To this aim, the research design entailed developing a case study with an interventionist research approach where IR concepts were used in combination with Systems Thinking tools (Meadows, 2008; Senge, 1990), specifically a sub-system diagram and a stock and flow diagram (Sterman, 2000). More details about each choice are provided below.

The potentials and strengths of case studies (Eisenhardt, 1989; Yin, 1994) to explore and explain how management accounting in practice works—both in terms of the techniques, procedures, and systems which are used and how they are used—are recognized by a wide literature (e.g., Hoque et al., 2017; Ryan et al., 2002; Scapens, 1990). Particularly, this case study is about a family-owned small-sized company operating in the agri-food sector in the Mediterranean area (more specifically, in Italy) called Small Farm Ltd. (this is the disguised name of the company).

We believe that the business case is a peculiar one since the agri-food industry is interested in (and by) the transition to CE and several studies already witnessed the breadth of applications that can be found in this regard in this domain (e.g., Esposito et al., 2020; Muscio & Sisto, 2020). Additionally, the geographical area is one of

interest for the research question addressed in this study. The European context provides a relevant setting given the great relevance that the European Union is assigning to CE and CE-related practices not only as a means of ensuring sustainability in environmental terms but also in social and economic ones (e.g., Domenech & Bahn-Walkowiak, 2019). Furthermore and notably, the case study focuses on a small-sized organization that is family-owned. This kind of organization is not only quite widespread worldwide (and, predominantly, in Italy) but also increasingly eager to engage with the use of management accounting and sustainability practices and reporting tools (e.g., Broccardo et al., 2019; Le Breton-Miller & Miller, 2016)—also in terms of CE activities and opportunities (Barnabè & Nazir, 2020; Prieto-Sandoval et al., 2019). However, these organizations quite often lack the competence to do so (e.g., Bianchi, 2002) and are managed heavily relying on the owners' prior and tacit knowledge that is not adequately shared and transmitted across different generations of owners (Giovannoni et al., 2011).

It is the authors' opinion that all these motivations make this case study the ideal fit for the development of interventionist research, as explained subsequently. As underlined by Dumay (2010, p. 46), although not always widely accepted (Suomala, 2009), "interventionist research has its foundations in traditional observation-based case study research but differentiates itself by allowing the researcher to become fully immersed in the phenomenon being studied." The underlying idea is that most of field-based case study entails some degree of interventionist research, thereby not allowing for a completely independent and objective analysis of the case study and the practices under investigation. An interventionist approach, on the contrary, advocates the participation of the researcher that collaborates with the organization in developing actual solutions to problems (Jakkula et al., 2006; Suomala, 2009). In this way, the researcher is able not only to extend the case study methodology but also to make both a theoretical contribution and an organizational contribution—by assisting critically and constructively the organization, analyzing data, implementing change, solving and ameliorating problems (Dumay, 2010; Dumay & Baard, 2017). In this specific case, the interventionist approach was motivated due to the owners' initial—even though partial—lack of knowledge about CE principles and their will to "find" technical as well as managerial solutions to implement internally.

In total, 13 meetings (see Table 2 for more details) were organized and carried out with the three owners of the company: two of them are 2nd generation owners (A, B), while the third one is a third generation owner (C). As shown by Table 2, part of the meetings were devoted to presenting the principles and concepts of IR, from a theoretical point of view. Subsequently, the meetings entailed analyzing and modeling the organization's resources, activities, and CE initiatives, having the IR framework (IIRC, 2013a; IIRC, 2021) and the principle of IT as the underlying key points of reference.

In more detail, after a preliminary collection of data and information, the intervention during the case study was structured as a four-step process:

1. introduce and explain key IR concepts and principles (specifically, IT), and subsequently utilize such concepts to describe the company's business domain, thereby identifying the key capitals, business activities, outputs, and outcomes;
2. rely on the main concepts of IR to develop a subsystem diagram for the company's business domain;
3. translate the subsystem diagram into a more detailed stock and flow diagram, thereby operationalizing the principle of IT;
4. build on the theoretical framework presented in this study and the information gathered through steps 1, 2, and 3 of the intervention to analyze the company's operations and discuss available CE-related opportunities with the owners, as to further develop strategies of value creation.

Notably, the researchers brought into the intervention the use of Systems Thinking tools (Meadows, 2008; Senge, 1990) considering this methodology as a viable fit for the purpose of this study. In broad terms, we can describe Systems Thinking as a holistic approach to analyze how systems work and can be managed; it is also a set of techniques and tools that will support analysts, learners, and decision-makers in facing problem-solving tasks and complex issues. When applied in real-world case studies, Systems Thinking tools also provide the opportunity to reorganize existing information and visualize it thereby creating a "new" visual representation of such knowledge about the domain under analysis (Barnabè et al., 2019; Maani & Cavana, 2000).

In detail, we first introduced a specific visual tool named subsystem diagram. *Subsystem diagrams* show the broad architecture of a system (or a model, or a map), and are particularly useful since they convey information on the boundaries and the level of aggregation used to analyze such domain (Sterman, 2000). Moreover, these diagrams may provide useful insights to understand the relationships and the interplays among variables and/or sectors that are internal for the organization under analysis, and those that are external to it (Sterman, 2000). Subsequently, the researchers introduced the use of a stock and flow diagram, developed with the Vensim PLE software. *Stock and flow diagrams* consist of variables (stocks—boxes, i.e., the capitals at an organization's disposal; flows—arrows adding to, or subtracting from, the stocks—i.e., inflows and outflows; other variables) connected by causal linkages among such variables. Each causal link is assigned a polarity, either positive (+) or negative (−) to clarify how the dependent variable changes when the independent variable changes. A positive link (+) means that if the cause increases, the effect increases above what it would otherwise have been, and if the cause decreases, the effect decreases below what it would otherwise have been. A negative link (−) means that if the cause increases, the effect decreases below what it would otherwise have been, and if the cause decreases, the effect increases above what it would otherwise have been. When more variables are connected circularly, they create a "feedback loop," either positive (or reinforcing, generating growth) or negative (or balancing, inducing equilibrium and stasis).

These tools were considered particularly suitable not only to operationalize the concept of IT, as defined by the IR framework, but

TABLE 2 Case study overview: Meetings, topics, and participants

Meeting no.	Topic(s)	Length	Participant(s)
1	Collection and preliminary analysis of data and information available. Discussion about the project, the schedule, the key concepts, and the goals to pursue. Presentation of IR concepts and principles.	2 h	2nd generation owners (A), (B), and 3rd generation owner (C)
2	Case-study starts IR Capitals • Financial • Manufactured • Intellectual IR Business activities	1.5 h	(C)
3	IR Capitals: • Human • Social and relationship • Natural IR Business activities IR Outputs (products, services, and by-products)	45 min	(C)
4	IR Capitals, Outputs, Outcomes, and Waste	45 min	(A), (B), (C)
5	IR Capitals, Outputs, Outcomes, and Waste - Summary and recap	20 min	(C)
6	IR Outputs, Outcomes and Waste in a CE perspective	45 min	(A), (B), (C)
7	IR Outputs, Outcomes and Waste in a CE perspective - Summary and recap	20 min	(C)
8	Development of the sub-system diagram and analysis from an IT perspective	45 min	(C)
9	Refinement of the sub-system diagram Circular Economy, R loops and IT Development of the stock and flow diagram	2,5 h	(A), (B), (C)
10	Refinement of the stock and flow diagram Circular Economy, R loops and IT	1 h	(A), (B), (C)
11	Policy analysis about Circular Economy behavior and future decision-making	1 h	(A), (B), (C)
12	Policy analysis about Circular Economy behavior and future decision-making	1 h	(A), (B), (C)
13	Case study recap and feedback	1 h	(A), (B), (C)

Abbreviations: CE, circular economy; IR, integrated reporting.

also to visualize and take into consideration the circular processes (i.e., the feedback loops) which represent the core idea of a CE and its activities. Notably, previous research already provides some examples of the application of Systems Thinking tools in the domain of CE (e.g., Bassi et al., 2021; Franco, 2019). Additionally, it is to underline that, throughout this part of the intervention, one of the researchers played the role of modeler and facilitator (Vennix, 1996) for the interactive modeling process, thereby stimulating and guiding the discussion among the owners and explaining technical details, when needed.

As an aid during the case study, we used several sources and relied on multiple data collection methods to increase the validity and reliability of this research through triangulation (Patton, 1987). Notably, data and information were also gathered through written documents and informal discussions (additional to the meetings described in Table 2). Written documents include the company's annual accounting records as well as several other documents and reports available at the time of the analysis.

5 | RESULTS

Small Farm Ltd. (the disguised name for this organization) is a family-owned small-sized company operating in the agri-food sector in the Mediterranean area (Italy). The company can be described as a traditional farm, whose key resources are represented by livestock, crops, fruit trees, vineyards, olive trees, as well as equipment and machinery. The business activities carried out by the company pursue the twofold aim of producing goods to be sold on the market and satisfy the family needs, thereby ensuring sustainable management of the company (in economic, environmental, and social terms) and with a perspective of ongoing concern. In this context, all the resources at disposal need

TABLE 3 Summary of capitals, business activities, outputs, and outcomes for Small Farm Ltd. according to an IR perspective

Elements	Description from IIRC (2013a and 2021)	From small farm Ltd.					
		Financial capital	Manufactured capital	Intellectual capital	Human capital	Social and relationship capital	Naturalcapital
Capitals	The capitals are stocks of value that are increased, decreased, or transformed through the activities and outputs of the organization. They are categorized in the Integrated Reporting Framework as Financial, Manufactured, Intellectual, Human, Social and Relationship, and Natural capital. However, organizations preparing an integrated report are not required to adopt this categorization or to structure their reports along the lines of the capitals aforementioned.	• Equity financing • Debt • Subsidies • Cash flow from operations revenues	• Buildings • Machinery • Equipment • Warehouse • Cellar • Tools • Work clothing	• Licenses • Concessions • Tacit knowledge • Protocols	• Staff and skills • Experience and shared knowledge • Knowledge and skills	• Wide network of suppliers and service providers • Relationships with customers • Alliances with other farmers • Memberships in trade associations • Tradition and cultural heritage	• Soil • Water • Forests • Crops • Olive trees and fruit trees • Vineyards • Livestock • Biodiversity (for crops)
Business activities	Business activities include the planning, design and manufacture of products or the deployment of specialized skills and knowledge in the provision of services.	1. Cultivating the land 2. Planting and sowing 3. Growing plants and trees 4. Reaping, harvesting, collecting fruits, cutting trees 5. Breeding 6. Buying and selling 7. Acquiring and repairing equipment, machinery, and tools 8. Making alliances, partnerships, networking. 9. Updating and strengthening knowledge and skills through courses and alliances 10. Recycling, remanufacturing, restoring, refurbishing 11. Composting					
Outputs	An organization's products and services, and any by-product and waste.	• *Products*: Cereals, legumes, vegetables, grapes, olives, fruit, wood, meat, milk. Also, flour, wine, olive oil, sausages, jams, bales of hay. • *By-products*: Chipboard, sawdust, mowing, straw, compost. • *Services*: Services traded with other farmers, e.g., to press the bales of hay. • *Waste*: Mowing Manure and poultry litter Processing waste					

TABLE 3 (Continued)

Elements	Description from IIRC (2013a and 2021)	From small farm Ltd.					
		Financial capital	Manufactured capital	Intellectual capital	Human capital	Social and relationship capital	Naturalcapital
Outcomes	The internal and external consequences (positive and negative) for the capitals as a result of an organization's business activities and outputs.	CO_2 emissions Greenhouse gases Noise (e.g., of machinery)					

Abbreviation: IR, integrated reporting.

to be properly managed and exploited to create value, and strong interrelationships among the various sectors of the company are continuously managed to reduce unused and waste. A web of relationships with external stakeholders (e.g., suppliers, customers, trade associations, banks and financiers) are necessary to run the company profitably and sustainably.

According to the four-step process outlined in the research design section, and after a preliminary collection of data and information, we scheduled various meetings with the owners of the company, each of them tailored on specific concepts, and with the ultimate aim to increase the owners' conceptualization of CE-related concepts and opportunities in this business domain.

The first step entailed introducing and explaining key IR concepts and principles (specifically, IT), and subsequently utilize such concepts to describe the company's business domain, thereby identifying the key capitals, business activities, outputs, and outcomes. To this aim, we introduced extensively the IR framework (IIRC, 2013a) explaining its core terms and concepts (meeting no. 1), and subsequently, we facilitated the discussion in order to utilize IR key concepts and conceptualize how this specific domain is structured (meetings 2–5). Table 3 presents the results from this process with the information reorganized according to the key concepts of IR, that is: capitals, business activities, outputs, and outcomes.

Table 3 was developed by interviewing and collaborating with the three owners of the company and having the IR framework (IIRC, 2013a, 2021) as the underlying structure of reference. This table clarifies which are the main resources (the "capitals," divided into six categories) at the organization's disposal, its key operations (i.e., the "business activities"), and the results (both in terms of "outputs" and "outcomes") thereby generated. Specifically, the concept of "capitals" was quite relevant to organize and run these meetings and identify the resources considered to be strategically relevant for the Small Farm Ltd. Notably, all the categories of capitals (i.e., financial, manufactured, intellectual, human, social and relationship, and natural) theorized by the IR framework (IIRC, 2013a, 2021) are displayed in Table 3 and were discussed at the company.

As one of the owners (Owner C) emphasized, "I already thought of our resources mainly in material, natural, and financial terms. This classification definitely helps me to think about our resources adopting a different perspective and from different angles."

This stage of the intervention also entailed (in meetings no. 6 and 7) starting to discuss CE-related activities with the owners, using Table 3—that is, IR concepts tailored for this company—as the underlying basis and introducing progressively CE-ideas. The logic of CE was said to be seen as "completely coherent and implemented in an agri-food company like this one" (Owner A), even to the extent to consider key CE-related principles and suggestions as straightforward. As one of the owners (Owner B) underlined, as an example, "we do not have waste, or at least, the waste is at minimum. Whatever we produce has some value, even what is residual becomes a by-product or is reused as new raw material. As examples, think about the following ones: chipboard, sawdust, mowing, straw, and compost."

The second step of the analysis (meetings 8–9) required to further elaborate the information summarized in Table 3 and gathered with the initial meetings to develop a diagram representing the company's business domain. As mentioned in the research design, we developed a *sub-system diagram* (Figure 3) that summarizes graphically the key elements in the domain under analysis.

The sub-system diagram was developed reorganizing and filtering data and knowledge about the business domain to describe the capitals, the inflows and outflows to and from them, and the key agents (the owners and/or external stakeholders) involved in this process. In this regard, this subsystem diagram was developed also to clarify where the boundaries for the company are set, and which key flows (i.e., inflows and outflows adding to—or subtracting from—the capitals) are generated about the company's business activities.

As mentioned by the 3rd generation owner (Owner C), "certainly, this is a way to structure our reasoning and that helps to represent what is going on in and about our business."

Notably, in building this diagram each group of resources and the flows were depicted with the color and the name of the category of capitals theorized by the IR Framework (IIRC, 2013a, 2021). All the six categories of capitals theorized by IIRC (2013a, 2021) are represented in the diagram.

This step of the intervention also entailed discussing the concept of integration and, subsequently, starting looking for relationships and interactions between capitals and activities at the company.

As mentioned by Owner B, "we already had a rough idea of our resources and how they change over time, but we definitely needed to start thinking in a more structured way about our company, to look for relationships among them. And, also, to understand what to do in the future."

This led to the third step of the intervention (meetings no. 9–10). In detail, to identify and portray the relationships among all the components aforementioned, thereby operationalizing the principle of Integrated Thing, activities in this step of the case study were devoted to translating the subsystem diagram into a more detailed *stock and flow diagram* (see Figure 4). From a technical point of view, we remind that stock and flow diagrams consist of variables (stocks—boxes, i.e., the capitals at an organization's disposal; flows—arrows adding to, or subtracting from, the stocks, i.e., inflows and outflows, and other variables) connected by causal linkages among such variables, alongside their polarities (denoting the direct or indirect influence between a cause and an effect).

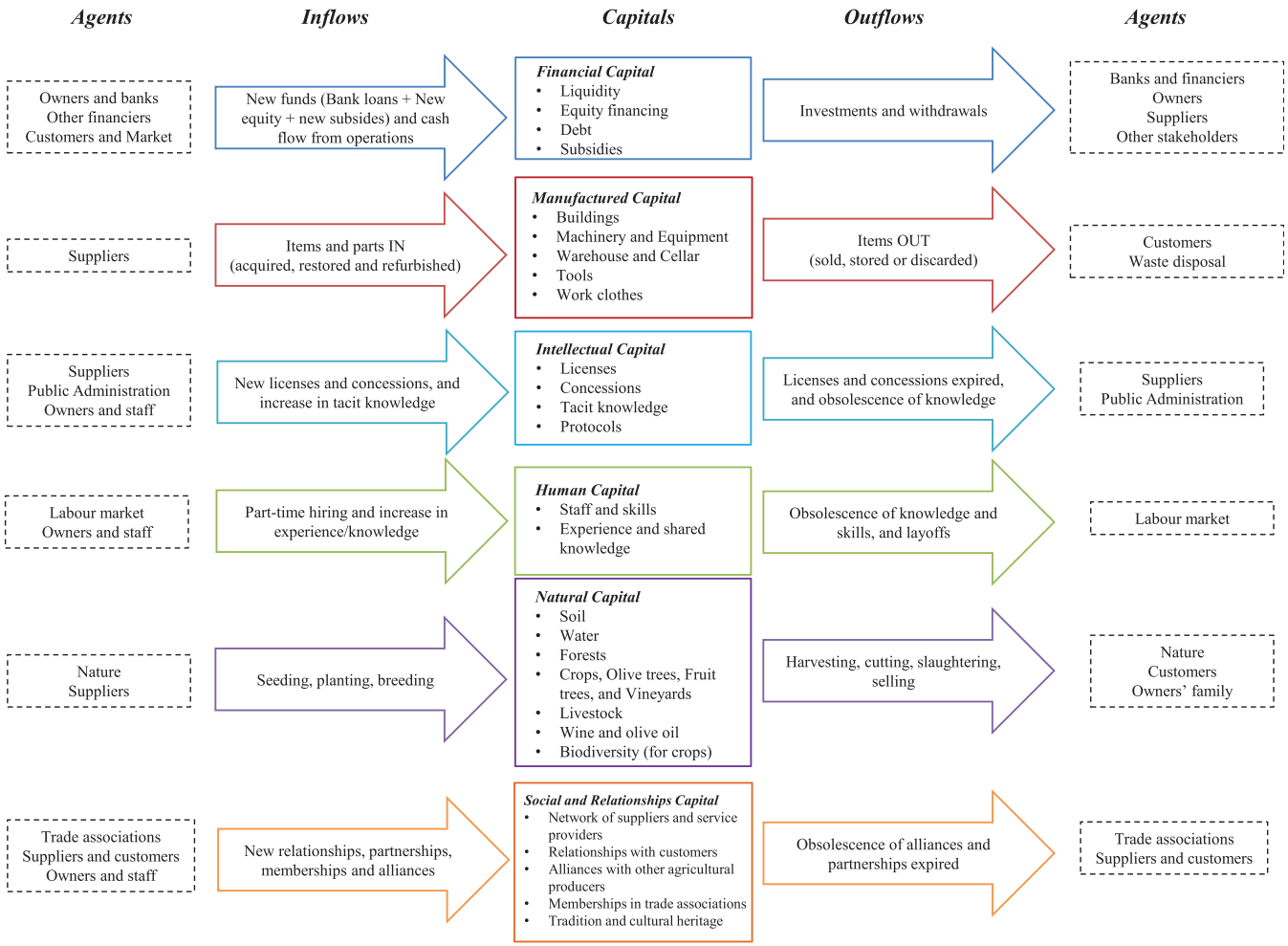

FIGURE 3 Subsystem diagram for Small Farm Ltd [Colour figure can be viewed at wileyonlinelibrary.com]

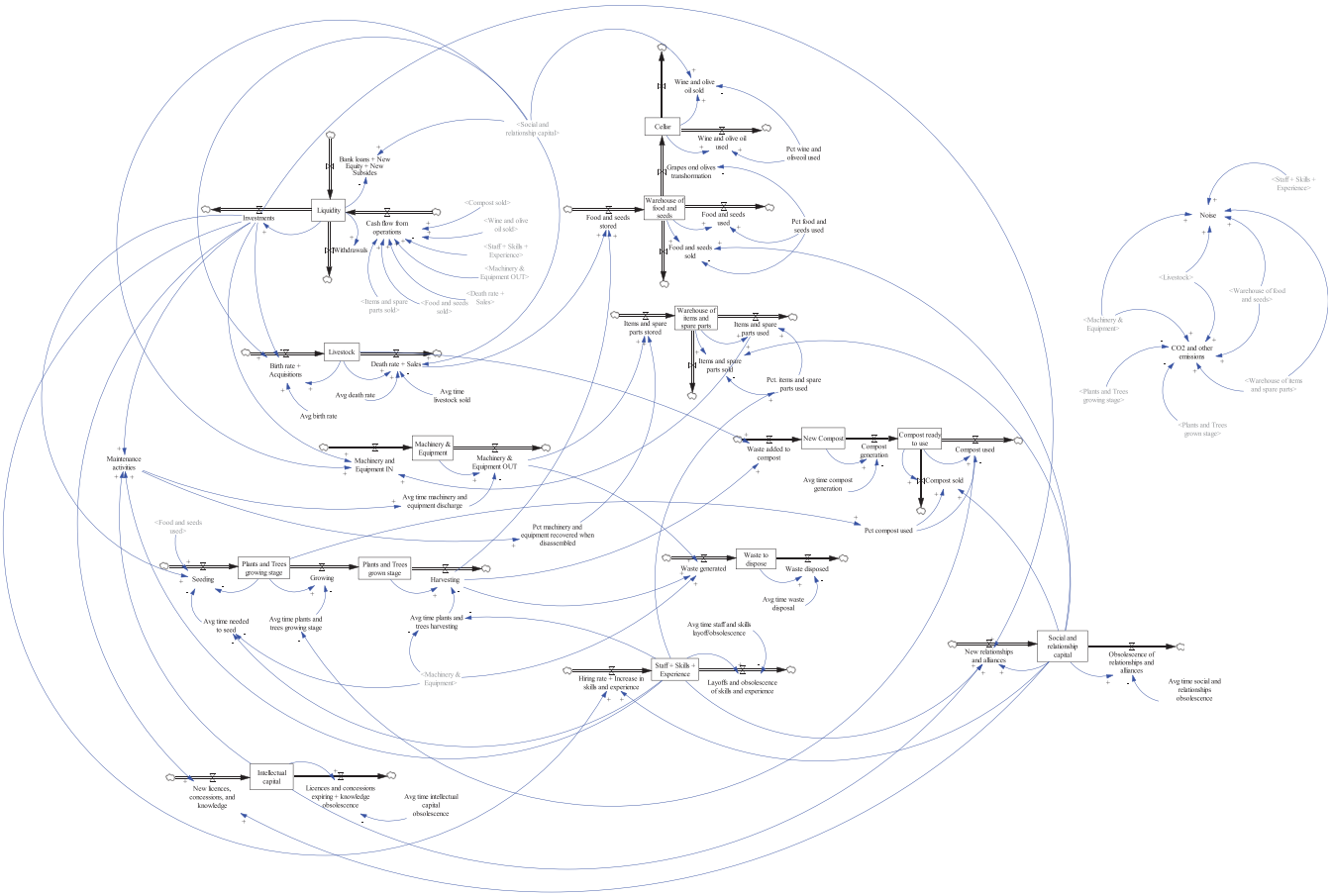

FIGURE 4 Stock and flow diagram for Small Farm Ltd [Colour figure can be viewed at wileyonlinelibrary.com]

The stock and flow diagram displayed in Figure 4 shows the business domain under analysis as modeled during the intervention and partially refined after each meeting to prepare the following one.

As one of the owners mentioned (Owner A), commenting on the process of transforming data and information into the stock and flow diagram, "it is different to look at our company in this way, to actually *see* on the paper what it is made of and how complex it is."

Although the complexity of the stock and flow diagram was considered substantial, the diagram fueled and supported discussion among the owners also allowing a more in-depth analysis of the company's operations and their mutual interdependencies. In detail, having the stock and flow diagram as the underlying basis, the concepts of "causal relationships" among various variables, and of "trade-offs" among different typologies of capitals (as represented in this diagram) were addressed. This entailed analyzing with the owners how the resources at the organization's disposal are affected and affect (i.e., generating impacts on the inflows and the outflows to and from such capitals) other capitals, to create value over time. The result of this analysis is summarized in Table 4.

Trade-offs and causal relationships are building blocks of the IR approach and key concepts underlining the IT principle, since their identification and analysis allow understanding how connectivity and integration happen in practical terms and, about this study also how they feed into a CE-oriented system.

As an example, consider Figure 5 (that was rearranged to increase its readability) that presents a feedback loop of length #10 (i.e., with 10 active cause-and-effect relationships among the variables involved, which are circularly connected).

The figure presents a feedback loop centered on a typical CE-related issue for an agri-food company, that is, the generation and use of compost, as follows:

1. Increasing Investments,
2. increases the rate "Birth rate + Acquisitions" (in this case through the new acquisitions on the market),
3. increases Livestock,
4. increases Waste added to compost,
5. increases New Compost,
6. increases Compost generation,
7. increases Compost ready to use,
8. increases Compost sold,
9. increases Cash flow from operations,
10. increases Liquidity,
11. thereby and eventually, increasing Investments and closing the loop.

Notably, this is an example of a positive feedback loop able to generate growth (from the disposal and management of waste) due to the

TABLE 4 IR elements in the stock and flow diagram for Small Farm Ltd

Typology of capital	Capitals/stocks	Inputs	Outputs	Linkages with other capitals from (affected by)	Linkages with other capitals to (affecting)
Financial	Liquidity	Cash flow from operations Bank loans + New equity + New subsides	Investments Withdrawals	• Manufactured • Natural • Human • Social and relationship	• Manufactured • Intellectual • Human • Social and relationship • Natural
Manufactured	Machinery & Equipment	Machinery & Equipment IN	Machinery & Equipment OUT	• Financial • Manufactured • Intellectual • Human • Social and relationship	• Financial • Manufactured • Natural
Manufactured	Warehouse of items and spare parts	Items and spare parts stored	Items and spare parts used Items and spare parts sold	• Manufactured • Human • Social and relationship	• Manufactured • Financial
Intellectual	Intellectual capital	New licenses, concessions, and knowledge	Licenses and concessions expiring + knowledge obsolescence	• Financial • Social and relationship	• Manufactured • Social and relationship
Human	Staff + Skills + Experience	Hiring rate + increase in skills and experience	Layoffs and obsolescence of skills and experience	• Financial • Social and relationship	• Natural • Manufactured • Social and relationship
Natural	Livestock	Birth rate + Acquisitions	Death rate + Sales	• Financial • Natural • Social and relationship	• Natural • Financial • Social and relationship
Natural	Plants and Trees growing stage	Seeding	Growing	• Financial • Natural • Human • Manufactured	• Natural
Natural	Plants and Trees grown stage	Growing	Harvesting	• Natural	• Natural
Natural	Warehouse of food and seeds	Food and seeds stored	Food and seeds sold Food and seeds used	• Natural • Social and relationship • Human	• Financial • Natural
Natural	Waste to dispose	Waste generated	Waste disposed	• Natural • Manufactured	• Natural
Natural	New Compost	Waste added to compost	Compost generation	• Natural	• Natural
Natural	Compost ready to use	Compost generation	Compost used Compost sold	• Natural • Social and relationship	• Natural • Financial
Social and Relationship	Social and Relationship capital	New relationships and alliances	Obsolescence of relationships and alliances	• Intellectual • Human • Social and relationship	• Financial • Manufactured • Intellectual • Human • Natural

Abbreviation: IR, integrated reporting.

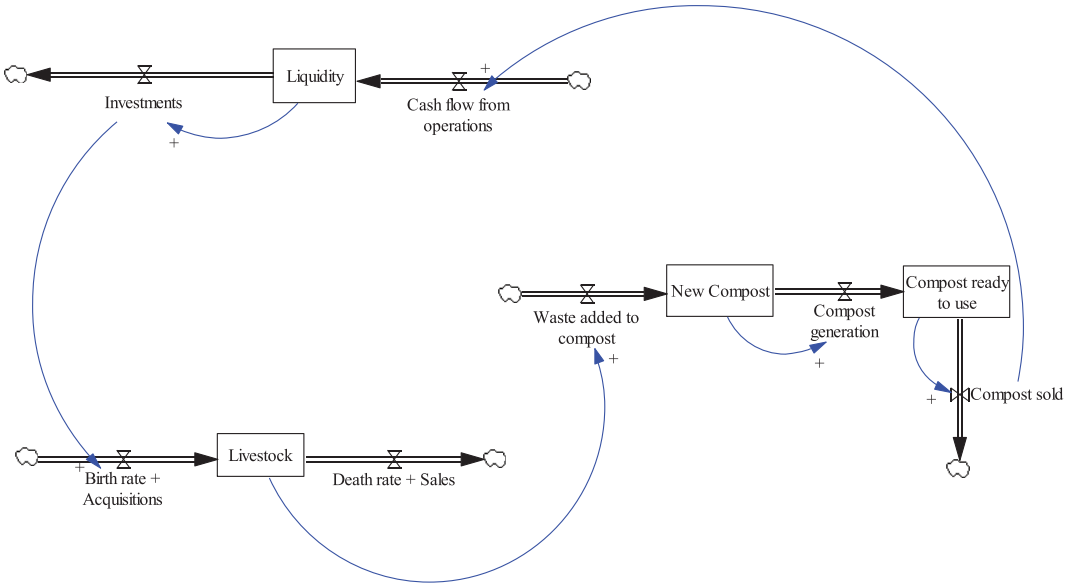

FIGURE 5 An example of a feedback loop for Small Farm Ltd [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 5 Examples of the 6Rs of CE for Small Farm Ltd

Typology of CE R-loop	Examples at the small farm
Reduce (R1)	Acquiring items, seeds, and goods in big quantities, reducing packaging and waste. Exploiting experience, knowledge, skills, technology, and maintenance activities to reduce the usage rates (e.g., of equipment). Consuming less natural resources as possible. Reducing CO_2 and other gas emissions.
Reuse (R2)	Reusing items and spare parts, when they are disassembled, maintained, and subsequently reused. Acquiring second-hand tools, equipment, and machinery. Reusing some products and by-products which become "new" raw materials (e.g., seeds).
Recycle (R3)	Recycling any material or residual component that may have value for the company (e.g., paper, iron, mowing). Recycling fuels and disposing of potentially harmful substances.
Reproduce /Remanufacture (R4)	Rebuilding some pieces of equipment and machinery to specifications of the original products, using recycled, reused, or repaired items (and some new parts).
Redesign / Repurpose (R5)	Inventing new tools and pieces of equipment with old spare items.
Recover (R6)	Water recovering. Exploiting end-of-life products. Recovering basic materials.

Abbreviation: CE, circular economy.

conceptualization and exploitation of the trade-offs among a few capitals at the company's disposal (in this case, the starting point is an investment that initially drains Liquidity but will subsequently allow increasing livestock, compost, and, eventually, liquidity, thereby closing the feedback loop).

The last and final step of the intervention (meetings no. 11–12) entailed building on the theoretical framework presented in this study and the information gathered through steps 1, 2, and 3 of the intervention to analyze the company's operations and discuss available CE-related opportunities with the owners, also to develop strategies of value creation.

Specifically, the tables and the diagrams resulting from the previous steps of the process were used to inform discussion and reflection, in two directions.

First, to extensively discuss *if* and *where* the 6Rs of CE were active in this domain and, second, to explore how they could be further exploited to assist decision-making and, subsequently, develop future sustainable CE-related strategies. The former task of this analysis is

TABLE 6 Examples of key success loops for Small Farm Ltd

Feedback loop no.	Typology and lengthof feedback loop	Variables included in the loopand description of the feedback loop
B1	Negative (Balancing) 1	An increase in investments Decreases the stock of Liquidity
B2	Negative (Balancing) 4	An increase in Investments Increases Hiring rate + Increase in skills and experience Increases the stock of Staff + Skills + Experience Decreases Cash flow from operations eventually impacting Liquidity and new Investments
R1	Positive (Reinforcing) 5	An increase in Investments increases Machinery and Equipment IN (i.e., purchased) increases the stock of Machinery & Equipment increases Machinery & Equipment OUT (in this case, sold), that in turn increases Cash flow from operations thereby increasing the stock of Liquidity and new Investments
B3	Negative (Balancing) 5	An increase in Investments increases Maintenance activities increases Avg time machinery and equipment discharge (i.e., the lifetime for these items), thereby decreasing Machinery & Equipment OUT and, subsequently, impacting Cash flow from operations and the stock of Liquidity and new Investments
B4	Negative (Balancing) 7	An increase in Investments increases Hiring rate + Increase in skills and experience increases the stock of Staff + Skills + Experience increases Maintenance activities increases Avg time machinery and equipment discharge decreases Machinery & Equipment OUT thereby eventually and subsequently impacting Cash flow from operations, Liquidity, and new Investments
B5	Negative (Balancing) 1	An increase of Layoffs and obsolescence of skills and experience investments Decreases the stock of Staff + Skills + Experience
B6	Negative (Balancing) 1	An increase of Machinery & Equipment OUT (e.g., sold, discharged, or disassembled) Decreases Machinery & Equipment
R2	Positive (Reinforcing) 5	An increase of Machinery & Equipment OUT (in this case, disassembled) Increases Items and spare parts stored Increases Warehouse of items and spare parts Increases Items and spare parts used Increases Machinery and Equipment IN Thereby increasing the stock of Machinery & Equipment
B7	Negative 1	An increase in Items and spare parts used decreases Warehouse of items and spare parts

summarized in Table 5, while the latter is addressed subsequently through the presentation of a few key feedback loops (Table 6 and Figure 6) and in the discussion section, also providing some quotes.

Part of the information displayed in Table 5 was not entirely new to the owners as the discussion revealed that the more established concepts and ideas of a CE were already in place at the company, with the principles of R1 (Reduce), R2 (Reuse), and R3 (Recycle) extensively known and already practiced. As a 2nd generation owner (Owner B) emphasized, "maybe we did not always call it circular economy. Certainly, the idea of extending the life of our equipment and reusing and recycling items is at the very core of what an agri-food organization does. But I understand that there is more."

In this regard, the discussion and the diagrams developed throughout the case study helped to conceptualize where additional Rs of the CE were active at the company or could be strengthened/activated in the future.

To this aim, and starting from the stock and flow diagram (that contained a high number of feedback loops), the owners and the researchers could identify and isolate a few feedback loops considered particularly relevant for the company (see Figure 6 for some examples). Those loops, according to Daniel Kim's (1997) definition, are *key success loops* (KSLs).

Whereas Figure 6 portrays graphically some examples of what the owners considered to be relevant (i.e., key success) loops identified during the development of the case study,

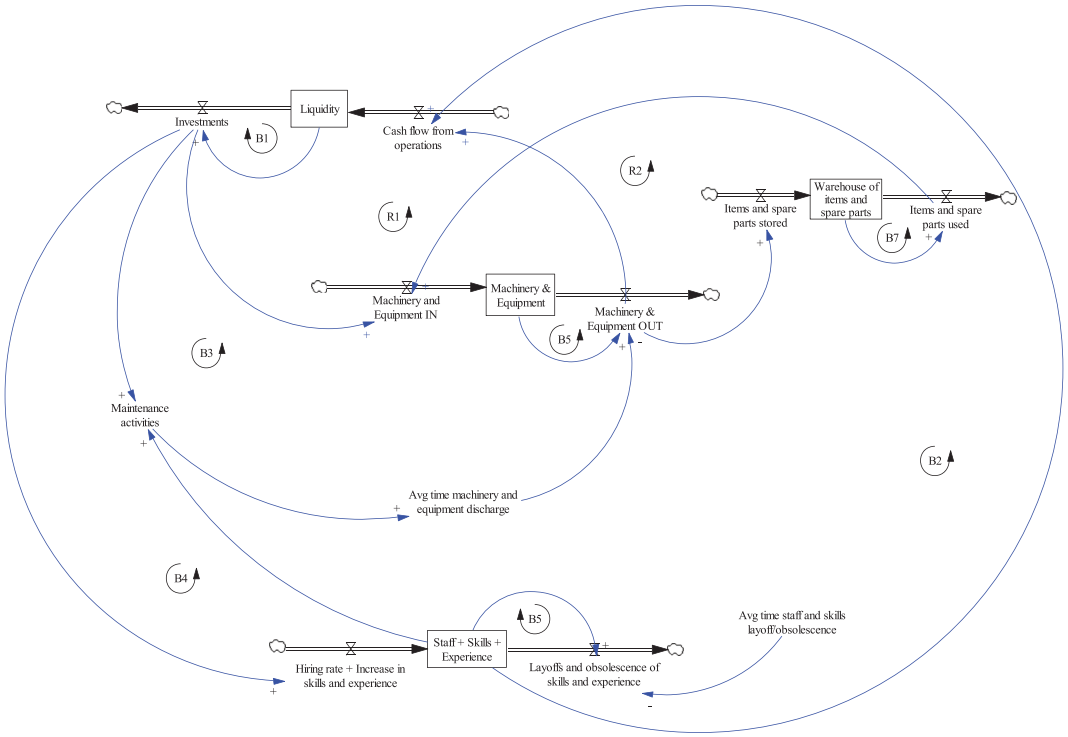

FIGURE 6 Examples of key success loops for Small Farm Ltd [Colour figure can be viewed at wileyonlinelibrary.com]

Table 6 presents the main technical information about such loops, that is:

- their label and progressive numeration—for a straightforward identification the letter "B" is used to denote negative/balancing loops, while the letter "R" is used for positive/reinforcing loops;
- length—in terms of the number of causal linkages active within each loop;
- description—explicating the chain of causal connections across each loop thereby clarifying its functioning.

Overall, Figure 6 and Table 6 refer to nine feedback loops (seven balancing loops—inducing stasis or equilibrium, and two reinforcing loops—generating growth) considered by the owners as good examples of relevant loops for the organization's business activities and strategies.

6 | DISCUSSION

This study investigated how companies can conceptualize and enable CE principles and opportunities through IR practices and, specifically, the principle of IT. To pursue this aim, a case study—about a family-owned small-sized company operating in the agri-food sector (the Small Farm Ltd.)—was developed with an interventionist approach. One of the main motivations behind this study is that if on one hand, CE is acquiring relevance and is increasingly applied worldwide, on the other hand, its conceptualization and systemic operationalization stills seem to lag (e.g., Kirchherr et al., 2018), thereby calling for more research (e.g., Kunc et al., 2020; Stewart & Niero, 2018).

A four-step approach was followed to develop the case study and pursue its intended aims. Subsequently, we will provide our discussion for the findings stemming from each of those steps.

The first step entailed introducing and explaining key IR concepts and principles (specifically, IT), and subsequently utilizing such concepts to describe the company's business domain, thereby identifying the key capitals, business activities, outputs, and outcomes. The use of IR concepts revealed to be instrumental for a better conceptualization of the domain under analysis. Specifically, the concept of "capitals" was quite relevant to organize and run the initial meetings and identify the resources considered to be strategically relevant for the Small Farm Ltd. Notably, all the categories of capitals theorized by the IR framework (2013a and 2021) were identified and discussed during the meetings (see Table 3). Having defined the key resources at the organization's disposal (the capitals) also helped to quickly identify inputs to and outputs from them, as well as to conceptualize which are the main outputs and outcomes for the company and where the boundaries for this business domain are set. It is the authors' opinion that the knowledge acquired in this step of the process goes beyond the understanding and use of IR concepts and principles. In this context, the IR framework and IR terms started playing a performative role (Brown & Dillard, 2014) in guiding the discussion among the researchers and the owners and enabling the latter ones to purposefully think about their business domain and conceptualize it. In detail, step by step the discussion allowed creating a detailed description of the company from an IR perspective, as summarized by Table 3 and,

subsequently, by Figure 3 which is the main result of the second step of the intervention (i.e., "rely on the main concepts of IR to develop a subsystem diagram for the company's business domain").

Notably, the data and the description contained in Table 3 and Figure 3 were recognized by the owners as having a twofold meaning: *internally*, making clear which are the building blocks for the organization, the levers to be managed, the main outputs and outcomes thereby generated, the boundaries of the system, and the key categories of relevant stakeholders being involved; and, *externally*, providing a description potentially useful to communicate relevant information to the organization's stakeholders and increase their future engagement. This is in line with part of the literature that underlines the potentials of IR to serve both internal and external purposes (e.g., Adams, 2017; Busco et al., 2013).

At this point, the case study extensively focused on the principle of IT. As we mentioned, IT in IR is described as "the active consideration by an organization of the relationships between its various operating and functional units and the capitals that the organization uses or affects" (IIRC, 2021, p. 3). Specifically, this phase of the intervention entailed "translating the subsystem diagram into a more detailed stock and flow diagram, thereby operationalizing the principle of IT."

The decision of relying on Systems Thinking tools (Meadows, 2008; Senge, 1990) was dictated by the necessity to analyze and represent holistically (but also technically) the specific domain under analysis, specifically about key concepts such as causal relationships, trade-offs, and feedback loops, which are key both for the IR approach and CE principles.

The feedback collected at the end of the intervention (meeting no. 13) confirmed that the use of Systems Thinking tools was appreciated since it allowed direct interaction among the owners and between them and the researchers, also generating a technical and comprehensive representation of the domain under analysis and its underlying complexity (Barnabè et al., 2019). As the 3rd generation owner (Owner C) explained, "it is not always easy to grasp that everything is connected with almost everything. Quite often we just act and run our operations in a straightforward manner. But the idea of integration is key to understand where we should focus to save money, time, and resources."

In detail, joint consideration of Figure 4 and Table 4 specifically clarifies how the principle of IT was practically applied and subsequently represented during the case study, thereby making the unobservable visible, as suggested by previous literature (e.g., Malafronte & Pereira, 2021). From a technical point of view, the stock and flow diagram and the discussion among the owners that stemmed from its development and analysis allowed not only describing the complexity embedded in this domain (through the concepts of stocks and flows, causal connections, and polarities of causal linkages) but also identifying where trade-offs among capitals, processes, and units are active across the whole company (see Figure 5 for an example of a feedback loop used to address the concept of trade-off).

As the third generation owner mentioned, "Sometimes it is useful to remind that everything is connected here. What we have done here is a good exercise to make this complexity come to the surface - or, at least, a bit of it."

This is in line with the bodies of literature that assign a relevant role to IR-related tools and diagrams (e.g., Kunc et al., 2020), the principle of IT in IR (Adams, 2017; Busco et al., 2021), and Systems Thinking tools (e.g., Maani & Cavana, 2000; Meadows, 2008;Senge, 1990; Sterman, 2000) in identifying connections within a business domain and clarifying where leverage points might exist. Even more relevant is the fact that this step stimulated the owners of the company to think in terms of feedback loops (Richardson, 1999)—considered as "the lowest meaningful units of analysis" (Kim, 1997)—and focusing on single factors, resources or actions.

This finally (i.e., the last step of the case study) allowed identifying and discussing patterns of value creation and opportunities to be exploited in a CE-oriented perspective (building on the theoretical framework presented in this study and the information gathered through steps 1, 2, and 3 of the intervention).

Overall, as the 3rd generation owner (Owner C) underlined, this process was "not only useful to understand better our business, but also to understand better ourselves and the way in which we think and operate. It will be a bit easier to improve from there."

This is coherent with the extant literature that emphasizes the potential role of IR practices for facilitating a deep internal change (e.g., Feng et al., 2017) and the development of an organization's internal culture (e.g., Dumay & Dai, 2017).

The first result of this process is represented by the examples of Key Success Loops (Kim, 1997) displayed in Figure 6 and described in Table 6. In broad terms, we underline that the task of managers/owners and the goal of a successful and sustainable strategy would be that of strengthening positive feedback loops, at the same time removing and/or properly managing the negative ones (Senge, 1990; Sterman, 2000). More specifically, the opportunity to analyze key leverage points and paths of value creation was considered one of the "most relevant contributions" of this case study (as stated by the 3rd generation owner). This allowed moving from a static and quite traditional view of how value creation works in an agri-food organization to consider the opportunities given by a CE and with a dynamic and future-oriented perspective.

More specifically, exploiting the methodological choice of an interventionist approach, the case study allowed using again IR concepts and the tables and the diagrams we already mentioned (e.g., Tables 3 and 4, and Figures 3–6) to explore where the 6R loops of CE were active for this company (see Table 5) and, subsequently, support future strategy development about them.

In this way, analysis and discussion with the owners of the company were further stimulated and facilitated. Specifically, the discussion within the team revealed that all of the 6R loops are active for the company, even though attention and emphasis are mostly given to processes that are both basic and core for an agri-food company, such as those related to material flows (i.e., R1—Reduce, R2—Reuse, and R3—Recycle). We already mentioned that this is in line with a more traditional perspective about CE (e.g., Chen, 2009), and can be considered a basic feature of an agri-food organization where "all

waste is useful and of some value for us" (second generation owner—Owner B).

Subsequently, the discussion led to the identification of a few future strategies aimed not only at strengthening some internal and traditional CE-related processes (e.g., R2-related activities) but also, and more specifically, at opening the organization to external stakeholders, especially in terms of fostering the relationships and increasing the number and variety of agreements with the suppliers, some customers, and a few trade associations. This second category of initiatives and strategies (e.g., reinforcing or making new agreements with the suppliers to enable R4 and R6 CE-related principles—i.e., Remanufacture and Recover) was particularly and extensively discussed on the basis of the representation provided by Figure 4 (i.e., the stock and flow diagram) and with the lenses of both IT and KSL. This eventually allowed understanding which capitals could be involved in implementing the strategies above mentioned, and anticipate which consequences could be generated in the short- and long-term by them.

In this context, IR was again fundamental in helping the owners and the researchers to conceptualize how its principles and concepts could be used internally and externally for communicating businesses activities, goals, strategies, and results in terms of the CE, and to understand that this happens within a broad integrated system.

Finally, we would underline again the strengths of an interventionist perspective (Dumay, 2010; Dumay & Baard, 2017; Suomala, 2009) to case study development: in this specific situation, this approach allowed direct participation of the researchers and a contribution to the analysis of the case study both in theoretical and practical terms.

From a theoretical point of view, the case study demonstrated that the fundamental concepts of the IR approach can play a performative role (similarly to what happens with other management accounting tools, e.g., Brown & Dillard, 2014), thereby being used to inform discussion in teams (in this case, among the three owners of the company and, also, the researchers) and conceptualize how the business domain is structured.

From a technical point of view, the intervention allowed introducing and experiencing with an array of principles and tools (i.e., IR, Systems Thinking, etc.) able to contribute to the analysis and operationalization of the CE and to represent holistically a specific business domain, thereby practically applying the principle of IT.

7 | LIMITATIONS AND FURTHER RESEARCH

Our study is not without limitations. One limitation is linked to the presentation of a single case study, and this does not allow generalizing the findings and the insights thereby gained. However, the case study selected for this study is to be considered relevant since it well represents a typology of organizations (small-sized and family-owned ones) widespread in the geographical area under investigation and interested by the challenges raised by CE.

Second, the method adopted entails some technical challenges about the understanding of IR and IT concepts and the use of Systems Thinking which could be not easy to grasp. For this reason, we relied on the interventionist approach to develop the case study, thereby allowing the researchers to play an active role throughout the whole process. Different approaches to case study development could be chosen and applied in future research.

Third, the diagrams developed during the intervention mainly provide a qualitative view of the business domain and the CE-related processes in place. About this, the authors plan to analyze and address in future research how quantified simulation models may be helpful in this domain.

ORCID

Federico Barnabè https://orcid.org/0000-0002-4014-7395
Sarfraz Nazir https://orcid.org/0000-0001-7925-8597

REFERENCES

Adams, C. A. (2015). The international integrated reporting council: A call to action. *Critical Perspectives on Accounting*, *27*(1), 23–28. https://doi.org/10.1016/j.cpa.2014.07.001

Adams, C. A. (2017). *Understanding integrated reporting: The concise guide to integrated thinking and the future of corporate reporting*. Routledge.

Adams, R. B., Licht, A. N., & Sagiv, L. (2011). Shareholder and stakeholders: How do directors decide? *Strategic Management Journal*, *32*(12), 1331–1355. https://doi.org/10.1002/smj.940

Andersen, M. S. (2007). An introductory note on the environmental economics of the circular economy. *Sustainability Science*, *2*(1), 133–140. https://doi.org/10.1007/s11625-006-0013-6

Atkins, J. F., Solomon, A., Norton, S., & Joseph, N. L. (2015). The emergence of integrated private reporting. *Meditari Accountancy Research.*, *23*(1), 28–61. https://doi.org/10.1108/MEDAR-01-2014-0002

Barnabè, F., Giorgino, M. C., & Kunc, M. (2019). Visualizing and managing value creation through integrated reporting practices: A dynamic resource-based perspective. *Journal of Management and Governance*, *23*(2), 537–575. https://doi.org/10.1007/s10997-019-09467-z

Barnabè, F., & Nazir, S. (2020). Investigating the interplays between integrated reporting practices and circular economy disclosure. *International Journal of Productivity and Performance Management*. https://doi.org/10.1108/IJPPM-03-2020-0128

Bassi, A. M., Bianchi, M., Guzzetti, M., Pallaske, G., & Tapia, C. (2021). Improving the understanding of circular economy potential at territorial level using systems thinking. *Sustainable Production and Consumption*, *27*, 128–140. https://doi.org/10.1016/j.spc.2020.10.028

Beck, C., Dumay, J., & Frost, G. (2017). In pursuit of a 'single source of truth': From threatened legitimacy to integrated reporting. *Journal of Business Ethics*, *141*(1), 191–205. https://doi.org/10.1007/s10551-014-2423-1

Bernal-Conesa, J. A., de Nieves Nieto, C., & Briones-Peñalver, A. J. (2017). CSR strategy in technology companies: Its influence on performance, competitiveness and sustainability. *Corporate Social Responsibility and Environmental Management*, *24*(2), 96–107. https://doi.org/10.1002/csr.1393

Bianchi, C. (2002). Introducing SD modelling into planning and control systems to manage SMEs' growth: A learning-oriented perspective. *System Dynamics Review*, *18*(3), 315–338. https://doi.org/10.1002/sdr.258

Broccardo, L., Truant, E., & Zicari, A. (2019). Internal corporate sustainability drivers: What evidence from family firms? A literature review and research agenda. *Corporate Social Responsibility and Environmental Management*, *26*(1), 1–18. https://doi.org/10.1002/csr.1672

Brown, J., & Dillard, J. (2014). Integrated reporting: On the need for broadening out and opening up. *Accounting, Auditing & Accountability Journal*, *27*(7), 1120–1156. https://doi.org/10.1108/AAAJ-04-2013-1313

Brown, L. (2012). *World on the edge: How to prevent environmental and economic collapse*. Routledge.

Busco, C., Frigo, M. L., Riccaboni, A., & Quattrone, P. (2013). *Integrated reporting. Concepts and cases that redefine corporate accountability*. Springer.

Busco, C., Granà, F., & Achilli, G. (2021). Understanding integrated thinking: Evidence from the field, the development of a framework and avenues for future research. *Meditari Accountancy Research*, *29*(4), 673–690. https://doi.org/10.1108/MEDAR-04-2021-1263

Busco, C., Granà, F., & Quattrone, P. (2017). Integrated thinking. Aligning purpose and the business model to market opportunities and sustainable performance. *CIMA Research Executive Summary*, *13*(3), 1–26.

Busco, C., Malafronte, I., Pereira, J., & Starita, M. G. (2018). The determinants of companies' levels of integration: Does one size fit all? *The British Accounting Review*, *51*(3), 277–298. https://doi.org/10.1016/j.bar.2019.01.002

Chen, J. Z. (2009). Material flow and circular economy. *Systems Research and Behavioral Science*, *26*(2), 269–278. https://doi.org/10.1002/sres.968

Cohen, J. L., Holder-Webb, L., Nath, L., & Wood, D. (2012). Corporate reporting on nonfinancial leading indicators of economic performance and sustainability. *Accounting Horizons*, *26*(1), 65–90. https://doi.org/10.2308/acch-50073

de Villiers, C., Hsiao, P.-C. K., & Maroun, W. (Eds.). (2020). *The Routledge handbook of integrated reporting*. 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. https://doi.org/10.1108/AAAJ-06-2014-1736

DeLorenzo, A., Parizeau, K., & von Massow, M. (2019). Regulating Ontario's circular economy through food waste legislation. *Society and Business Review*, *14*(2), 200–216.

Domenech, T., & Bahn-Walkowiak, B. (2019). Transition towards a resource efficient circular economy in Europe: Policy lessons from the EU and the member states. *Ecological Economics*, *155*, 7–19. https://doi.org/10.1016/j.ecolecon.2017.11.001

Dossa, A. A., Gough, A., Batista, L., & Mortimer, K. (2020). Diffusion of circular economy practices in the UK wheat food supply chain. *International Journal of Logistics Research and Applications*, 1–20. https://doi.org/10.1080/13675567.2020.1837759

Dumay, J. (2010). A critical reflective discourse of an interventionist research project. *Qualitative Research in Accounting & Management*, *7*(1), 46–70. https://doi.org/10.1108/11766091011034271

Dumay, J., & Baard, V. (2017). An introduction to interventionist research in accounting. In Z. Hoque, L. D. Parker, M. A. Covaleski, & K. Haynes (Eds.), *The Routledge companion to qualitative accounting research methods* (pp. 265–283). Routledge.

Dumay, J., Bernardi, C., Guthrie, J., & Demartini, P. (2016). Integrated reporting: A structured literature review. *Accounting Forum*, *40*(3), 166–185. https://doi.org/10.1016/j.accfor.2016.06.001

Dumay, J., & Dai, T. (2017). Integrated thinking as a cultural control? *Meditari Accountancy Research*, *25*(4), 574–604. https://doi.org/10.1108/MEDAR-07-2016-0067

Eccles, R. G., & Krzus, M. P. (2011). *One report. Integrated reporting for a sustainable strategy*. Wiley.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*(4), 532–550 Retrieved from https://www.jstor.org/stable/258557

Elia, V., Gnoni, M. G., & Tornese, F. (2017). Measuring circular economy strategies through index methods: A critical analysis. *Journal of Cleaner Production*, *142*, 2741–2751. https://doi.org/10.1016/j.jclepro.2016.10.196

EMF. (2013a). *Towards the Circular Economy. Economic and business rationale for an academic transition* (Vol. 2). Ellen MacArthur Foundation.

EMF. (2013b). *Towards the Circular Economy. Opportunities for the consumer goods sector* (Vol. 2). Ellen MacArthur Foundation.

EMF. (2015). *Delivering the circular economy – A toolkit for policymakers*. Ellen MacArthur Foundation.

Esposito, B., Sessa, M. R., Sica, D., & Malandrino, O. (2020). Towards circular economy in the Agri-food sector. A systematic literature review. *Sustainability*, *12*(18), 7401. https://doi.org/10.3390/su12187401

EU - European Union. (2014a). *Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains*. Publications Office of the European Union Retrieved from https://op.europa.eu/en/publication-detail/-/publication/0619e465-581c-41dc-9807-2bb394f6bd07

EU - European Union. (2014b). *Non-financial reporting*. Publications Office of the European Union Retrieved from https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/non-financial-reporting_en

EU - European Union. (2020). *Circular Economy Action Plan*. Publications Office of the European Union Retrieved from file:///C:/Users/federico/Downloads/KH0420290ENN.en.pdf

FAO. (2019). *The state of the world's biodiversity for food and agriculture*. Food and Agriculture Organization of the United Nations Retrieved from http://www.fao.org/cgrfa/assessments/global-assessments/sow/en/

Feng, T., Cummings, L., & Tweedie, D. (2017). Exploring integrated thinking in integrated reporting—An exploratory study in Australia. *Journal of Intellectual Capital*, *18*(2), 330–353. https://doi.org/10.1108/JIC-06-2016-0068

Franco, M. A. (2019). A system dynamics approach to product design and business model strategies for the circular economy. *Journal of Cleaner Production*, *241*, 118327. https://doi.org/10.1016/j.jclepro.2019.118327

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular economy–a new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Gerwanski, J. (2020). Does it pay off? Integrated reporting and cost of debt: European evidence. *Corporate Social Responsibility and Environmental Management*, *27*(5), 2299–2319. https://doi.org/10.1002/csr.1965

Gibassier, D., Adams, C. A., & Jérôme, T. (2019). *Integrated Reporting and the Capitals' Diffusion*. Report published by the French Accounting Standard Setter (Autorité des Normes Comptables).

Giorgino, M. C., Supino, E., & Barnabè, F. (2017). Corporate disclosure, materiality, and integrated report: An event study analysis. *Sustainability*, *9*(12), 2182. https://doi.org/10.3390/su9122182

Giovannoni, E., Maraghini, M. P., & Riccaboni, A. (2011). Transmitting knowledge across generations: The role of management accounting practices. *Family Business Review*, *24*(2), 126–150. https://doi.org/10.1177%2F0894486511406722

Govindan, K., & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards circular economy: A supply chain perspective. *International Journal of Production Research*, *56*(1–2), 278–311. https://doi.org/10.1080/00207543.2017.1402141

Gray, C., & Charter, M. (2007). *Remanufacturing and product design designing of the 7th generation*. The Centre for Sustainable Design, University College for the Creative Arts and SEEDA.

Gray, R., Adams, C. A., & Owen, D. (2014). *Accounting, social responsibility and sustainability: Accounting for the society and the environment*. Pearson.

Gray, R., Owen, D., & Adams, C. (1996). *Accounting & accountability: Changes and challenges in corporate social and environmental reporting*. Prentice Hall.

Greer, R., von Wirth, T., & Loorbach, D. (2020). The diffusion of circular services: Transforming the Dutch catering sector. *Journal of Cleaner Production*, *267*, 121906. https://doi.org/10.1016/j.jclepro.2020.121906

Gunarathne, N., Wijayasundara, M., Senaratne, S., Kanchana, P. K., & Cooray, T. (2021). Uncovering corporate disclosure for a circular economy: An analysis of sustainability and integrated reporting by Sri Lankan companies. *Sustainable Production and Consumption*, *27*, 787–801. https://doi.org/10.1016/j.spc.2021.02.003

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

Hoque, Z., Parker, L. D., Covaleski, M. A., & Haynes, K. (Eds.). (2017). *The Routledge companion to qualitative accounting research methods*. Routledge.

Hussain, N., Rigoni, U., & Cavezzali, E. (2018). Does it pay to be sustainable? Looking inside the black box of the relationship between sustainability performance and financial performance. *Corporate Social Responsibility and Environmental Management*, *25*(6), 1198–1211. https://doi.org/10.1002/csr.1631

Ieng Chu, C., Chatterjee, B., & Brown, A. (2013). The current status of greenhouse gas reporting by Chinese companies: A test of legitimacy theory. *Managerial Auditing Journal*, *28*(2), 114–139. https://doi.org/10.1108/02686901311284531

IIRC. (2013a). *The international IR framework*. International Integrated Reporting Council Retrieved from https://integratedreporting.org/resource/international-ir-framework/

IIRC. (2013b). *Capitals*. International Integrated Reporting Council Retrieved from https://integratedreporting.org/wp-content/uploads/2013/03/IR-Background-Paper-Capitals.pdf

IIRC. (2013c). *Value creation*. International Integrated Reporting Council Retrieved from https://integratedreporting.org/wp-content/uploads/2013/08/Background-Paper-Value-Creation.pdf

IIRC. (2016). *Creating value: The cyclical power of integrated thinking and reporting*. International Integrated Reporting Council Retrieved from https://integratedreporting.org/wp-content/uploads/2016/11/CreatingValue_IntegratedThinking_pdf

IIRC. (2021). *International IR framework*. International Integrated Reporting Council Retrieved from https://integratedreporting.org/wp-content/uploads/2021/01/InternationalIntegratedReportingFramework.pdf

Jakkula, V., Lyly-Yrjänäinen, J., & Suomala, P. (2006). Challenges of practically relevant management accounting research – the scope and intensity of interventionist research. *Paper presented at the 5th New Practices in Management Accounting Research Conference*, Brussels.

Jawahir, I. S., & Bradley, R. (2016). Technological elements of circular economy and the principles of 6R-based closed-loop material flow in sustainable manufacturing. *Procedia Cirp*, *40*, 103–108. https://doi.org/10.1016/j.procir.2016.01.067

Ki, C. W., Chong, S. M., & Ha-Brookshire, J. E. (2020). How fashion can achieve sustainable development through a circular economy and stakeholder engagement: A systematic literature review. *Corporate Social Responsibility and Environmental Management*, *27*(6), 2401–2424. https://doi.org/10.1002/csr.1970

Kim, D. H. (1997). From key success factors to key success loops. *The Systems Thinker*, *8*(5), 6–7.

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the circular economy: Evidence from the European Union (EU). *Ecological Economics*, *150*, 264–272. https://doi.org/10.1016/j.ecolecon.2018.04.028

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, *175*, 544–552. https://doi.org/10.1016/j.jclepro.2017.12.111

Kraaijenhagen, C., Van Oppen, C., & Bocken, N. (2016). *Circular business. Collaborate and circulate*. Circular Collaboration.

Kunc, M. H., Barnabè, F., & Giorgino, M. C. (2020). Mapping circular economy processes in integrated reporting: A dynamic resource-based approach. In L. Songini, A. Pistoni, P. Baret, & M. H. Kunc (Eds.), *Non-financial Disclosure and Integrated Reporting. Practices and Critical Issues* (pp. 83–106). Emerald Publishing.

Kunc, M. H., Giorgino, M. C., & Barnabè, F. (2021). Developing forward-looking orientation in integrated reporting. *Meditari Accountancy Research*, *29*(4), 823–850. https://doi.org/10.1108/MEDAR-12-2019-0664

La Torre, M., Bernardi, C., Guthrie, J., & Dumay, J. (2019). Integrated reporting and integrating thinking: Practical challenges. In S. Arvidsson (Ed.), *Challenges in managing sustainable business* (pp. 25–54). Palgrave Macmillan. https://doi.org/10.1007/978-3-319-93266-8_2

Le Breton-Miller, I., & Miller, D. (2016). Family firms and practices of sustainability: A contingency view. *Journal of Family Business Strategy*, *7*(1), 26–33. https://doi.org/10.1016/j.jfbs.2015.09.001

Maani, K. E., & Cavana, R. Y. (2000). *Systems thinking and modelling: Understanding change and complexity*. Prentice Hall.

Malafronte, I., & Pereira, J. (2021). Integrated thinking: Measuring the unobservable. *Meditari Accountancy Research*, *29*(4), 805–822. https://doi.org/10.1108/MEDAR-12-2019-0640

Malafronte, I., Pereira, J., & Busco, C. (2020). The role of corporate culture in the choice of integrated thinking. *CIMA Research Executive Summary*, *16*(2), 1–17.

McNally, M. A., Cerbone, D., & Maroun, W. (2017). Exploring the challenges of preparing an integrated report. *Meditari Accountancy Research*, *25*(4), 481–504. https://doi.org/10.1108/MEDAR-10-2016-0085

Meadows, D. H. (2008). *Thinking in systems: A primer*. Chelsea Green Publishing.

Melloni, G., Stacchezzini, R., & Lai, A. (2016). The tone of business model disclosure: An impression management analysis of the integrated reports. *Journal of Management and Governance*, *20*(2), 295–320. https://doi.org/10.1007/s10997-015-9319-z

Millar, N., McLaughlin, E., & Börger, T. (2019). The circular economy: Swings and roundabouts? *Ecological Economics*, *158*, 11–19. https://doi.org/10.1016/j.ecolecon.2018.12.012

Moraga, G., Huysveld, S., Mathieux, F., Blengini, G. A., Alaerts, L., Van Acker, K., de Meester, S., & Dewulf, J. (2019). Circular economy indicators: What do they measure? *Resources, Conservation and Recycling*, *146*, 452–461. https://doi.org/10.1016/j.resconrec.2019.03.045

Morseletto, P. (2020). Targets for a circular economy. *Resources, Conservation and Recycling*, *153*, 104553. https://doi.org/10.1016/j.resconrec.2019.104553

Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, *140*(3), 369–380. https://doi.org/10.1007/s10551-015-2693-2

Muscio, A., & Sisto, R. (2020). Are Agri-food systems really switching to a circular economy model? Implications for European research and innovation policy. *Sustainability*, *12*(14), 5554. https://doi.org/10.3390/su12145554

Núñez-Cacho, P., Molina-Moreno, V., Corpas-Iglesias, F. A., & Cortés-García, F. J. (2018). Family businesses transitioning to a circular economy model: The case of "Mercadona". *Sustainability*, *10*(2), 538. https://doi.org/10.3390/su10020538

Oliver, J., Vesty, G., & Brooks, A. (2016). Conceptualising integrated thinking in practice. *Managerial Auditing Journal*, *31*(2), 228–248. https://doi.org/10.1108/MAJ-10-2015-1253

Omran, M. S., Zaid, M. A., & Dwekat, A. (2021). The relationship between integrated reporting and corporate environmental performance: A green trial. *Corporate Social Responsibility and Environmental Management*, *28*(1), 427–445. https://doi.org/10.1002/csr.2059

Park, J., Sarkis, J., & Wu, Z. (2010). Creating integrated business and environmental value within the context of China's circular economy and ecological modernization. *Journal of Cleaner Production*, *18*(15), 1494–1501. https://doi.org/10.1016/j.jclepro.2010.06.001

Patton, M. Q. (1987). *How to use qualitative methods in evaluation*. Sage.

Pieroni, M. P., McAloone, T. C., & Pigosso, D. C. (2019). Business model innovation for circular economy and sustainability: A review of approaches. *Journal of Cleaner Production*, *215*, 198–216. https://doi.org/10.1016/j.jclepro.2019.01.036

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

Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R. J., & Ormazabal, M. (2019). Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1473–1484. https://doi.org/10.1002/csr.1761

Reike, D., Vermeulen, W. J., & Witjes, S. (2018). The circular economy: New or refurbished as CE 3.0?—Exploring controversies in the conceptualization of the circular economy through a focus on history and resource value retention options. *Resources. Conservation and Recycling*, *135*, 246–264. https://doi.org/10.1016/j.resconrec.2017.08.027

Riccaboni, A., & Leone, E. L. (2010). Implementing strategies through management control systems: The case of sustainability. *International Journal of Productivity and Performance Management*, *59*(2), 130–144. https://doi.org/10.1108/17410401011014221

Richardson, G. P. (1999). *Feedback thought in social science and systems theory*. Pegasus Communications.

Rinaldi, L. (2020). Integrated thinking for stakeholder engagement. In C. de Villiers, P.-C. K. Hsiao, & W. Maroun (Eds.), *The Routledge handbook of integrated reporting*. Routledge.

Ryan, B., Scapens, R. W., & Theobald, M. (2002). *Research method and methodology in finance and accounting* (2nd ed.). Thomson.

Scapens, R. W. (1990). Researching management accounting practice: The role of case study research methods. *British Accounting Review*, *22*(3), 259–281. https://doi.org/10.1016/0890-8389(90)90008-6

Senge, P. M. (1990). *The fifth discipline. The art and practice of the learning organization*. Doubleday-Currency.

Sierra-García, L., Zorio-Grima, A., & García-Benau, M. A. (2015). Stakeholder engagement, corporate social responsibility and integrated reporting: An exploratory study. *Corporate Social Responsibility and Environmental Management*, *22*(5), 286–304. https://doi.org/10.1002/csr.1345

Stahel, W. R. (1982). *The product life factor. An inquiry into the nature of sustainable societies: The role of the private sector*. NARC.

Sterman, J. D. (2000). *Business dynamics. System thinking and modeling for a complex world*. McGraw-Hill.

Stewart, R., & Niero, M. (2018). Circular economy incorporates sustainability strategies: A review of corporate sustainability reports in the fast-moving consumer goods sector. *Business Strategy and the Environment*, *27*(7), 1005–1022. https://doi.org/10.1002/bse.2048

Stubbs, W., & Cocklin, C. (2008). Conceptualizing a "sustainability business model". *Organization & Environment*, *21*(2), 103–127. https://doi.org/10.1177%2F1086026608318042

Stubbs, W., & Higgins, C. (2014). Integrated reporting and internal mechanisms of change. *Accounting, Auditing & Accountability Journal*, *27*(7), 1068–1089. https://doi.org/10.1108/AAAJ-03-2013-1279

Suomala, P. (2009). Interventionist research – Contributing to management accounting through industry—University collaboration. *Research Update*, *2009*, 10–11.

Torelli, R., Balluchi, F., & Furlotti, K. (2020). The materiality assessment and stakeholder engagement: A content analysis of sustainability reports. *Corporate Social Responsibility and Environmental Management*, *27*(2), 470–484. https://doi.org/10.1002/csr.1813

UN - United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Author Retrieved from https://sustainabledevelopment.un.org/

Vennix, J. A. M. (1996). *Group model building. Facilitating team learning using system dynamics*. Wiley.

Vitale, G., Cupertino, S., Rinaldi, L., & Riccaboni, A. (2019). Integrated management approach towards sustainability: An Egyptian business case study. *Sustainability*, *11*(5), 1244. https://doi.org/10.3390/su11051244

Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Sage.

How to cite this article: Barnabè, F., & Nazir, S. (2022). Conceptualizing and enabling circular economy through integrated thinking. *Corporate Social Responsibility and Environmental Management*, *29*(2), 448–468. https://doi.org/10.1002/csr.2211