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Integrated Reporting in practice: Insights on Intellectual Capital and Big Data

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Introduction

Integrated reporting is gaining momentum as a novel reporting paradigm that redefines the traditional reporting boundary. It is tracing a new path for corporate reporting due to its combination of financial and non-financial information in a single document, the integrated report (IR). Such report conveys how the company's strategy, governance, performance and prospects lead to the creation of value in the short, medium and long term. It particularly aims to represent a holistic portrayal of the company's value creation process. Integrated reporting is promoted by the International Integrated Reporting Council (IIRC) and implemented according to the principle-based guidance of the International Integrated Reporting Framework. Such Framework provides impetus for an interconnected approach to corporate reporting aimed at depicting the company's value creation story, by explaining in a single report the corporate strategy, how the strategy translates into a business model, and how the business model leverages on six forms of capital. Integrated reporting includes, in addition to financial capital, manufactured, intellectual, human, social and relationship, and natural capitals. Thus, it comprises in the value creation story three forms of intangible, non-financial capitals that have been traditionally named intellectual capital. Additionally, the IR preparation requires a huge amount of strategic, operational, and performance information to be gathered and processed in the effort to develop a systems-based view of the corporate value creation process. In this regard, the IIRC has urged companies to adopt Big Data as a single, combined information architecture that assists in implementing integrated reporting. In 2018, it has also launched an initiative aimed at collecting early experiences about Big Data by companies that issue the IR (i.e. IR adopters). Therefore, integrated reporting provides new scope for investigations on both intellectual capital and Big Data.

Moving from such considerations, the overall purpose of this thesis is to explore how those subjects involved in the IR preparation (i.e. IR preparers) deal with intellectual capital and Big Data while engaging in integrated reporting. It aims at

investigating integrated reporting in practice from three different, but interrelated perspectives. In particular, it is a collection of three papers that uncover insights on intellectual capital (first and second papers) and Big Data (third paper), by assuming an insider viewpoint. To gain knowledge and understanding about the process of IR preparation, this thesis inspects integrated reporting process within early adopters and addresses, respectively: 1) the ontology of intellectual capital (first paper); 2) the performativity of intellectual capital (second paper); and 3) the epistemic authority of Big Data (third paper). From a methodological stance, this thesis assumes a critical/interpretative approach that allows to both reach the IR preparers' ideas and experiences about the flourishing integrated reporting process, and unpack the underlying procedures concerned with the "black box" of IR preparation.

The first paper is co-authored with Silvano Corbella, Cristina Florio, and Riccardo Stacchezzini (University of Verona). It investigates the intellectual capital ontology in an integrated reporting context, by exploring the function IR preparers assign to intellectual capital and the role of integrated thinking in this process. Searle's social ontology theory helps elucidate how a company operating in the energy sector socially constructs an intellectual capital ontology, where intellectual capital is a core element of its IR value creation story. By benefitting from in-depth interviews with the company's members, the empirical analysis sheds new light on the subjective nature of intellectual capital ontology. Such ontology emerges in the function that IR preparers assign to intellectual capital in the process of IR preparation. More specifically, intangible elements work driving sustainability-oriented financial value creation according to the sustainability approach embraced by the company's business model. The paper shows that integrated thinking helps develop a unique idea on how intellectual capital exists in the process of value creation. This study is the first to empirically investigate intellectual capital ontology in the integrated reporting context. While its scope is limited to the IR preparation process, further research might explore intellectual capital ontologies beyond this process.

The second paper is also the result of a joint research with Silvano Corbella, Cristina Florio, and Riccardo Stacchezzini (University of Verona). It explores how intellectual capital is problematised in the context of integrated reporting. Drawing on Mouritsen's performative approach to intellectual capital, the paper investigates the role of organisational members in defining, classifying and valuing intellectual capital within the process of IR preparation. The analysis relies on in-depth interviews with IR preparers of a European oil and gas company that has been issuing IRs since 2012. The study reveals that intellectual capital definition, classification and valuation stimulate ongoing interaction among various actors. An active role is played by the members of the department responsible for the IR preparation, but also by organisational actors who are indirectly involved in this process and by external actors, such as the company's peers, IIRC representatives and the company's accounting advisors. Some sketches, matrixes and maps inspired by the International Integrated Reporting Framework were pivotal in defining concepts and categories of intellectual capital and its connection to value creation, although the quantification of intellectual capital's effect on value creation remains disputed. In showing how organisational members problematise and engage with intellectual capital inscriptions within the process of IR preparation, the paper enriches the scant research that examines the performativity of intellectual capital in the context of corporate external reporting and answers the call for more research on how intellectual capital affects the management of organisations.

The third paper of this thesis is single authored, although the research project benefitted from the supervision of Leonardo Rinaldi (Royal Holloway, University of London). It aims to offer preliminary insights on the extent to which corporate members might rely on Big Data while preparing their IR. It particularly adopts an exploratory approach in analysing Big Data as a source of knowledge in a company operating in the banking industry. The study mainly draws on interviews to representatives of departments involved in both the Big Data project and the IR preparation. Drawing on Kruglanski's epistemic authority, the exploratory findings suggest that the authority of Big Data might stem from both the *energy* the company devotes in exploiting Big Data and the identification of prospective information. They also hint that, while the *self* might play a major role in defining the authority

of Big Data, the *context* (i.e. the corporate department) might not influence the acceptance of Big Data as a source of knowledge. This study contributes to the infant literature on Big Data in corporate reporting, by focusing on the very process of IR preparation. More specifically, it suggests practical possibilities that Big Data might open to the IR preparation (e.g. construction of performance indicators and/or development of risk preventing solutions). Thus, its contribution rests on preliminary insights that leave wide room for future researches, which might go deeper in understanding the usability of Big Data in the IR preparation.

1. An intellectual capital ontology in an integrated reporting context

Abstract

This paper investigates the intellectual capital (IC) ontology in an integrated reporting context to explore the function that integrated report (IR) preparers assign to IC elements and the role of integrated thinking in this process. Social ontology theory helps elucidate how an energy-sector company socially constructed an IC ontology in which IC is a core element of the value creation story told in the IR. The empirical analysis benefited from in-depth interviews with the corporate staff. The subjective nature of IC ontology emerges, in that IC's function is defined during the very process of IR preparation. The intangible elements drive sustainability-oriented financial value creation according to the sustainability approach embraced by the company's business model. Integrated thinking both facilitates this perspective on IC is shared among various departments of the company and provides a procedure for scrutinising what counts as IC in this integrated reporting context. The research scope is limited to the IR preparation process. Further research could explore IC ontologies beyond this process. This study is the first to explore IC ontology empirically within an innovative integrated reporting context. It opens paths to further research on the relationships between IC and integrated thinking.

Keywords Integrated reporting, Intellectual capital, Integrated thinking, Social ontology

1.1 Introduction

The new paradigm of integrated reporting aims to provide a holistic portrayal of a company's value creation process. It also traces directions for future corporate reporting through its ability to combine financial and non-financial information in a single document (de Villiers et al., 2014; Dumay et al., 2016). This means the integrated report (IR) provides an impetus for an interconnected approach to corporate reporting, referring to "corporate strategy, how the strategy translates into a firm's business model, and how the business model takes advantage of the six forms of capital […] to create or destroy value" (de Villiers et al., 2017b; p. 939).

According to the International Integrated Reporting Framework published by the International Integrated Reporting Council (IIRC) in 2013 (IIRC, 2013), IRs should recognise the involvement of both tangible and intangible capital in

explaining the value creation process. The Framework thereby redefines the reporting boundary by considering, in addition to financial capital, five other forms of capital: manufactured, intellectual, human, social and relationship, and natural (IIRC, 2013, § 2.10). What is generally referred to as intellectual capital (IC) – comprising human, structural, and relational forms of capital (Stewart, 1997; Sveiby, 1997) – in the IC literature is captured in the combination of the following three forms of capital defined by the International Integrated Reporting Framework (IIRC, 2013): "intellectual capital", "human capital" and "social and relationship capital" (Guthrie et al., 2012; Beattie and Smith, 2013; Melloni, 2015; Dumay, 2016).

Hence, integrated reporting represents new hope for IC because it repositions IC on corporate agendas (Dumay, 2016). More precisely, integrated reporting places IC in the centre of the value creation story (Abhayawansa, 2014; Dumay and Cai, 2014) and explores its connections with a concept that is central to IR: value creation (de Villiers and Sharma, 2018). The International Integrated Reporting Framework enhances the relevance of IC within the value creation story built by IR:

> Under [integrated reporting], if IC, human capital, or relationship capital is set to play an important value creation role in the future of an organization, then this value creation story, with IC at its core, has to be told in the [IR] (de Villiers and Sharma, 2018; p. 11).

IR preparers are urged to explain the role of IC in value creation (IIRC, 2016). However, the way in which IC is intended to contribute to value creation within a company cannot be assumed: it reflects IR preparers' interpretations. Indeed, prior IC research has elucidated the unstable, subjective ontology of IC, with calls for additional research to explore the role of IC for value creation (Mouritsen, 2006, 2009). Given that IC is a malleable and fragile concept (Mouritsen, 2006), its assessment requires further development to support interventions, rather than mandating definitive measures of its value (Mouritsen, 2009). Integrated thinking can play an important role in moulding how IC is meant to contribute to value creation. It may facilitate organisational departments in coming to agree on the role of IC within a company, and in defining the connections between IC and the

corporate strategy, governance, past performance, and future prospects (de Villiers et al., 2014; Dumay et al., 2017a; Feng et al., 2017).

Prior integrated reporting research mainly focuses on IC disclosures in reports (Melloni, 2015; Setia et al., 2015; Ahmed Haji and Anifowose, 2017) without exploring empirically how companies deal with IC in their IR preparation process. Further, there is scant research on the role of integrated thinking in this process, although integrated thinking might be applied to actively considering the IC's contribution to value creation (Feng et al., 2017). To address this gap, the present study investigates how IR preparers define the IC's function while preparing the IR, and the role of integrated thinking in this process.

In exploring how IC ontology is socially constructed through IR preparation, this study turns to the social ontology theory introduced by the philosopher John R. Searle (1995, 2006, 2008). Searle's approach helps clarify the analysis and interpretation of how IR preparers collectively assign a function to IC elements and establish what counts as IC in an integrated reporting context. The case study focuses on an integrated reporting pioneer that operates in the energy sector, and has already published several annual IRs. In-depth interviews with managers and employees involved in the IR preparation process provide the key empirical material to inform the detailed description of IC ontology.

This study contributes to extant literature by extending analyses of the subjective ontology of IC (Mouritsen, 2006, 2009; Vlismas and Venieris, 2011) in a specific and novel integrated reporting context. It also responds to calls to explain how IC exists in the process of integrated reporting (Cuozzo et al., 2017; Dumay et al., 2017b). The study clarifies in detail the nexus between integrated reporting and IC, a noteworthy topic that apart from some exceptions (Melloni, 2015; Feng et al., 2017), has received little empirical research attention. By exploring how IR preparers come to share a collective view about the role of IC in the IR value creation story, this study specifies the relationships among IC, integrated reporting and integrated thinking (Chaidali and Jones, 2017; de Villiers et al., 2017b; Feng et al., 2017). In light of the call for additional guidance on the conceptualisation and implementation of integrated thinking (IIRC, 2017, 2018), this study offers

practical insights on how integrated thinking emerges and stimulates collective reasoning about IC in the IR preparation process.

The paper proceeds as follows: Section 1.2 provides a review of extant research on both IC ontology and the role of IC in the integrated reporting context. Section 1.3 theoretically frames the study, and Section 1.4 presents the case-study context and the research methodology. Section 1.5 highlights the findings and discusses them according to the theoretical framework and prior research. Section 1.6 concludes by highlighting the implications, contributions and limitations of this study.

1.2 Literature review

The ontology of IC is a challenging, underdeveloped topic that has attracted the attention of several scholars who have proposed conceptual frameworks to shed light on IC modes of existence (Mouritsen, 2006, 2009; Vlismas and Venieris, 2011). Mouritsen (2006) problematises the lack of a unique, rigorous definition of IC. Drawing on Latour (1986), Mouritsen (2006) also theorises two approaches to studying IC: the ostensive and the performative, each of which relies on different ontological assumptions. In the ostensive approach, IC is represented by broad, discrete components, and its contribution to value creation can be measured by causal models. In contrast, in the performative approach, IC is represented by idiosyncratic, context-specific components, and its contribution to value creation cannot be measured objectively because "IC is co-produced in the course of its application" (Mouritsen, 2006; p. 824).

Advancing the performative approach, Mouritsen (2009) also argues that although measuring IC is difficult, measurements are necessary for developing knowledge about how IC transforms into value. Mouritsen (2009) rejects the possibility of a perfect correspondence between IC and numbers but supports the idea of a measurement related to the visibility of IC in action (i.e. in interaction with other forms of capital such as manufactured capital and natural capital). According to Mouritsen (2006, 2009), the subjective nature of IC entails ontological subjectivity. He contends that the absence of a shared definition of IC and the

malleability of IC elements (i.e. human, structural, and relational capital) mean that IC changes depending on the different systems of corporate goals in which it is situated by managers. Thus, Mouritsen (2009) maintains that IC "classification is a construction done by a 'we'" (p. 155) and recognises IC measurements as "constitutive" of IC because they enable reasoning on the relationship between the IC elements (i.e. human, structural, and relational capital) and value creation. Further, IC measures can help managers transform and intervene on a company's processes (Mouritsen, 2004, 2009). Actors mobilise IC elements according to their function and effects, such that:

> IC is what it has come to be in the situation in hand […] IC elements are mobilized and related to effects that themselves are invented in the network where IC is given meaning (Mouritsen, 2006; p. 823).

In formulating their ontological proposition for the IC domain, Vlismas and Venieris (2011) offer an interdisciplinary synthesis. They particularly analyse the ontological perspectives of different IC research streams (e.g. accounting and economics, strategic management, organisational learning and knowledge) and identify generic categories of IC elements. Their conceptual investigation implies that several disciplines and different elements underlie IC's contribution to value creation. Other scholars affirm IC as a primary source of corporate value (Marr and Chatzkel, 2004; O'Donnell, 2004; Cuganesan, 2005; Beattie and Smith, 2013), proposing that IC contributes to value creation through the "central concepts" (Mouritsen, 2009; p. 154) of human, structural, and relational forms of capital (Guthrie et al., 2012; Abhayawansa et al., 2018). The intangible and intertwined nature of these forms of capital complicates the measurement of IC's contribution to value creation (Mouritsen, 2006, 2009). To overcome the challenge, some scholars recommend visual maps and similar tools to illustrate the role of IC in the value creation processes (Marr et al., 2004; Giuliani, 2016; Zakery et al., 2017); other scholars argue that the fragile, ambiguous nature of IC requires alternative modes (e.g. narrative techniques) to reflect accurately how it drives value creation (Cuganesan, 2005; Dumay, 2009). Murthy and Mouritsen (2011) argue that the connections between IC and value creation may be multidirectional and non-linear, such that any relationship is changeable according to the context. Dumay (2016)

states that context is key to understand IC because it influences both the effect of IC on value creation and the characterisation of the value (i.e. monetary, utility, social, and sustainable value) at the basis of the value creation process.

Acknowledging IC as a source of value creation also requires new reporting paradigms to "supplement and complement traditional financial statements by providing information on intangible value drivers or corporate IC" (Abhayawansa, 2014; p. 101). In particular, integrated reporting seeks to overcome the shortcomings of traditional financial reporting (Owen, 2013; Rowbottom and Locke, 2016), and the International Integrated Reporting Framework (IIRC, 2013) places IC in a subset of forms of capital that can lead to corporate success. Accordingly, prior studies identify integrated reporting as a relevant opportunity for rekindling IC reporting (Dumay, 2016; Dumay et al., 2016; Feng et al., 2017; de Villiers and Sharma, 2018).

Given that integrated reporting represents a valuable clarification of the often-missed interplay between IC and other corporate resources (Cuozzo et al., 2017; Dumay et al., 2017b), high-quality integrated reporting requires embedding an integrated thinking approach into corporate reporting practice (de Villiers et al., 2017b). A background paper on connectivity jointly developed by the IIRC and the World Intellectual Capital/Assets Initiative (WICI, 2013) conceptualises integrated thinking in terms of connections among strategy, governance, past performance, and future prospect, as well as across functional departments. In gathering the experiences of some integrated reporting pioneers, the Chartered Institute of Management Accountants (CIMA, 2017) provides recommendations on how to "make integrated thinking happen" (p. 18). It particularly suggests creating cross-functional groups involved in business planning, measuring and reporting, as well as in identifying drivers and activities that allow the execution of the corporate business model. The staff members of finance departments likely play a major role in driving integrated reporting and thinking. A survey on integrated thinking undertaken by the South African Institute of Chartered Accountants (SAICA, 2015) notes that specific tools such as key performance indicators and the balance scorecard may assist companies in enhancing integrated thinking; however, this survey also highlights that few companies have engaged with such tools while

preparing their IR. Similarly, the Network Italiano per il Business Reporting (NIBR, 2018) states the importance of identifying key performance indicators and dedicated dashboards to integrated reporting and thinking.

In the academic literature, Feng et al. (2017) empirically identify active board, management involvement and cross-organisational teams for IR preparation as examples of how integrated thinking emerges. Chaidali and Jones (2017) suggest that integrated thinking "help[s] organisations to demonstrate the interconnectivity between strategy, strategic objectives, performance, risk and incentives" (p. 16). In arguing that integrated reporting requires managers to engage in integrated thinking, de Villiers et al. (2017a) consider "breaking down the barriers between departments and stimulating strategic dialogue between financial and non-financial teams" (p. 454) as relevant aspects of integrated thinking. Similarly, Guthrie et al. (2017) demonstrate that cross-functional teams emerge as important mechanisms of change in the path towards integrated thinking and reporting. However, Dumay and Dai (2017) observe that managers of the same company may express opposite views on the capability of integrated thinking to overcome organisational silos. They ascribe this controversial perception on integrating thinking to the greater efforts made by the IIRC in arguing for "why" companies need to prepare IR rather than explaining "how" companies should operationalise integrated thinking.

As demonstrated by the results of a global consultation on its International Integrated Reporting Framework (IIRC, 2017), the IIRC is working to address the criticisms of the concept of integrated thinking. Following this consultation, the IIRC constituted a network group on "Integrated Thinking and Strategy" (IIRC, 2018) that is meant to collect case studies and examples of current practices on integrated thinking and further develop this concept.

Despite the call for further exploration of integrated thinking in practice (de Villiers et al., 2014; Dumay et al., 2016; IIRC, 2017, 2018; Rinaldi et al., 2018), no prior research has inspected how integrated thinking influences IR preparers' engagement with IC in the integrated reporting process. Drawing on social ontology theory (Searle, 1995, 2006, 2008), the present research aims to address this gap by investigating the "social existence" of IC in a company that engages in integrated reporting.

1.3 Theoretical frame

Searle (1995) addresses social ontology, or "how social facts exist" (p. 5), defining *social facts* as those "facts in the world […] that exist only because we believe them to exist" (p. 1). That is, social facts arise through intentional human activity that represents objects and imposes them a function that would otherwise not be performed simply by virtue of the nature of the object itself. For example, a stone (object of the world) represents a paperweight only if intentional human activity imposes this function on the stone (i.e. to keep loose papers in place); this function does not depend on the stone's own physical nature. Searle (1995) argues that human beings create human institutions as systems of shared, established rules.

In outlining his theory, Searle (1995, 2006) also distinguishes brute facts from institutional facts. *Brute facts* exist independently of human institutions (e.g. mountains); *institutional facts* require, for their existence, human institutions (e.g. money). To this ontological distinction, Searle (1995) adds an epistemic distinction based on the truth or falsity of judgements about facts in the world. In particular, features of objects can be *observer-independent* (or intrinsic) in nature or *observer-relative*, that is, "relative to the intentionality of observers" (Searle, 1995; p. 9). Observer relativity implies the ontological subjectivity of the object, but this subjectivity does not prevent human beings from conducting epistemically objective representations of that object. Accordingly, Searle (1995) claims that institutional facts are ontologically subjective: they exist only to the extent that conscious agents experience them. He justifies this subjective mode of the existence of institutional facts through the observer relativity of the functions, that is, the roles that conscious agents (in line with their beliefs and purposes) assign to institutional facts. Searle (1995, 2006) also argues that institutional facts may be epistemically objective in the sense that they can be ascertained as true or false according to an objective procedure of verification that is independent of the opinions or attitudes of observers.

Further, Searle (1995) identifies three primitive elements that are necessary to account for the ontology of social reality: "assignment of function", "collective intentionality", and "constitutive rules" (p. 13). The assignment of function refers to the capacity of conscious agents to impose functions (Y) on objects (X) according

to their practical interests. Functions are thus always observer-relative, assigned depending on the interests of specific users and situated into a system of purposes, objectives and values. Collective intentionality refers to the capacity of conscious agents to engage in cooperative behaviours and share beliefs, interests and intentions. Collective intentionality implies a common sense of doing something together that allows the object (X) to perform the assigned function (Y) by virtue of a collective acceptance. For example, Searle (2008) refers to status function, which exists when a certain function of a particular object is collectively accepted and relates the construction of the status function to the construction of an institutional fact, which "works to the extent that it is collectively accepted" (p. 453). Finally, constitutive rules create the very possibility for social facts to exist. Assigning a status function becomes a regular activity performed by conscious agents, such that rules become institutionalised and assume a logical form of *"*X counts as Y in context C" (Searle, 1995; p. 26). Therefore, constitutive rules allow that "anything that satisfies the X condition counts as having the Y status function" in a given context C (Searle, 2008; p. 453).

Given that IR may provide a means to mobilise IC, in moulding the company's value creation story (Dumay, 2016; de Villiers and Sharma, 2018), this social ontology theory seems insightful for exploring the social existence of IC in an integrated reporting context. Social ontology theory particularly helps depict the function assigned to IC, the constitutive rules that cause corporate elements such as IC to exist in that context, and the cooperative behaviour through which IR preparers share their views and socially construct IC. Prior accounting research has demonstrated the potential of the Searle's theory to elucidate how measurement and reporting principles are socially constructed and the role of corporate reporting preparers in moulding the social existence of these principles (Barker and Schulte, 2017; Lai et al., 2017). In adopting this approach, the authors are aware that the findings of the analysis focus on the contingent aspects of IC ontology detected in the case study, rather than provide insights into any stable dimensions of IC that could be identified by drawing on different theories of ontology (Vlismas and Venieris, 2011).

1.4 Case-study context and methodology

1.4.1 The Company

This research draws on the case of a multinational corporation working in the energy sector, which is given the fictitious name "Energy Co." or simply "the Company" for reasons of confidentiality. The Company's business model targets value creation in terms of profitability, growth and efficiency improvements. It also seeks to preserve the environment and improve the wellbeing of the populations involved in its business operations. Its continuous investments in research and development (R&D) and technology, and its innovative attitudes to enhancing intellectual property represent major drivers of the sustainability approach that inform its business model. The Company has pioneered integrated reporting and annually issues an IR. It has also demonstrated its commitment to integrated reporting by embracing several IIRC initiatives aimed at developing best practice and sharing its experiences on integrated reporting. Since its initial adoption of integrated reporting, the Company has sought to identify the most effective way of explaining how IC contributes to value creation. Therefore, exploring Energy Co. can provide interesting insights into an IC ontology in the integrated reporting context.

1.4.2 Research approach

The research draws on social ontology theory (Searle, 1995, 2006, 2008), which requires understanding how IC as an institutional fact is structured through IR preparation. To reach such understanding, the study seeks to analyse Searle's three primitive elements – assignment of function, collective intentionality and constitutive rules – with reference to a single case study.

To guarantee confidentiality, both the Company and the interviewees remain anonymous. Only the departments in which the interviewees are employed are generically mentioned; each department is described by reference to its function within the Company, without revealing its exact name. The confidential policy also prevents direct citation of the interviews and assigning specific information to any interviewees (i.e. no disclosure of "who said what"). These stringent confidentiality measures might seem to limit the study, but they ensured that the interviewees could

speak freely. Thus, the study benefits from this degree of freedom to speak and provides a comprehensive account of the social ontology of IC in the context of IR preparation.

1.4.3 Data collection and analysis

The study is based on eight in-depth interviews conducted with Energy Co. "insiders" – specifically, actors in departments that are directly or indirectly involved in IR preparation. The individual interviews were conducted between March and November 2017. They lasted for 55 to 110 minutes (approximately 70 minutes on average). Interviewees were representatives of the following departments: accounting and finance, sustainability, investor relations and risk management. Within the Company, the accounting and finance department is responsible for materially drafting the IR, and the other departments participate in meetings, brainstorming sessions, and other efforts to define which IR contents are relevant to the Company. The interviewees were managers and employees who have been working for Energy Co. for periods ranging from 10 to 25 years.

In conducting the interviews, the focus was to gain understanding of the process of IR preparation and how IC "exists" for integrated reporting purposes, that is, how the Company's actors behave and interact to define IC, which function they assign to IC, and which constitutive rules allow them to identify IC in this specific context. The issues to address during the interviews were derived from social ontology theory (Searle, 1995, 2006, 2008) and include the conditions required and tools adopted by the Company to identify, measure and represent IC in its IRs. The interviews also probed IC-related activities and initiatives, the history of IR in the Company, contributions by and interactions among actors involved in the process of IR preparation.

To ensure traceability and mitigate contingent concerns about methodological rigor and inherent subjectivity, the analyses were documented step-by-step. In the first stage of analysis, the key concepts related to the issues mentioned in the interviews were identified. Each author separately examined the interview notes, and then the entire research team focused on identifying the primitive elements outlined by Searle (1995). No substantially different interpretations arose among

the authors. In the second stage of the analysis, the authors discussed the overall IC ontology that existed in the Company's integrated reporting process.

Before conducting the interviews, the authors also carefully read all the IRs prepared by the Company, the financial reports it published prior to the shift to IR, and the sustainability reports it published in the last ten years. In particular, this reading allowed gathering preliminary information about the Company and drafting the interviews. As another source of preliminary information, the authors examined the Company's website to identify its IC-related initiatives. The authors also participated in public workshops, academic conferences, and roundtables at which Company representatives explained its shift towards integrated reporting.

1.5 Findings and discussion

1.5.1 Collective intentionality

The process of IR preparation at Energy Co. involves several departments. The accounting and finance department is the "owner" and "coordinator" of this process. It defines the IR's contents, collects non-financial information from other departments, interacts with the chief executive officer (CEO) to agree on the IR "philosophy", and then refines the final version before approval by the board of directors.

While preparing the IR, the accounting and finance department particularly benefits from collaboration and interactions with the sustainability department. The latter provides information on specific social and environmental initiatives developed by the Company, but it also shares its views on the Company's mission, strategy and business model. Its perspective is particularly relevant to defining the IR's contents because both the chair of the board of directors and the CEO of Energy Co. consider sustainability a "core concept" of the Company's value creation process, and often share this view in letters to shareholders and during "investor days" or official meetings to present the Company's corporate strategy. The sustainability department supports the accounting and finance department in explaining to IR readers the sustainability approach manifested in the Company's business model, as well as the drivers of the Company's value creation process. The

planning and control department offers pertinent details about core ideas and implementation of the corporate strategy, as established by the board of directors.

The need to explain the sustainability approach emerged at the very beginning of the Company's integrated reporting project and required that the accounting and finance department began reasoning about the best way to explain the role of non-financial capital in creating value. The staff of this department particularly felt compelled to explain that the Company's business model was not solely supported by "tangible capital". The Company interprets IC as comprising three of the six capitals outlined by the International Integrated Reporting Framework (i.e. "intellectual capital", "human capital" and "social and relationship capital"). That is, the Company employs IC as an umbrella term that considers IC to be more than patents and research expenditures and activities, in that it also refers to human (e.g. skills), structural (e.g. internal procedures), and relational (e.g. alliances) components. This interpretation of IC captures all the elements of IC generally referred to in the literature when defining IC (Stewart, 1997; Sveiby, 1997), and requires the accounting and finance department to share its view about how IC contributes to value creation. The Company's departments engage in several cooperative behaviours that lead to a collective acceptance of the interpretation of IC (Searle, 1995). Particularly, the sustainability and the investor relations departments participate in meetings organised by the accounting and finance department to promote a common view of IC's role in value creation. The sustainability department shares the results of its prior focus groups that aim to gather managers' ideas about the Company's IC and its relationships with corporate sustainability issues. The investor relations department helps explain investors' information needs in relation to IC and creating value. The Company primarily addresses its IR to investors (shareholders and debtholders), so the investor relations department must gather investors' expectations about non-financial information. The risk management department is also (indirectly) involved in explaining IC's role in creating value; it provides the sustainability department with pertinent risk measures about non-tangible assets. The sustainability department then shares this information with the accounting and finance department, and together they decide how to incorporate these measures in IR sections devoted to

the business model and forms of capital. Finally, the CEO and the board of directors put their imprint on the integrated reporting process by communicating to the corporate departments and external stakeholders the centrality of sustainability in value creation.

In discussing the best way to explain how IC creates value, the different departments also express different opinions about its measurement. Each department uses specific metrics to measure this contribution, as reflected in brainstorming activities that aim to measure the effect of the Company's current work-safety project on value. The departments involved in the brainstorming were all aware that the project had succeeded in increasing the IR preparers' awareness about health and safety issues and decreasing injuries. However, some departments believed that the cost reductions associated with fewer injures represent a proper proxy of the effect of the work-safety project on value creation, while others maintained that cost reduction was only a (minor) aspect of the value created through this initiative. In the IR preparers' view, the "value" of people's safety cannot be measured in terms of saved costs. For the IR preparation, IR preparers sought some form of quantification in relation to avoided accidents, reduced training expenses, or increased productivity due to the more consistent presence of personnel at work. However, some departments also identified an incoherence between the resulting value and their view of reality. In the years since the first IR was prepared, the IR preparers have continued to struggle to find common metrics for measuring the degree to which IC affects financial performance because they disagree on the assumptions that underlie the measurements, thus creating value they perceive as unreliable. Despite the desire to identify appropriate metrics, these metrics remain an expected achievement of their efforts in measuring the IC's contribution to value creation.

In brief, the IR preparers at Energy Co. deal with IC through cooperative reasoning that aims to understand how IC creates value. The intention of these IR preparers is to develop a shared explanation of how IC performs its value creation function. As highlighted by prior research (Guthrie et al., 2012; Beattie and Smith, 2013; Melloni, 2015; Dumay, 2016), IC is intended to capture three of the six capitals outlined by the International Integrated Reporting Framework (i.e.

"intellectual capital", "human capital" and "social and relationship capital") (Guthrie et al., 2012; Beattie and Smith, 2013; Melloni, 2015; Dumay, 2016). Thus, the IR preparers assume an active role in defining what counts as IC within their reporting context.

In balancing the financial outcomes expected by shareholders with the sustainability approach that informs the Company's business model, IR preparers struggle to find intangible drivers of sustainability actions that create financial value. Their collective intentionality (Searle, 1995) is necessary for defining how IC supports financial value creation by means of socially and environmentally sustainable actions. This collective intentionality stems from brainstorming and other joint activities, such that IR preparers engage in cooperative reasoning, which helps them overcome boundaries between functional departments and share ideas about what constitutes IC. IR preparers work to develop a unique viewpoint on how IC delivers financial value. As suggested by Mouritsen (2006), the way IC contributes to value creation depends on the situation at hand, beyond any formulas included in predictive frameworks or models. Although the Company's departments do not always agree on what is the best way to explain IC's role in creating value, they share a common idea of what IC is. That is, they might debate the value of IC in an IR preparation context, but there are no disputes about how IC should be defined. The IC elements are meant to be intangible drivers for sustainability-based financial value creation, an interpretation that is evocative of both IC's assigned function in the integrated reporting context and the constitutive rules (Searle, 1995) for recognising corporate resources as IC.

1.5.2 Constitutive rules

To function as IC within the Company's integrated reporting context, a corporate resource, asset, or state of being (hereafter, corporate element) must satisfy three constitutive rules (Searle, 1995). First, the corporate element needs to be intangible. That is, the Company's business model is not supported solely or exclusively by tangible assets: both financial capital and manufactured capital are relevant, but intangible elements are also important. Even if the intangible elements

are not easy to measure, they are crucial for allowing the Company's business model to create value.

Second, the (intangible) corporate elements must support actions that are sustainable from a social or environmental perspective. These elements must respect, protect, or improve the quality of the environment in which the Company operates and/or guarantee the safety and wellbeing of employees and local communities that are involved directly or indirectly in its business activities.

Third, the sustainable actions driven by the (intangible) corporate elements must foster financial value creation. The IR preparers recognise non-tangible elements as IC only to the extent that they affect the Company's financial performance, directly or indirectly, in terms of revenues, expenses, cash flows, and financial ratios (e.g. leverage ratio, return on assets, breakeven point). According to the Company's IR preparers, the effect of IC is mostly indirect, but the preparers strive to identify this effect and detail the path by which a corporate element induces one or more non-financial results and thereby affects financial outcomes. This path may require several steps, together with a deep knowledge of the Company's business model and value creation process.

These three constitutive rules create the conditions that must be met to allow IC to exist in the context of Energy Co.'s integrated reporting (Searle, 1995). For example, the Company's IRs offer explanations of corporate programmes for employee safety, noting that Energy Co. leveraged intangible elements (e.g. personnel skills, organisational procedures) to enhance its financial performance (lower injury costs in the income statement), which was made possible through multiple corporate actions designed to decrease the number of injuries. These corporate actions ranged from careful asset management and plant design to constantly developing *ad hoc* process manuals and training aimed to disseminate safety information to workers. The IR preparers also cite the Company's careful analysis of the causes of previous adverse incidents related to safety, which informed new intervention plans and systematic emergency-management procedures, including safety contracts with any suppliers working on production sites.

Another of the Company's projects provides an example of an activity that does not meet three constitutive rules. Energy Co. developed a local project to support the population of one of its host countries through resettlement, livelihood restoration, access to water, improved hygiene and sanitary conditions, on-grid and off-grid electrification, and primary education programmes. The project succeeded in benefitting the local population, achieving the sustainability requirement, but IR preparers did not consider the third constitutive condition satisfied, that is, they could not identify contingent effects in relation to cost reductions, revenue increases, or cash flow optimisation. Therefore, the project was not included in the IR, but was fully described in the sustainability report that Energy Co. continues to publish in parallel with its IR.

Thus, in the context of the Company's integrated reporting, IC refers to intangible drivers of the sustainability actions that affect financial value creation. In the Company's IRs, this status emerges in a connectivity map that explains the contribution of the IC (and other forms of capital) to value creation. The IC is represented as intangible elements that are mobilised through sustainable actions that in turn affect financial performance. For example, the IRs portray connections between social and relationship capital (an IC component) and cash flows by showing how the IC elements favour dialogue with trade unions and cooperation with host-country populations. This representation is particularly helpful in demonstrating the effect of stakeholder-engagement activities on financial performance and the role of social and relationship capital in this process. Measuring the financial effects of (avoided) strikes and the (lack of) welcoming by populations remains a work in progress for the Company, but the connectivity map offers a pertinent representation of the benefits that arise from this specific IC element and its related sustainable actions.

An internal debate among IR preparers emerged to define the role of the time-to-market in the value creation process. According to some IR preparers, time-to-market is an intermediate, non-financial outcome generated by the soft competences of the Company's human capital (a component of its expanded notion of IC) that enables the Company to develop discovered resources faster than it once did. An accelerated time-to-market leads to lower unitary operating expenditures, intended

as the ultimate financial outcome obtained. However, according to other IR preparers, time-to-market is an intangible driver of financial value creation that helps the Company enjoy immediate positive effects on its cash flows. After careful reasoning, the former perspective has been collectively identified as the most appropriate.

These findings support Mouritsen's (2009) argument that despite it being impossible to obtain a perfect representation of IC with numbers, IC measures help identify its intrinsic features. For example, the connectivity map provides an overall representation of the complex process in which IC is embedded, and clarifies IC features (i.e. intangibility, sustainability, contribution to financial performance) and the hidden links between IC and financial performance.

1.5.3 Assignment of function

At Energy Co., IC serves as an intangible driver for sustainable financial value creation. In line with the Searle's ontology, this function is assigned to multiple corporate elements that act as IC in the value creation story told by the IRs, coherently with the system of purposes that the Company aims to accomplish (i.e. sustainability approach and financial success). For example, this function is ascribed to intellectual property (e.g. patents, rights and licences, software, copyrights), knowledge management through innovative procedures and protocols, and information and communication technologies. This broad set of elements, referred to as "research and development", are likely to affect the Company's value creation by enhancing competitive advantage, productivity, and operational efficiency; creating licenses to operate; and mitigating risk exposure. To allow these IC elements to enhance value creation, R&D activities and partnerships are required.

Other corporate elements that provide intangible drivers of sustainable value creation include the health and safety of the employees, skills and competences of the employees, respect for diversity, and integrity. These "people and safety" elements affect value creation by enhancing productivity, efficiency, competitiveness, risk mitigation, company reputation, innovation, and the capability to attract new talent. The most relevant actions in this realm are

investments in corporate integrity, safety-improvement projects, diversity and inclusion of employees, and efforts to enhance employees' capabilities and skills.

Relationships with stakeholders of any kind (e.g. customers, suppliers, industrial partners, local communities, governments, non-governmental organisations, universities, labour unions, other associations) also serve as intangible drivers for sustainable value creation. These elements of IC, referred to as "social, human wellbeing, and transparency" by the IR preparers, influence value creation by enhancing the Company's reputation, alignment with international best practice, competitive advantage, and market share. The elements also have benefits in relation to customer retention, supplier reliability, time-to-market reduction, and country-risk mitigation. The most relevant actions for these IC elements are community investments and training on human rights and other social issues.

A table presenting the Company's key performance indicators and value creation in the IRs highlights functions of IC elements in supporting sustainable value creation. This table links the three categories of the IC elements to corporate value creation. It also presents key performance indicators that the Company's managers use to make strategic decisions and assess the outcomes of these decisions. For example, the main key performance indicators associated with R&D are the number of patents held, number of innovation and research partnerships activated, investments in R&D activities, and identifiable outcomes. Ultimately, all these key performance indicators deal, more or less directly, with measurable financial outcomes.

In brief, the general function of IC as a value creator is exploited to align the goal of financial value creation with sustainability, which is core to the Company's business approach. Therefore, through the assignment of function (Searle, 1995), IR preparers inflect the value creation function of IC according to the Company's characterisation of value and its way of doing business. As predicted by de Villiers and Sharma (2018), if IR preparers are aware of the importance of IC for corporate financial performance, they place IC at the core of the value creation story told in the IR. Dumay (2016) argues that the effect of IC on value creation depends on context; the present study goes further to suggest that the ways in which IC delivers value result from the functions that IR preparers assign to IC. That is, in this case

study, IC can only be defined by considering the Company's sustainability approach to the business.

1.6 Conclusion

The ontology of IC remains an underdeveloped topic. Most research approaches IC by applying a conceptual lens, without exploring empirically how IC is socially constructed within companies. This case study addresses that gap by investigating the ontology of IC in the flourishing context of integrated reporting. Specifically, it analyses how IR preparers deal with IC while preparing the IR and highlights the role of integrated thinking in this process.

The analysis reveals that IC displays a subjective ontology (Searle, 1995) – as an institutional fact, IC exists to the extent that IR preparers define its contribution to value creation. The IC ontology emerges through its subjective nature, such that IC's function is not assumed, but rather defined in the very process of IR preparation. In the case study, the way in which IC is socially constructed is moulded by both financial goals and the sustainable approach of the business model. This ontology of IC is subjectively established according to the system of corporate values and purposes that inform the Company's performance and business model. Three constitutive rules are the basis of IC's existence in the integrated reporting context: to act as IC, a corporate element must be intangible in nature, drive (social and environmental) sustainable actions, and contribute to financial value creation. That is, the IC elements work as intangible drivers for sustainability-based financial value creation, and as intangible assets, resources, and states of being, they enable socially and environmentally sustainable actions to generate financial outcomes. This function is socially constructed because it derives from and possibly changes with IR preparers' collective understanding of how IC exists in the value creation process.

Integrated thinking appears to play a major role in shaping this subjective ontology because it underlies the possibility of enacting cooperative reasoning in relation to how IC performs as an intangible sustainability driver. Integrated thinking particularly emerges as a shared sense of doing, which involves all IR

preparers' common ideas about how IC exists in the process of IR preparation. Integrated thinking moulds this subjective ontology of IC, in that it triggers a holistic, systems-based understanding of interdependencies that bridge IC with value creation. In particular, the analysis reveals interaction among departments and the constitution of cross-functional groups as important aspects of integrated thinking, which is in line with the arguments of practitioners and academics (WICI, 2013; CIMA, 2017; de Villiers et al., 2017a; Dumay and Dai, 2017; Feng et al., 2017; Guthrie et al., 2017). While these studies generically highlight the relevance to integrated reporting of breaking down organisational silos, the present research elucidates how various departments of a real-world company work together to understand IC's contribution to value creation. Prior research has underlined the role of finance departments in driving integrated reporting and thinking (CIMA, 2017), yet the present analysis demonstrates that what counts as IC in an integrated reporting context is not entirely influenced by the (financial) mindset of the department that "owns" the IR preparation process (i.e. accounting and finance). Other departments, such as the sustainability, investor relations, and risk management departments, play a substantial role in defining the function of IC by offering their view on IC's contribution to value creation.

The IR preparers' ability to define the connections between IC and corporate strategy, business model and performance emerges as another important component of integrated thinking (Dumay and Dai, 2017). Integrated thinking particularly supports the epistemic objectivity of IC (Searle, 1995) by outlining an objective procedure that IR preparers apply to scrutinise how IC influences the process of (financial) value creation by means of (social and environmental) sustainability initiatives. IR preparers subjectively come to define IC ontology by stating IC's function, but the epistemic process is developed objectively. Whether corporate elements work as IC depends on three constitutive rules, and if any one of these rules is not met, the corporate elements cannot function as IC in the Company's value creation story told in the IR.

The connectivity map and the key performance indicators and value creation table are used to ensure the objective identification of what serves the IC function in the integrated reporting context, requiring preparers to reflect on the connections

between IC and the corporate strategy, business model and performance. Indeed, preparers must deal with the map and the table while identifying what counts as IC in the integrated reporting context. Preparers are particularly required to focus on intangible assets, sustainability actions, and financial performance as interconnected aspects of the value creation process. They endeavour to define cause-and-effect relationships between IC (and other forms of capital) and value creation, with sustainable actions as mediators. In addition, IR preparers must determine how IC is embedded in corporate sustainable actions that may favour financial value creation. That is, they require an enhanced understanding of the hidden connections among IC, sustainable actions, and corporate financial performance. The IR preparers are required to explain how IC is part of the Company's business model but also to problematise and create a visual depiction of the connections between IC and value creation. This entire process requires insightful reasoning about the connections among strategy, the business model, non-financial outcomes, and financial value creation (Chaidali and Jones, 2017; de Villiers *et al.*, 2017b).

The findings of the present study reveal the role of connectivity maps, key performance indicators and value creation tables in stimulating integrated thinking about the connections between IC and a company's strategy, business model and performance. These findings are in line with prior studies that highlight the role of specific tools (e.g. key performance indicators and dashboards) in enhancing integrated thinking and reporting (SAICA, 2015; NIBR, 2018). Further, the present study extends prior research detailing instruments that help to visualise IC (Marr et al., 2004; Cuganesan, 2005; Dumay, 2009; Giuliani, 2016; Zakery et al., 2017). Indeed, it demonstrates that such instruments are critical for objectively scrutinising what counts as IC in the integrated reporting context. Echoing Mouritsen (2009), the connectivity map and the key performance indicators and value creation table are constructive and constitutive of the epistemic objectivity of IC.

These findings contribute to extant literature in several ways. First, this study provides empirical evidence of the possibilities created by integrated reporting. While previous research predict that integrated reporting offers a new opportunity for IC (Dumay, 2016; de Villiers and Sharma, 2018), this study provides practical

insights into how integrated reporting represents this "new deal". IR preparers must specify the relevance of IC within the value creation story told through the IR. In turn, IR appears poised to become a document of reference for companies that depend on IC, as suggested by Cuozzo et al. (2017). IR is also a trigger for collective reasoning about the modes of existence of IC in the value creation process, as suggested by the emerging literature (e.g. Dumay, 2016; de Villiers and Sharma, 2018). Second, this study expands the analysis of the subjective ontology of IC by offering an empirical perspective. By addressing the ontological subjectivity of IC in a specific and novel integrated reporting context, the study demonstrates that the existence of IC depends on the function that IR preparers assign to IC. By doing so, the study advances knowledge and understanding of the subjective mode of existence for IC, adding practical insights to the more conceptual views currently available (e.g. Mouritsen, 2006, 2009; Vlismas and Venieris, 2011). Third, the empirical analysis addresses the underexplored interplay between IC and integrated thinking, elucidating the role of integrated thinking in defining the ontology of IC in a specific integrated reporting context. Integrated thinking allows IR preparers to gain an enhanced awareness of IC through their proactive consideration of IC within a network of corporate resources (Cuozzo et al., 2017; Dumay et al., 2017b). In particular, integrated thinking acts as an underlying mechanism that arises during IR preparation, which helps IR preparers develop a common understanding of the ways in which IC supports value creation processes. Moreover, integrated thinking allows the identification of a procedure for scrutinising what can be considered IC in this integrated reporting context. The connectivity map and the key performance indicators and value creation table ensure this objective identification of IC in relation to its contribution to value creation processes.

The findings of the present study also have practical implications. The study recommends that IR adopters promote integrated thinking to discern how IC contributes to the value creation processes. Involving various functional departments, as well as the board of directors and the CEO, is particularly beneficial in this endeavour. In line with the call to address criticisms of the concept of integrated thinking (Dumay and Dai, 2017; IIRC, 2017, 2018), the IIRC might consider introducing specific guidelines to help IR preparers design appropriate IC-

related maps and tables. Indeed, this study demonstrates maps and tables are tools that support integrated thinking in relation to making connections between IC and corporate strategy, business model and performance.

However, the scope of this study is limited to IC ontology in the context of IR preparation, and relies on interviews with staff members (directly or indirectly involved in the IR preparation process) from only one company. The research focused on the "social existence" of IC within the integrated reporting context. Further research could compare this ontology with that emerging in other reporting contexts (e.g. sustainability reporting). Moreover, future research could expand the scope of the present research and continue to explore how IC ontology emerges in other companies, in the same or in other sectors.

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2. Integrated reporting and the performativity of intellectual capital

Abstract

The research investigates how intellectual capital (IC) is problematised in the context of integrated reporting. Drawing on a performative approach to IC, the paper explores the role of organisational actors in *defining*, *classifying* and *valuing* IC within the process of preparing an integrated report (IR). The analysis relies on in-depth interviews with IR preparers of a European oil and gas company that has been issuing IRs since 2012 and considers IC to be a core element of its business model and value creation story. The case study reveals that IC definition, classification and valuation stimulate ongoing interaction among various actors. An active role is played by the staff of the department responsible for the IR preparation process, but also by organisational actors who are not directly involved in this process and by external actors, such as the company's peers, IIRC representatives and the company's accounting advisors. Some sketches, matrixes and maps inspired by the IIRC Framework (i.e. the business model sketch, the KPIs matrix and the connectivity map) were pivotal in defining concepts and categories of IC and its connection to value creation, although the quantification of IC's effect on value creation remains disputed. In showing how organisational actors problematise and engage with IC inscriptions within the process of IR preparation, the paper enriches the scant research that examines the performativity of IC in the context of corporate external reporting and answers the call for more research on how IC affects the management of organisations.

Keywords Intellectual capital, Integrated reporting, Performative approach, Connectivity maps, Oil and gas company

2.1 Introduction

The primary purpose of an integrated report (IR) is to explain to financial capital providers how an organisation creates value over the short, medium and long term (International Integrated Reporting Council [IIRC], 2013). IR preparers may detail how they use or affect a broad range of 'capitals', that is, the 'stocks of value that are increased, decreased or transformed through the activities and outputs of the organization' (IIRC 2013, § 2.11). The International Integrated Reporting Council (IIRC) recognises that 'what differentiates the organization to give it

competitive advantage and enable it to create value [is] how the organization develops and exploits intellectual capital' (IIRC 2013, § 4.29). Intellectual capital (IC) is one of the 'capitals' that preparers may disclose, according to the IIRC Framework. Further, with its principles-based approach, the IIRC Framework allows organisations to flexibly mobilise IC elements while constructing their 'value creation story' and acknowledges that some organisations may consider IC to comprise what is generally identified as 'human', 'structural' and 'relational' capitals (Stewart, 1997; Sveiby, 1997).[1] In other words, IR preparers' interpretations of IC may trespass on the IIRC definition of IC and mobilise other IR 'capitals', such as 'human' and 'social and relationship' capitals (Melloni, 2015). In their analysis of the IR potential for the future of IC reporting, de Villiers and Sharma (2018; p. 11) strongly underlined the need to explain the role of IC in value creation: '*Under <IR>, if IC, human capital, or relationship capital is set to play an important value creation role in the future of an organization, then this value creation story, with IC at its core, has to be told in the integrated report*'. The IIRC Framework also suggests using specific key performance indicators (KPIs) to quantify the contribution of IC to value creation (IIRC 2013, § 1.11).

Organisations that address the challenge of preparing an IR are thus invited to address the problems related to IC *definition* (how IC is intended to work within the company), *classification* (how IC is categorised) and *valuation* (how IC is evaluated and related to value creation). *'How does IC work?', 'what is IC composed of?'* and *'how is IC related to value?'* are three 'big questions' (Mouritsen, 2006; p. 823) that organisations are likely to answer while preparing an IR. Given the flexibility offered by the principle-based approach of the IIRC Framework, the answers should not be taken for granted. The present paper addresses these 'big questions' in the context of integrated reporting, empirically exploring how an integrated reporting

[1] As underlined by Feng et al. (2017, p. 331), the World Intellectual Capital/Assets Initiative (WICI) has closely collaborated with the IIRC 'to ensure that the IR could recognize "IC" as a critical source of an organization's value creation'. This helps us understand why the IIRC interpretation of IC is 'flexible'. For a review of guidelines and frameworks on IC external reporting, see Abhayawansa (2014).

'pioneer' company addresses IC *definition*, *classification* and *valuation* while preparing its IR.

To address these 'big questions', the paper draws on the performative conceptualisation of IC (Mouritsen, 2006) for its theoretical framework. In accord with the Latourian performative approach to reality (Latour, 1986, 2005), Mouritsen (2006) suggests a performative approach to IC entails that IC is not definable *ex ante*. IC elements cannot be assumed to be variables of a stable proposition leading to value creation, and scholars should be 'concerned with how IC elements are mobilized and related to effects that themselves are invented in the network where IC is given meaning' (Mouritsen, 2006; p. 823). How IC performs depends on how organisational actors mobilise IC elements: it gains an identity in relation to other elements. The present research argues that a performative approach to integrated reporting helps us depict how diverse organisational actors – belonging to different departments and directly or indirectly involved in preparing an IR – engage with and mobilise IC elements. This allows us to explain how IC contributes to value creation. The flexibility allowed by the IIRC Framework in driving preparers to mould the company's value creation story (de Villiers and Sharma, 2018; Lai et al., 2018) requires that we consider IC definition, classification and valuation as malleable and contingent on how IR preparers interact and engage with IC elements, that is, how they 'perform' IC.[2]

From an empirical point of view, the research primarily benefits from in-depth interviews of organisational actors involved in the IR preparation process of the case study company. The company under investigation, which operates in the oil and gas industry, has prepared an annual IR since 2012. The company's business model (BM) is strongly influenced by IC. This is demonstrated by its huge commitment to research in science and technology and its innovative approach to

[2] A performative approach also suggests not establishing *ex ante* a specific definition of IC, although the authors are fully aware of the differences that exist between the definition of IC in the literature (which comprises 'organisational, relational and human capitals' – see Stewart, 1997 and Sveiby, 1997) and the one suggested by the IIRC Framework (which essentially corresponds only to 'organisational capital'). In line with this approach, the present paper describes IC according to the definition(s) of IC contingently established by the interviewees.

the enhancement and management of intellectual property. As explained during interviews, the company's staff strongly believe that the sustainability of the BM relies more on IC than on financial and manufactured capitals. Despite the fact that companies in this industry may not be eager to base their value creation stories on IC-related aspects, the company under investigation showed a prominent interest in basing its sustainable value creation story on IC elements because these are considered innovative and relevant for the sustainability of the BM.

The case study reveals that IC definition, classification and valuation give rise to continued interaction between different actors. A role is played not only by the staff of the department responsible for the IR preparation process, but also by actors not directly involved in this process and by external actors, such as the company's peers, IIRC representatives and the company's accounting advisors. An active role is also played by sketches, matrixes and maps that the preparers developed by drawing on the IIRC Framework. The business model sketch, a KPIs matrix and a connectivity map helped preparers visualise and narrate IC within the IR value creation story and stimulated discussions and mediations on the nature of IC and its contribution to value creation.

To the best of the authors' knowledge, this is the first paper that adopts a performative approach to the empirical investigation of IC in the process of IR preparation. In showing how organisational actors problematise and engage with IC elements within the process of IR preparation, the paper enriches the scant research that has examined the performativity of IC (see Abhayawansa et al., 2018) and answers the call for more research on how IC affects the management of organisations (e.g. Catasús and Gröjer, 2006; Catasús et al., 2007; Giuliani and Marasca, 2011; Chiucchi, 2013; Chiucchi and Montemari, 2016; Giuliani, 2016; Giuliani et al., 2016). Although the role of organisational actors in 'managing' IC is acknowledged by scholars marking the so-called 'third stage' of IC research (Guthrie et al., 2012), there is a lack of research exploring the practices and challenges of defining, classifying and valuing IC in the context of IR preparation. The current study offers some relevant case insights and contributes to the emerging literature on the future of IC reporting (Dumay, 2016; Zambon, 2016; Feng et al., 2017; de Villiers and Sharma, 2018). The research also offers a theoretical

advancement of Mouritsen's (2006) framework by testing this framework in a novel setting (i.e. integrated reporting) and suggests possibilities for further refinement based on empirical evidence.

The paper proceeds as follows. Section 2.2 theoretically frames the study according to Mouritsen's (2006) performative conceptualisation of IC and explains how this approach is helpful in addressing research questions regarding IC definition, classification and valuation in the context of integrated reporting. This section also reviews pertinent literature on IC measurement and reporting. Section 2.3 explains the research design, detailing how the research attempts to answer the three research questions. Section 2.4 presents the findings, which are organised into three subsections according to the three research questions. Section 2.5 discusses the findings according to the theoretical framework and in relation to prior research. Section 2.6 concludes by highlighting the contributions and limitations of the study.

2.2 Theoretical background and prior research

Bruno Latour (1986, 2005) theorised two alternative approaches to reality based on divergent ontological premises. The *ostensive approach* postulates that reality has stable properties (or fundamental and generalisable elements) that exist independently of human action and interaction. From a methodological point of view, scholars are expected to try to '"black-box" social objects' and create predefined conceptualisation of the world functioning (Boedker, 2010; p. 597). The *performative approach* instead posits that reality has a variable set of human practices (or actions and interactions) that change depending on how its elements are mobilised (Boedker, 2010). Focusing on action and enactment (Schultze and Orlikowski, 2010; p. 813), the performative approach investigates reality as 'a doing', that is, as enacted in ongoing practice (Barad, 2003). Reality is constituted by 'fluid, dynamic, multiple, and emergent phenomena' (Schultze and Orlikowski, 2010; p. 814). From a methodological point of view, scholars are asked to 'trace the footsteps of diverse actors' (Boedker, 2010; p. 597) who enact the objects under investigation.

Drawing on Latour's (1986) dichotomy, Mouritsen (2006) problematises IC research and compares the ostensive approach to the study of IC with the performative approach. If taking an *ostensive approach* to IC, scholars should try to demonstrate that 'IC elements are fundamental drivers that exist prior to any interaction that actors initiate but that can be found out by careful study and testing' (Mouritsen, 2006; p. 822). These drivers are more important *per se* than their mobilisation within actors' concrete activities. The task for research is to uncover the formula by which IC elements are connected to value creation and organisational results: researchers should develop a 'generalized model of IC that leaves aside particulars, contingencies, and circumstance to get to the essence of IC' (Mouritsen, 2006; p. 823).

Conversely, Mouritsen (2006) suggests that a *performative approach* spurs us to consider IC to be undefinable *ex ante*: IC elements are not fixed variables of a stable proposition of value creation. Researchers should develop 'a situated model of IC that includes all manner of localities, circumstances, and contingencies that cannot be generalised' (p. 836). Indeed, 'IC is hardly a linear model leading to effects; it is a model of multiple potential relations and associations' (p. 826). Adopting a performative approach to the study of IC allows us to explore IC in a process of becoming, in which it is understood to be a mutable, context-specific set of practices mobilised for the production of value. A performance-oriented investigation emphasises IC in action by focusing on situated and relational practices that enact contingent boundaries, identities, entities and effects (Schultze and Orlikowski, 2010). In this vein, Mouritsen (2006; p. 826) maintains that IC 'has an appearance that allows us to see it, but it is impossible to predict its effects from these properties since they are weakly structured'. According to a performativity approach, IC is expected to be mobilised by a variety of organisational actors; each of them owns a specific view of the nature, meaning and role that IC can play.

To facilitate the development of a performative understanding of IC, Mouritsen (2006) developed three questions: *'How does IC work?'*, *'What is IC composed of?'* and *'How is IC related to value?'* (Mouritsen, 2006; p. 823). Each of these questions addresses a specific aspect of IC: IC definition, IC classification and IC valuation. To address the question *'How does IC work?'*, scholars should acknowledge the

role of actors in the management of IC and seek to understand 'how IC elements are mobilised towards transforming organisational behaviour' (Mouritsen, 2006; p. 834). IC gains its appearance by means of *inscriptions*, that is, particular kinds of representation that actors develop to organise the world and make it accessible. An inscription 'defines space and its organization, sizes and their measures, values and standards, the stakes and rules of the game' (Latour, 1986; p. 286). IC-related inscriptions include, for instance, the *mapping techniques* through which the dynamics of value creation are visualised and the *IC statements* that support knowledge-management activities. Such inscriptions do not stand alone; they participate in the construction of a *narrative* in which the achievements of IC are told. Researchers are urged to understand who participates in defining the role of IC within the narrative, remembering that the boundary between IC-related elements and events that are included in the narrative and those that remain outside is unstable (Mouritsen, 2006; p. 827).

In questioning *'What is IC composed of?'*, scholars should be aware that IC can be stocked with difficulty into stable classifications. Mouritsen (2006) mentions the case of 'training', which can be categorised as human, organisational or relational IC depending on how actors explain the activity. This case highlights the fact that IC concepts have a 'problematical organising capability because their ability to make sense of events is weak' (p. 830). In other words, since some events can be differently classified according to different points of view, the names of the categories used to classify IC do not necessarily signify the practices they represent (pp. 830-831). IC elements do not have immutable referents. Therefore, IC classifications present instability and movement, which creates problems for the interpretation of (the models of) how IC is mobilised. IC classification systems contingently change, and IC inscriptions and narratives inform each other in the process of defining these systems.

The instability and movement of IC concepts also affects processes of valuation. The value of IC (*'How is IC related to value?'*) should be considered to be set by convention because it is not universal or immutable. IC value is the result of a procedure of recognition: 'The strength sought in measurement is more a hope than a fact' (Mouritsen, 2006; p. 832). Researchers are required to focus more on

the process of creating value than on value as the final point of a valuation exercise (*ibidem*). They should try to understand how IC inscriptions and narratives facilitate the process of valuation rather than questioning the resulting value(s) of IC.

Adoption of Mouritsen's (2006) performative approach to IC in the context of integrated reporting is absent in the literature. The present study argues that investigation of the performativity of IC in this context may help disentangle how organisational actors mould IC definitions, classifications and valuations by drawing on peculiar IC inscriptions.[3] The advent of the IR – the latest reporting paradigm aimed at providing a holistic story of how organisations perform – poses new issues and opportunities in relation to IC definition, classification and valuation. The preparation of the IR is considered a new hope for IC because it stimulates preparers to reposition IC in their agendas and provides room for the enhancement of IC relevance within the value creation story built through the IR (Abhayawansa, 2014; Dumay, 2016; de Villiers and Sharma, 2018). Despite the IIRC has collaborated with the WICI in the preparation of the WICI Intangibles Reporting Framework (2016), its definition of IC differs from the WICI's one: the IIRC Framework refers to IC as "organizational, knowledge-based intangibles" (IIRC 2013, §§ 2.15 and 2.18), while the WICI Framework adds to this capital, the human and the relationship ones (Feng et al., 2017).The IIRC Framework suggests using specific KPIs to quantify the IC contribution to value creation, although it also admits that 'quantitative indicators are included in an integrated report whenever it is practicable and relevant to do' and '[t]he ability of the organization to create value can best be reported on through a combination of quantitative and qualitative information' (IIRC 2013, § 1.11).[4]

[3] In adopting a performative approach, the authors are aware that the findings of the analysis are focused on the contingent aspects of IC definitions and configurations within integrated reporting rather than providing insights into any stable properties of IC. However, the authors believe that the approach adopted can favour fruitful debates regarding the role of IC within companies and the future of IC reporting.

[4] WICI developed a similar stance within its Intangible Reporting Framework (World Intellectual Capital/Assets Initiative [WICI] 2016, p. 1): 'WICI […] recognizes the need for corporate reporting that integrates the communication of narrative and quantified information on how organizations

Abeysekera (2013) notes that, in the IR preparation context, IC representation requires more narrative and visual tools than numbers to achieve an accountable and transparent representation of its contribution to value creation. By adopting a principles-based approach, the IIRC Framework enables discretion and flexibility regarding how preparers may disclose IC concepts, classifications and values. The content element BM and the principle of connectivity may represent two important referent points for reporting IC within the IR. On the one hand, visual representation of the BM asks preparers to consider, visualise and measure how IC (as well as other capitals) contributes to value creation (Melloni, 2015). Further, the connectivity principle, which asks for 'a holistic picture of the combination, interrelatedness and dependencies between the factors that affect the organization's ability to create value over time' (IIRC 2013, § 3.6), may spur preparers to question and represent how IC is related to other elements that affect value creation (Feng et al., 2017). Both the BM content element and the connectivity principle may solicit IR preparers to develop IC inscriptions (e.g. statements and maps) and assist them in moulding IC narratives, which in turn may contribute to the 'performance' of IC in the context of integrated reporting.

While no prior research has adopted Mouritsen's (2006) performative approach to IC within the context of integrated reporting, a number of scholars have embraced a performative perspective to investigate what lies behind IC measurement and reporting (see Guthrie et al., 2012; Dumay and Garanina, 2013). For instance, Chiucchi (2013) showed that implementing an IC measurement system can favour IC mobilisation, but actors are fundamental in this process because they need to develop an 'experiential learning cycle' to be able to mobilise IC. The actors that have active roles in designing and implementing IC measurement systems (e.g. the controller in the case study company) are pivotal in driving the mobilisation of IC. External actors (e.g. the interventionist researcher in the case study company) are also relevant because they can facilitate interaction among internal organisational actors, who in turn develop their own learning processes regarding IC. Veltri and Bronzetti (2015) highlighted that context and firm specific factors (respectively,

create value over the short, medium and long term through the creation, management, combination and utilization of intangibles'.

external consultants and managerial staff in the case study) are crucial in defining how IC measurement and reporting are implemented. Reiteration of these measurement and reporting practices is shown to be largely contingent on their role in facilitating managers' needs beyond measurement and disclosure issues. Chiucchi and Montemari (2016) observed that the practical use of IC indicators within organisations may be hindered if managers dispute the related scores because they do not confirm to their perceptions of reality. Moreover, Giuliani et al. (2016) found that the practical use of IC indicators is affected by both the process followed and the actors involved in their production. Conceptualising IC reporting as a discursive practice incorporating the discussion of emergent change, Yu et al. (2017) use a longitudinal case study to illustrate how this form of reporting can be used to accommodate the conflicts and contradictions embedded in different organisational logics and to enact organisational transformation.

Focusing on the tools used to represent IC, Bukh et al. (2001), Mouritsen et al. (2001) and Marr et al. (2004) showed that IC statements and visual maps are fundamental to mobilising IC and making it amenable to intervention. In other words, how organisational actors develop these tools – integrating narratives, sketches and metrics – orients how IC is 'performed' within organisations. Dumay and Rooney (2011) highlighted that certain companies may be unable to identify a set of concrete IC measures, but this does not necessarily imply their inability to effectively implement IC practices and communicate their effect through 'IC statements based on an ongoing narrative' (p. 344). IC measures are useful as 'part of the IC reporting narrative' and the 'IC journey'.

By depicting different aspects of how IC is 'performed' in the context of measurement and reporting processes, these studies suggest that defining, classifying and valuing IC is largely contingent and strongly influenced by how organisational actors interact and engage with IC elements also by means of IC inscriptions. Integrated reporting represents an unexplored context with respect to the investigation of IC performativity, and the present paper aims to fill this gap.

2.3 Research design

To understand how companies deal with IC *definition*, *classification* and *valuation* questions in the context of integrated reporting, the authors conducted in-depth interviews with actors directly or indirectly involved in the IR preparation process of a European oil and gas company (hereafter named 'Company') that is strongly involved in the IIRC project, issuing annual IRs since 2012 and participating in both industry and national IIRC business networks.

Interviewees were managers and employees who had been working for the Company for periods ranging from 10 to 25 years and members of the accounting advisory firm that supports the financial reporting department who had been working in the accounting advisory firm for periods ranging from 7 to 12 years. The managers and employees of the Company belonged to the department directly involved in coordinating the IR preparation (i.e. the financial reporting department) and to the departments that were involved in brainstorming activities relating to the IR content (i.e. the sustainability department, the investor relations department and the risk management department) (Table 2.1). Ten interviews were run between March and November 2017. Three additional interviews were run in June 2018. Specifically, one investor relations employee and two members of the accounting advisory firm were interviewed. Interviews lasted for 68 minutes on average. We were particularly interested in understanding the process of IR preparation and how IC elements were mobilised within this process. Table 2.2 contains a list of the main issues covered during the interviews. We derived these issues from the theoretical concepts discussed by Mouritsen (2006) in his presentation of the performative approach to the study of IC.

Table 2.1 – Interviewees

- Financial reporting manager (4 interviews)
- Financial reporting employee (1 interview)
- Sustainability reporting manager (1 interview)
- Sustainability reporting employee (1 interview)
- Risk management manager (1 interview)
- Risk management employee (1 interview)
- Investor relations manager (1 interview)
- Investor relations employee (1 interview)
- Accounting advisory firm senior manager (1 interview)
- Accounting advisory firm manager (1 interview)

Table 2.2 – Main issues covered during the interviews

- Main steps in the Company's journey towards integrated reporting
- Actors involved in the process of IR preparation
- Role of and interaction across offices/departments involved in the process of IR preparation
- The Company's IC-related activities and initiatives
- Definition(s) and classification(s) of IC shared within the Company
- The Company's efforts visualising and evaluating IC
- Role of IR in emphasising the Company's IC elements
- Details of internal discussions on what, how and where IC-related information should be disclosed within the IR
- IC valuation processes within the IR context
- Role of the IR preparation process in promoting changes in the definition and valuation of IC across time
- Organisational effects of IR preparation

In analysing the interviews, we ensured traceability throughout the subsequent analysis to mitigate any concerns about methodological rigour or the subjectivity of such analyses. We began by identifying key patterns related to the issues mentioned in Table 2.2. The authors separately analysed the interviews and then discussed (and shared perspectives on) major insights arising from the analysis. No substantially different interpretations among the authors arose and the additional interviews to members of the accounting advisory firm confirmed what highlighted by the Company's staff in the preview round of interviews. We proceeded to relate our insights to each of the three questions outlined by Mouritsen (2006).

To ensure confidentiality, both the Company and the interviewees will remain anonymous. Each department is described by referring to its function within the Company, without revealing its name. The confidentiality policy prevents any direct citations of interviews or assigning specific information to any particular job role (i.e. no disclosure of 'who said what'). These stringent confidentiality rules might seem like a limitation, but they ensured that the interviewees would talk freely.

The interview analysis was preceded by an examination of all the IRs prepared by the Company (2012-2016), a pair of financial reports published prior to the shift to IR (2010-2011), the sustainability reports (2011-2016), the corporate documents tracing the Company's shift towards integrated reporting and the publicly available sources that document the Company's IC-related initiatives. This document

analysis helped us gain a preliminary understanding of the 'mobilisation' of IC within the IRs. We also participated in public workshops in which Company representatives discussed their journey towards integrated reporting.

2.4 Findings

2.4.1 How does IC work in the company?

The definition of IC relates to the way IC works within a company. It requires an ongoing attempt to understand how IC is mobilised. In the company under investigation, the pervasive role of IC in the development of business activities was well acknowledged long before the adoption of integrated reporting. Nevertheless, in the aftermath of the adoption of integrated reporting, the preparers struggle to offer a complete representation of how IC is embedded in the organisation's activities.

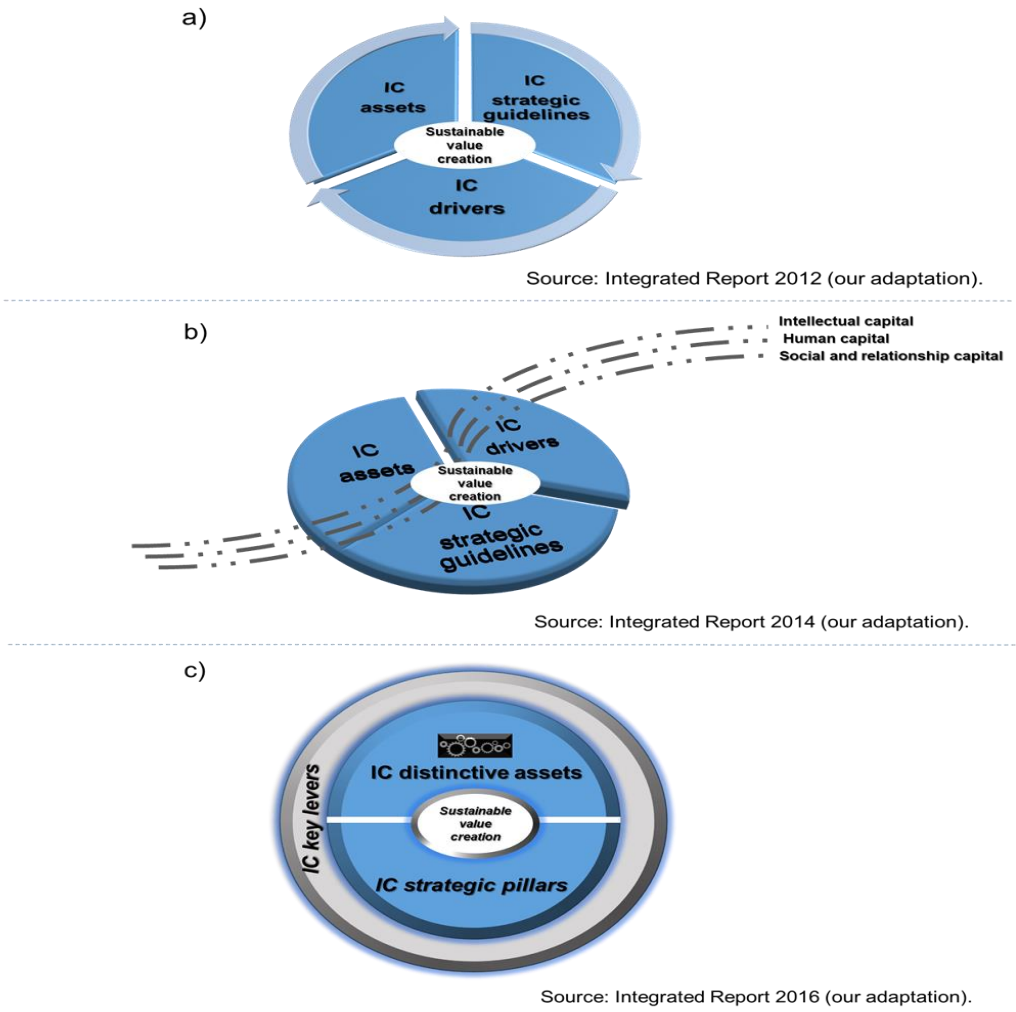
In supporting the adoption of integrated reporting, the chief executive officer (CEO) identified the financial reporting department as the responsible for the IR preparation process. However, the sustainability department was the first to propose the adoption of integrated reporting. The sustainability department conceived of IC in relation to the safeguarding and protection of the natural environment and social context. In particular, it stressed that the IR shall disclose that the Company places social and environmental sustainability at the core of its value creation process by leveraging IC. The financial reporting department highlighted the need for the IR to demonstrate the contribution of IC to financial sustainability, the third pillar of the Company's value creation process.

When integrated reporting was first adopted, the financial reporting department and the sustainability department established an early IR working group. Later, the financial reporting department involved two other departments in the working group – the investor relations department and the risk management department. The aim of the group was to develop a wider understanding of how IC works in the Company to create sustainable value. To this end, the financial reporting department gathered contributions and mediated positions among the Company's various 'souls'. Such diverse actors shaped the IC definition according to their

competencies, skills and focus on value creation. For their first decision, they agreed that the BM representation was the most suitable tool for depicting how IC performs within the Company. This representation involved the CEO, who interacted with the preparers to verify that the BM sketch effectively showed the corporate commitment to sustainable value creation communicated in public meetings and roundtables. The financial reporting department also required the support of an accounting advisory firm.

Even though the Company operates in the oil and gas industry, the preparers maintained that IC is critical to value creation. They argued that the representation of the performance of IC should not neglect the Company's business approach, which includes an emphasis on financial, social and environmental sustainability. The preparers agreed that sustainable value creation must be at the core of the corporate BM representation and engaged in many discussions to determine how IC should be displayed within this representation.

Figure 2.1 – The 'IC definition' within the BM sketch.



The BM sketches reported in Figure 2.1 depict the three stages in the BM representation and the role contingently assigned to IC in support of the BM.[5] The first stage encompassed the earliest IR preparation in 2012. The financial reporting department suggested the IR refer to assets, strategic guidelines and drivers as 'building blocks' to represent how IC performs in the Company. The risk management department immediately agreed with this idea and noted that an IC definition that considers IC's ability to perform as assets, strategic guidelines and drivers allows us to associate specific risks with IC and, accordingly, to capture the

[5] For Figures 2.1-2.4, the authors relied mainly on the preparation process of the 2012-2016 annual IRs and rearranged the Company's representation of the BMs to safeguard its anonymity.

potential effects of such risks on IC contribution to sustainable value creation. The sustainability department pushed to place sustainable value creation at the heart of the BM representation because the way IC performs in the Company is rooted in sustainability. To overcome the challenge of consistently applying the IIRC Framework, the financial reporting department also asked for the support of an accounting advisory firm. As a result of interactions between internal and external actors, the financial reporting department created the BM representation reported in Figure 2.1a. In this sketch, IC is defined as: assets, that is, resources on which the Company depends for its operations; strategic guidelines, that is, principles regarding the strategic course of action; and drivers, that is, critical capabilities enacting resources. Assets, strategic guidelines and drivers are displayed in a flat (i.e. one-level), circular and dynamic model with sustainable value creation at the core. The model is flat and circular to recognise that IC assets, strategic guidelines and drivers assume the same importance in the value creation process. The model is dynamic: arrows link the IC 'building blocks', introducing causality effects. More precisely, the model displays ongoing movement in which IC assets allow the pursuit of IC strategic guidelines, which in turn leverage IC drivers to develop new IC assets. IR preparers did not identify a start or end point in the model, underlining that each IC asset, strategic guideline and driver may continuously contribute to the process of sustainable value creation.

In the second stage (Figure 2.1b), the IC definition evolved through internal reasoning and interactions with external actors. Within the Company, the first BM representation stimulated further reflection, especially with reference to the causal processes between assets and strategic guidelines, between strategic guidelines and drivers and between drivers and assets. The financial reporting department, together with the sustainability and investor relations departments, decided to remove the arrows from the BM representation, maintaining the dynamic element of the representation by using a sloped board. After careful thought regarding the previous BM representation, the preparers decided upon a BM sketch in which the IC drivers were between the IC strategic guidelines and the IC assets. They also decided to transpose IC drivers and strategic guidelines.

Dialogue and benchmarking with peers further supported the evolution of the IC definition through the BM representation. The sustainability department and the investor relations department engaged in meetings and roundtables with peers participating in IIRC business networks. The financial reporting department undertook a benchmark activity using the IR Examples Database. Despite the different paths followed, all the preparers embraced the idea of a change aimed at emphasising the multiple capitals highlighted by the IIRC Framework. In 2014, the BM representation again showed IC to comprise assets, drivers and strategic guidelines. Added to this were the multiple capitals mobilised on behalf of IC, that is (social and) relationship, human and intellectual capitals. To preserve and further underline the dynamism of the BM sketch, the financial reporting department suggested that each of the capitals mobilised on behalf of IC be represented as a wave crossing the sloping board. This was to emphasise how IC prompts cascade effects in sustainable value creation by activating (social and) relationship, human and intellectual capitals in assets, drivers and strategic guidelines.

The third stage (Figure 2.1c) encompassed the 2016 IR. In this stage, the investor relations department promoted a significant revolution in the IC definition. The previous BM representation did not fully convince this department because the three capitals of the IIRC Framework provided a silo representation of IC operation far from the Company feeling and *modus operandi*, which was perceived to be much more unitary (see Section 2.4.2). The financial reporting department took up this challenge by proposing a wider reframing of the IC definition in the BM representation. The preparers stratified the BM representation using two layers enclosed in a wider circle and renamed the 'building blocks' as key levers, distinctive assets and strategic pillars. This change in wording aimed to provide a more vivid IC definition. Assets were characterised as 'distinctive', that is, able to make a difference in the value creation process. The change from strategic 'guidelines' to 'pillars' brought the IC definition to the higher level of a mainstay and avoided any reference to something which might be perceived as technical, such as a guideline. Drivers are changed with key levers to additionally stress the ability of IC to enact value for the Company. The three 'building blocks' were now displayed so that IC key levers constituted the basis for both the development of IC

distinctive assets and the pursuit of IC strategic pillars (see Section 2.4.2 for further implications of these changes). Sustainable value creation remained at the core of the BM representation.

2.4.2 What is IC composed of?

IC classification relates to the identification of those elements that mobilise IC within a company. In the Company, the preparers had felt IC classification was a crucial issue since the early phases of the adoption of integrated reporting. For instance, the sustainability department stressed the difficulty of identifying and systematising those IC elements that were pivotal in conducting business activities from an environmental and social perspective (e.g. safety, innovation and alliances) in the BM representation. The financial reporting department took part in European working groups and meetings with IIRC representatives. The aim was to engage in constructive dialogues with other IR preparers and learn from their experiences before any attempt at internal classification. Because of these meetings, the financial reporting department understood the opportunity of reasoning by considering that the IIRC Framework conceive IC as also comprising 'human', 'structural' and 'relational' capitals (i.e. a wider conceptualization of IC). Once it shared the inputs grasped from external interactions with other IR preparers, the financial reporting department coordinated discussions within the company's IR working group. It mediated between the positions of the sustainability department and the investor relations department regarding the opportunity of citing some IC elements. For example, the sustainability department proposed to list every initiative undertaken by the Company to support the population in host countries. Conversely, the investor relations department maintained that listing every single initiative would not allow investors focusing on what they consider more relevant. In the end, the financial reporting department mediated between the two departments by proposing to insert a general reference to cooperation with host populations in the IR and provide further details in the sustainability report.

The preparation of the BM representation strongly influenced IC classification because it offered the most suitable outlet in which the preparers could detail the elements that compose IC in the Company. IC classification draws on the IC

‘building blocks’ that organise the IC elements by referring to corporate resources, critical capabilities and strategic principles. Unlike the IC definition, it remains quite stable in the BM representation until the 2014 IR and changes within the 2016 IR (Figure 2.2).

In the first stage, that encompassed the 2012 IR (Figure 2.2a), the preparers identified IC elements by asking themselves: ‘*What are the Company's* assets *for creating sustainable value?*’, ‘*What are the Company's* strategic guidelines *to deploy and develop assets?*’ and ‘*What are the Company's* drivers *of sustainable value creation?*’. They addressed the above questions to analytically detail and frame IC elements related to assets, strategic guidelines and drivers. Among assets, the preparers listed elements such as competitive resources, giant projects, customer loyalty, potential exploration portfolio and brand. Excepting the Company brand, these elements are intangible resources that the Company holds, which cannot be included in the balance sheet. Among strategic guidelines, they indicated elements such as partnership, operatorship and focus on core areas and customers, identifying some relational and operational principles that outlined the future corporate strategy. Finally, the IR preparers listed elements such as cooperation, excellence, innovation, inclusiveness and responsibility as IC drivers. They included critical factors that mobilise IC towards sustainable value creation. Graphically, IC elements were reported in a bullet point list – one point for each IC element – in dedicated frames stemming from the BM representation.

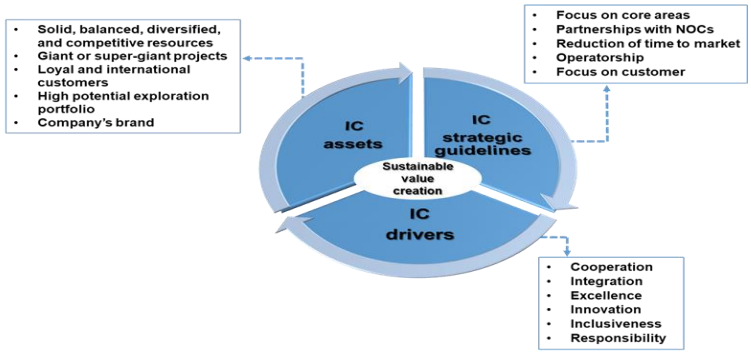
In the second stage (Figure 2.2b), which encompassed the 2014 IR, the IC classification remained the same, excepting the distinction among human, intellectual and social and relationships capitals (i.e. a wider conceptualization of IC). Even though the preparers engaged in a difficult debate regarding the previous BM, they agreed to retain the IC element classification in terms of assets, drivers and strategic guidelines.

In the third stage (Figure 2.2c), which encompassed the 2016 IR, the investor relations department advocated a substantial change in IC classification. First, following external IR users’ feedback (from investors and financial analysts), the investor relations department highlighted that distinction by capital was providing a disconnected view of the Company’s operating mode. The sustainability

department agreed and noted that, for instance, the same IC element (e.g. cooperation) could be classified as more than one IR capital (e.g. human and social and relationship capitals). In consequence of the critique regarding the silo representation of IC in the previous sketch, the distinction by capital was removed. Second, the change in IC classification was stimulated by the revolution in IC definition in the BM representation, that was now organised according to key levers, strategic pillars and distinctive assets. IC key levers were identified as the cooperation and development model, the strategy of decarbonisation and the operating model. Some similarities existed between IC key levers and IC drivers listed in previous stages. However, the bullet points were reduced to focus only on the factors most crucial for sustainable value creation, that is, 'key' levers. IC strategic pillars were classified as restructuring, transformation and efficient and valuable growth, showing that the future course of action is concentrated on these three mainstays.

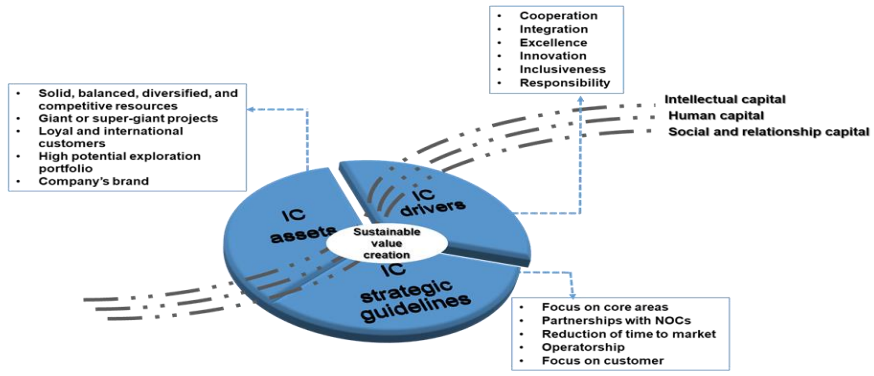
Figure 2.2 – The 'IC classification' within the BM sketch.

a)



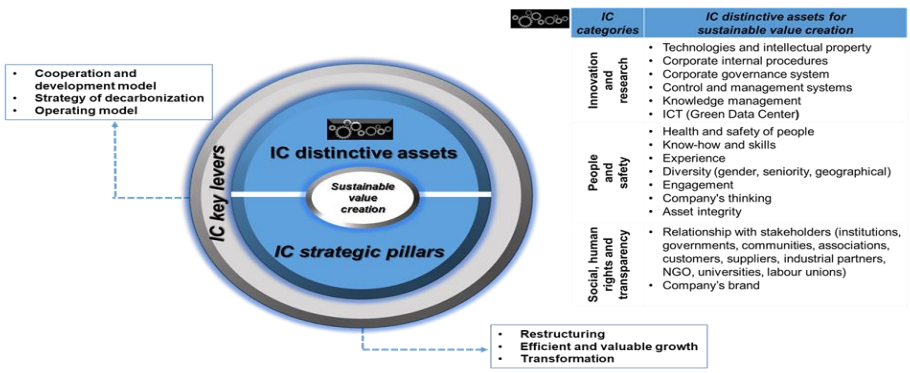
Source: Integrated Report 2012 (our adaptation).

b)



Source: Integrated Report 2014 (our adaptation).

c)



Source: Integrated Report 2016 (our adaptation).

While the identification of the elements that compose IC key levers and strategic pillars had the same degree of detail, the identification of the elements that compose IC distinctive assets went deeper. In particular, the preparers organised IC distinctive assets according to three 'IC categories': innovation and research; people and safety; and social, human rights and transparency. The *innovation and research* category concerned the development and protection of technology and

intellectual property, internal procedures at different levels and knowledge management in general. The *people and safety* category involved the improvement of internal competencies and external engagement and the Company commitment towards the wellbeing of corporate people and external communities. The *social, human rights and transparency* category mainly regarded different relationships (e.g. contractual and those involving duties or trust) that include the Company and its stakeholders. Combined with a transformation of IR preparers' problematisation of IC, existing sketches of IC classification stimulated more synthetic and focused representations of strategic pillars and key levers, while encouraging more detailed descriptions of distinctive assets. Moreover, 'IC categories' were added to classify distinctive assets in a more insightful and strategic way.

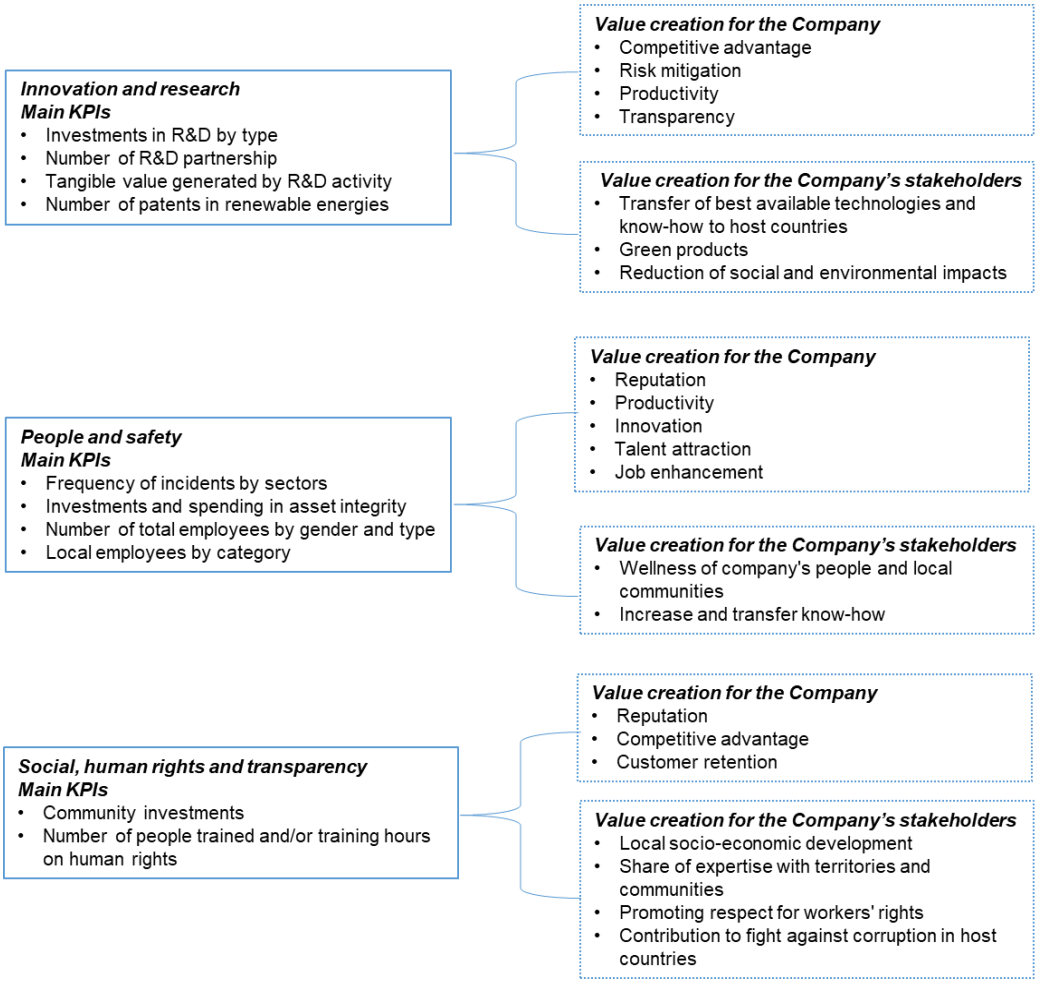
2.4.3 How is IC related to value?

IC valuation refers to the contribution of IC to value creation. In the Company, IR preparers considered IC valuation to be another 'existential question' because the construction of the Company's value creation story was the main purpose of preparing the IR and because of the complex, critical and mostly indirect links between IC and value creation within their business reality. IR preparers have been dealing with the challenge of representing how IC is related to value since the adoption of integrated reporting and offered a first representation only in the 2016 IR. Since the early phases of the adoption of integrated reporting, the financial reporting department and the sustainability department have been addressing the strong, yet often complex, association between IC and financial, social and environmental sustainability. Both the financial reporting department and the investor relations department undertook consistent benchmarking using the IRs issued by peers and participating in external meetings. The financial reporting department attended meetings with IIRC representatives to better understand the principles and tools for explaining the value creation process. Internal discussions and the suggestions of the accounting advisory firm finally lead IR preparers to shelve doubts and hesitations in 2016. They opted for including representations showing how IC related to sustainable value creation in the IR. The preparers realised that the valuation of the sustainable value created by IC could be

represented through the KPIs matrix (Figure 2.3) and the connectivity map (Figure 2.4).

The 'IC categories' that were previously identified to classify distinctive assets within the BM sketch (i.e. innovation and research, people and safety and social, human rights and transparency – see Figure 2.2) informed the construction of the *KPIs matrix* (Figure 2.3).

Figure 2.3 – The IC contribution to value within the KPIs matrix.



Source: Integrated Report 2016 (our adaptation).

For each IC category, several KPIs were selected, showing how the Company regards, analyses and measures IC in the process of value creation. For instance, within the category of innovation and research, the investments made in R&D and the number of R&D partnerships in place were collected. Within the people and safety category, reference was made to the frequency of incidents by sectors of

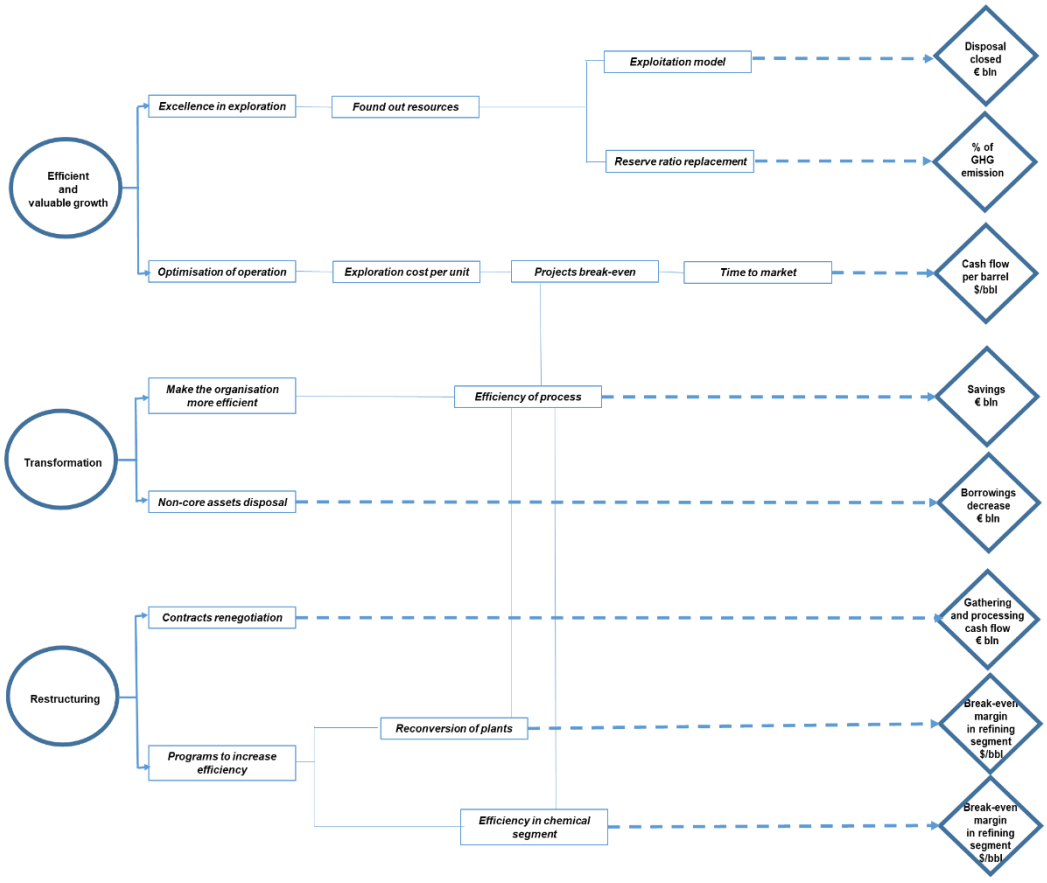
activity and employees (local, by gender and type). Training programs on human rights and community investments were cited as part of the social, human rights and transparency category. For each IC category, the KPIs matrix highlighted how IC develops value by disentangling value brought to the Company itself and value brought to its stakeholders. The concept of value embraced at the core of the BM representation was meant as financial, social and environmental sustainable value creation. For instance, investments in R&D (e.g. to develop green products) were expected to produce benefits for the Company itself, in terms of competitive advantage and risk mitigation, and for the Company's stakeholders, in terms of a reduction of environmental and social effects. Attention towards local employees of different genders was assumed to attract new talent, to the benefit of the Company, and to increase the wellbeing of the Company's people and local communities, providing value to the stakeholders. Training provided to workers could result in a competitive advantage for the Company and local social and economic development in a broad sense, that is, value for the Company's stakeholders.

No numbers, ratios or values were reported in the KPIs matrix, which basically acts as a way to communicate crucial indicators to understand value creation in the Company. By following the IC categories, the preparers linked the KPIs matrix to the BM, aiming to show how the corporate management of IC distinctive assets created sustainable value. In constructing the KPIs matrix, they followed an all-encompassing approach, inserting key indicators of sustainability into the corporate strategy (e.g. frequency of incidents by sector). The financial reporting department and the sustainability department took part in an internal project aimed at increasing awareness within the Company of the strategic sustainability indicators that the CEO was communicating externally in roadmaps and at other events.

The *connectivity map* (Figure 2.4) offered a different message. IR preparers linked the IC strategic pillars indicated in the BM representation to the corporate performance of 2016. The latter was measured by referring to the KPIs matrix and selecting the most suitable indicators to portray the sustainable value created. These indicators included numbers, ratios, financial outcomes and social and environmental results.

The IC key levers acted as mediators between the IC strategic pillars and corporate performance. For instance, the strategic pillar of restructuring enabled improvement of the break-even margin in the refining sector by means of specific programs developed to increase efficiency, including the reconversion of plants and programs to increase efficiency in the chemical sector. The reconversion of plants increased efficiency, leading to cost savings, an output stemming from the strategic pillars of restructuring and transformation. Moving from financial to environmental outcomes, efficient and valuable growth was realised through excellence in exploration (e.g. by discovering resources) and lead to a reduction of gas emissions.

Figure 2.4 – The IC contribution to value within the connectivity map.



Source: Integrated Report 2016 (our adaptation).

As a result of internal reasoning and feedback from external actors, IR preparers crafted a connectivity map to explain IC contribution to value creation. From benchmarking with peers and participating in meetings with IIRC representatives, the financial reporting department came to understand that the Company IRs (2012–

2014) lacked connectivity, which was recommended by the IIRC Framework. The investor relations department reported comments from users, who criticised the Company IR for the lack of links between the IC KPIs and the overall financial performance. The IR preparers leveraged the IIRC principle of connectivity to highlight the contribution of IC to value creation. In other words, the principle was converted into a tool for reasoning about and representing IC contribution to value creation. Discussions involving all IR preparers explored the multiple relations that mobilise IC to achieve corporate performance. In depicting these relations, the connectivity map called attention to the IC elements defined and classified in the BM sketch. However, some compromises were needed and some links were not reported in the IR for the sake of more conciseness. For instance, the map obscured the fact that 'reconversion of plants' was possible because of optimal relationships with labour unions and local associations in the territories affected by the reconversions. Similarly, the connectivity map did not show that 'efficiency of process' was achieved because of the corporate safety program that enabled a drop in annual injuries by involving all corporate people in initiatives aimed at increasing awareness of health and safety issues. After a talk between the financial reporting department and the sustainability department, they decided to detail such issues and results in the sustainability report.

Regarding IC valuing, the corporate safety program is emblematic of the challenges undertaken by IR preparers in telling the value creation story of the Company. At the time of the IR first adoption, the sustainability department proposed to quantify the effects of the corporate safety program (e.g. higher presence of personnel at work instead of ill or injured) in terms of avoided accidents, reduced training expenses and increased productivity. This department suggested referring to available data sources and evaluations delivered by external experts. Although some other departments initially supported this proposal, the financial reporting department pointed out that the assumptions needed to quantify the avoided costs and the expected benefits were neither based on a rigorous methodology or properly reflective of the business reality. The preparers acknowledged that the quantification of the effects (i.e. benefits and costs) of the corporate safety program through accounting systems was unfeasible at this stage.

They believed that a precise quantification of benefits delivered by IC was a goal to be pursued through a dialogue with peers who share the same problem. However, concrete outcomes are still under scrutiny. The financial reporting department argued that the quantification of IC in terms of its contribution to value creation is a goal and a forthcoming challenge.

2.5 Discussion

The present study aims to explore how companies deal with IC definition, classification and valuation in the context of integrated reporting. The findings that emerged from the analysis of an integrated reporting pioneer show that these processes stimulate ongoing interaction and discussions among various organisational departments from the time of the adoption of integrated reporting and in the following years. While the IR preparation process were coordinated by the department responsible for this process (i.e. the financial reporting department), some departments that were not directly involved in preparing the IR (i.e. the sustainability department, the risk management department and the investor relations department) participated in working groups and meetings to define, classify and value IC. They helped highlight the connections between IC and the concept of value creation embraced by the Company and shared feedback from and information needs of IR users. Further, external actors, such as the company's peers, IIRC representatives and the company's accounting advisors, offered comments and suggestions that were considered in the process of IR preparation. According to a performative approach to IC (Mouritsen, 2006), the findings showed that IC definition, classification and valuation are not definable *ex ante* or stable: they are the results of how diverse actors interact and engage with IC elements.

In defining, classifying and valuing IC, the preparers created sketches, matrixes and maps inspired by the IIRC Framework. These models helped organisational actors discuss and converge on a common interpretation of IC meaning and role. In other words, these models acted as 'inscriptions' that made the IC world 'accessible' and 'amenable to intervention' for organisational actors (Mouritsen,

2006). These models, which were eventually displayed in the IR, also helped develop narratives of IC nature, composition and achievements (Mouritsen, 2006).

IC definition and *IC classification* particularly benefited from discussions about the 'best way' to represent the Company's BM, which constituted a very important 'content element' in the eyes of the IIRC Framework and the Company. IC constituted the 'building blocks' of the BM that were helpful for creating 'sustainable value'. The definition of IC emerged as mutable and malleable, evolving through IR preparation over the years. 'Assets' became 'distinctive assets'. 'Strategic guidelines' became 'strategic pillars'. 'Drivers' became 'key levers'. Further, the IC definition was modified in terms of how the three 'building blocks' were connected and influenced each other. A different classification of the IC elements followed the change in the label of the IC 'building blocks'.

IC valuation emerged as a very complex process, as evidenced by long discussions, complicated reasoning and difficult attempts to quantify the IC contribution to 'sustainable value creation'. At the time of writing, the preparers are still trying to define the 'best way' to quantify the effect of IC on value creation, although they have benefited from consultations with an accounting advisory firm and benchmarking activities with peers. They developed a KPIs matrix and a connectivity map that helped them discuss and visualise how the IC 'building blocks' contribute to 'sustainable value creation'. The KPIs matrix defines a link between IC distinctive assets, creating value for both the company and the stakeholders. Within this matrix, the concept of value creation is inflected in terms of *social* and *environmental* sustainability performance. The connectivity matrix forges a link between IC strategic pillars and the company *financial* sustainability performance, mediated by the IC key levers. Together, these tools contribute to diverse narratives of the IC role in creating 'sustainable value'. This highlights the impossibility of converging on a single, stable quantification of the effect of IC on value creation and the role of IC narratives in overcoming the limits of valuations (Abeysekera, 2013).

The findings confirm the idea that IR may stimulate preparers to engage with IC while defining the organisation's value creation story (Abhayawansa, 2014; Dumay, 2016; Feng et al., 2017; de Villiers and Sharma, 2018). They also

demonstrate that in the IR preparation process, IC is meant to include not only the intangibles that the IIRC defines as IC, but also the human and the relationship capitals depicted by the WICI Intangibles Reporting Framework. In the case study company, the IIRC Framework's invitation to engage with BM representations, KPIs and the connectivity principle particularly stimulated reasoning on IC and its contribution to value creation. The BM content element and the connectivity principle acted as reference points for corporate external reporting (Melloni, 2015; Feng et al., 2017) and favoured the development of inscriptions, which in turn facilitated brainstorming on the IC role and value.

The ability of these inscriptions to make organisational members act on IC definitions, classifications and valuations highlights the 'agency' of these tools in the process of IC becoming. In other words, the findings show that the performativity of IC strongly relies on how these 'inscriptions' make IC amenable to reasoning, discussion and intervention for organisational actors. In this respect, the findings suggest the possibility to incorporate into Mouritsen's (2006) performative approach a more nuanced investigation of how these 'non-human actants make humans act' (Boedker, 2010; p. 601). As depicted within accounting-strategy research (Boedker, 2010), this enhancement would deserve a greater engagement with the Latourian concept of 'agency' and its application to 'non-human actors' (Latour, 1986, 2005).

By highlighting the role of diverse actors in moulding IC definition, classification and measurement, the present research enhances our understanding of the processes behind IC measurement and reporting. While prior research has highlighted the active role of some specific actors in the process of measuring IC (e.g. the controller and the interventionist researcher in the case analysed by Chiucchi (2013)), the present study shows that, in the integrated reporting context, this process involves several actors, some of whom belong to departments not directly involved in the reporting process. This finding encourages investigation of how IC is 'performed' beyond the departments traditionally involved in measuring or reporting IC, and the role of external consultants in this process (Veltri and Bronzetti, 2015). While Chiucchi and Montemari (2016) highlighted the disputes behind the scores of IC measures, the present research shows that when discussions

arise about IC value, the construction of a connectivity map and a KPIs matrix may help define how IC contributes to value creation. In this respect, the present research also confirms the role of visual tools in mobilising IC (Bukh et al., 2001; Mouritsen et al., 2001; Marr et al., 2004) and accommodating organisational conflicts and contradictions (Yu et al., 2017). It also calls for further investigation of how these tools may be mobilised to mould IC narratives (Dumay and Rooney, 2011) and to tell the organisation's value creation story within the IR (de Villiers and Sharma, 2018; Lai et al., 2018).

2.6 Conclusion

In the case study company, IC was thought to play a central role in creating value. This prompted IR preparers to address IC definition, classification and valuation while moulding the value creation story. Specific visual tools inspired by the IIRC Framework (i.e. the business model sketch, the KPIs matrix and the connectivity map) were forged to represent IC within the annual IR. These tools helped disclose IC and stimulated ongoing interaction and discussions among organisational actors. Actors from departments that were not directly involved in preparing the IR (i.e. the sustainability, risk management and investor relations departments) actively participated to define, classify and evaluate IC in relation to the company's value creation story told in the IR. The suggestions and comments of external actors, such as the company's peers, IIRC representatives and the company's accounting advisors were also considered. This resulted in an ongoing, malleable refinement of IC meaning and role within the IR preparation process.

This paper contributes to IC research in several ways. To the best of the authors' knowledge, this paper pioneers the adoption of a performative approach to the empirical investigation of the performativity of IC in the process of IR preparation. By detailing how organisational actors directly or indirectly involved in IR preparation problematise and engage with IC, the paper enriches the scant research that examines the performativity of IC (Abhayawansa et al., 2018). It also answers the call for more research on how IC affects the management of organisations (e.g. Catasús and Gröjer, 2006; Catasús et al., 2007; Giuliani and Marasca, 2011;

Chiucchi, 2013; Chiucchi and Montemari, 2016; Giuliani 2016; Giuliani et al., 2016) by showing that the IR preparation process may have a prominent effect on how IC is 'performed' within an organisation.

The paper also contributes to the emerging debate on IR and the future of IC reporting (Dumay, 2016; Zambon ,2016; Feng et al., 2017; de Villiers and Sharma, 2018). It shows that IR may put IC at the centre of an organisation's value creation story, stimulating brainstorming and reasoning about IC. The paper demonstrates that the BM content element and the connectivity principle established by the IIRC Framework offer preparers useful reference points for developing IC narratives within an IR, particularly when the quantification of IC is disputed. This suggests the IIRC should consider further collaboration with WICI to offer preparers more detailed guidelines for representing and narrating IC within IR.

Finally, the research theoretically advances Mouritsen's (2006) framework by testing this framework in a new setting – integrated reporting. It also suggests possibilities for a refinement that may help the development of a subtler investigation and interpretation of the 'agency' of 'non-human actors' (Latour, 1986, 2005; Boedker, 2010).

To conclude, the study had some limitations, which provide avenues for further research. First, the research focused on Mouritsen's (2006) performative approach to IC, deliberately omitting the ostensive approach. Future research could adopt both approaches and compare the resulting interpretations. Second, the interview process focused on organisational actors who were directly or indirectly involved in the IR preparation process. The authors decided to focus on preparers' perspectives, excluding users' views. Further research could explore regulator perceptions of IR and IC or focus on users' understanding of IC value creation. Third, the research focused on how IC is mobilised within integrated reporting. Further research could compare the mobilisation of IC in integrated reporting with that in sustainability reporting.

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3. The epistemic authority of Big Data in integrated reporting: an exploratory study from the banking industry

Abstract

Integrated reporting is a new approach to corporate reporting that results in an integrated report (IR). It entails companies to develop a system-based view of corporate information across multiple forms of capital and over the short, medium, and long term. It also requires companies to gather and process a large amount of data. The International Integrated Reporting Council maintains that corporate members may benefit from the rise of Big Data in preparing their IR. Despite the growing debate, the existing literature has mainly adopted a conceptual stance in analysing Big Data in corporate reporting. Conversely, this study adopts an exploratory approach and provides preliminary insights on the extent to which corporate members might rely on Big Data while preparing the IR. It specifically explores Big Data as a source of knowledge in a company operating in the banking industry. The analysis mainly draws on interviews with representatives of departments involved in both the Big Data project and the IR preparation. Under the lens of epistemic authority, the exploratory findings suggest that the authority of Big Data might stem from both the *energy* that the company devotes to exploiting Big Data and the identification of prospective information. They also hint that, while the *self* might play a major role in defining the authority of Big Data, the *context* (i.e. the corporate department) might not influence the acceptance of Big Data as a source of knowledge. This study contributes to the infant empirical literature on Big Data in corporate reporting by focusing on the process of IR preparation. Specifically, it suggests the practical possibilities that may be opened by Big Data in this process (e.g. the construction of performance indicators and/or the development of risk preventing solutions). Thus, its contribution rests on preliminary insights that pave the way to further investigations, which might go deeper in understanding the usability of Big Data in preparing IR.

Keywords Integrated reporting, Big Data, Epistemic authority, Bank

3.1 Introduction

Integrated reporting is a flourishing paradigm aimed at extending the boundaries of traditional reporting (de Villiers et al., 2014; Dumay et al., 2016). It traces a new pattern for corporate reporting and results in a single document, i.e. an

integrated report (IR), which provides a holistic portrayal of the corporate process of value creation (IIRC, 2013; de Villiers et al., 2014; Rinaldi et al., 2018). The IR is drawn up by following the principle-based guidance of the International Integrated Reporting Framework, issued by the International Integrated Reporting Council in 2013 (IIRC, 2013). In particular, IR aims to tell a company's value creation story by combining financial and non-financial information. Its preparation process involves several corporate departments (i.e. IR preparers), each of whom provides a specific piece of the overall company's value creation story. IR preparation requires preparers to develop a system-based view about strategic, operational, performance, and control information across multiple forms of capital and over the short, medium, and long term (Serafeim, 2014; Warren et al., 2015; Al-Htaybat and von Alberti-Alhtaybat, 2017, 2018). Indeed, IR preparation is rooted in an understanding of how a company is performing to create value over time by employing six forms of capital, i.e. financial, manufactured, natural, social and relationship, human and intellectual. In transforming existing reporting practices (Lodhia and Stone, 2017), integrated reporting entails preparers to gather and process a large amount of data to illustrate how their company creates value. In the Guide "*Technology for Integrated Reporting*" (2016), the IIRC urges companies to migrate from the traditional data warehouse to new, combined information architecture able to support the IR preparation process. More specifically, the IIRC advises that, while such migration may be a challenge for them, companies need to deal with it to overcome a situation in which *"information on human, social, intellectual and natural capital is often defined, processed and governed differently to information on financial or manufactured capital"* (IIRC, 2016; p. 15). The IIRC (2018) has also launched "*The <IR> Technology Initiative*" to gather experienced-based information on how new technologies, like Big Data, assist in the adoption of integrated reporting.

Academics and practitioners agree on considering Big Data a valuable alternative to the traditional data warehouse (CGMA, 2013; Oracle, 2016), due to the provision of additional information (Eccles, 2015) and forward-looking perspectives on corporate performance (Al-Htaybat and von Alberti-Alhtaybat, 2017, 2018; Arnaboldi et al., 2017). They remark that Big Data is a pervasive

phenomenon that will support the next generation of corporate reporting by enabling real-time reporting (Serafeim, 2014; Vasarhelyi et al., 2015).

Big Data is mainly defined as the availability of a huge amount of heterogeneous and continuously updated information. It is often characterised through its attributes of Volume, Velocity, Variety, Value, Variability, and Veracity, i.e. the so-called 6Vs model (Lycett, 2013; Hartmann et al., 2014; Gandomi and Haidar, 2015; Gartner, 2017). Although Big Data has already influenced decision-making processes in corporate areas, such as strategy and operations, it has approached financial reporting only in the last few years (Moffit and Vasarhelyi, 2013; Griffin and Wright, 2015). In particular, Big Data is supposed to bring new opportunities to companies and their stakeholders by affecting accounting and corporate reporting (ACCA, 2013, 2017; CGMA, 2013; Griffin and Wright, 2015; Janvrin and Watson, 2017).

According to Boyd and Crawford (2012), Big Data is a "*phenomenon that rests on the interplay of: (1) Technology […] (2) Analysis [*and*] (3) Mythology*" (p. 663). More specifically, they observe that *Technology* concerns the maximisation of the speed through which some instructions are carried out (i.e. computation power) and the accuracy of the algorithms applied to gather and analyse data (i.e. how good they are); therefore, it recalls the 6Vs model comprising Big Data attributes. *Analysis* refers to the identification of patterns which support claims of an economic, social, technical, and/or legal nature; thus, it concerns the possibility to extract (new) knowledge by processing a huge amount of data through the development of new methods. Finally, *Mythology* relates the common belief that a vast pool of data provides true, objective, and accurate knowledge, due to "*insights that were previously impossible*" to generate (Boyd and Crawford, 2012; p. 663).

The existing literature has addressed Big Data in corporate reporting by adopting mainly a conceptual stance (with the notable exceptions of Al-Htaybat and von Alberti-Alhtaybat, 2017; or Avallone et al., 2016, as regards eXtensible Business Reporting Language-XBRL) and from Technology and Mythology viewpoints. Accordingly, prior studies have advanced ideas, observations, and/or opinions about (current and prospective) effects that Big Data may produce on both corporate information and practice. In particular, they have pointed out potential

applications of Big Data (O'Leary, 2013; Warren et al., 2015), transformations fostered by it (Bhimani and Willcocks, 2014; Vasarhelyi et al. 2015), as well as possibilities and difficulties arising from its implementation (Arnaboldi et al., 2017). However, the existing literature has not yet explored Big Data in corporate reporting from an empirical stance or adopted the Analysis viewpoint. In an attempt to fill this gap, the present study adopts an exploratory approach to analyse Big Data as a (novel) source of information within the specific process of IR preparation. It aims to elucidate the process whereby IR preparers (i.e. those involved in the specific process of IR preparation) might count on Big Data while constructing the company's value creation story. The epistemic authority frame (Kruglanski, 1989; Kruglanski et al., 2005) helps explain the effects that a given source of information (i.e. Big Data) has on the construction of knowledge as well as the role that both the *context* and the *self* play in ascribing to such a source a determinative influence on the formation of knowledge. The study examines the case of a company operating in the banking industry, which has issued the IR since 2013 and belongs to a Group promoting a Big Data project. The exploratory analysis suggests that corporate members' ideas about Big Data are mainly influenced by their previous job experiences, while department in which they work and educational background do not play a role.

This study contributes to the infant literature on Big Data in corporate reporting, by focusing on integrated reporting. In particular, it provides preliminary empirical insights on the usability that Big Data might have in the process of IR preparation. It advances the understanding about the possibility of extracting (new) knowledge useful for IR purposes (e.g. to construct performance indicators and/or to prevent risks related to corruption, terrorism, and money-laundering and/or to strengthen the relationship with stakeholders).

The paper proceeds as follows. Section 3.2 provides a review of the existing literature on Big Data in accounting, corporate reporting, and integrated reporting. Section 3.3 sets out the theoretical frame of the study. Section 3.4 introduces the company under study and explains the research methodology. Section 3.5 presents the findings, which are discussed in Section 3.6 concluding by highlighting the main contributions and limitations of the study.

3.2 Prior research

Prior literature offers a plethora of definitions of Big Data. One of the earliest definitions was provided by Russom (2011), who identifies three attributes encompassing Big Data. The first attribute, Volume, concerns the magnitude of data generated, i.e. the size of data and dataset; the second attribute, Velocity, relates to the speed of data creation; the third attribute, Variety, refers to the various forms of data, i.e. structured data (e.g. databases and files), semi-structured data and unstructured data (e.g. audio recordings, images, and videos). In the same vein, Gartner (2017) states that Big Data is "*high-Volume, high-Velocity and high-Variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making*". Further studies have introduced other three attributes: Value, Veracity, and Variability (LaValle et al., 2011; Zikopoulos and Eaton, 2011; Lycett, 2013; Chen and Zhang, 2014; Hartmann et al., 2014; Gandomi and Haidar, 2015). While Value (LaValle et al., 2011; Lycett, 2013) proposes Big Data as an emerging asset that supports in achieving corporate performance, Veracity refers to the quality and accuracy of data that requires companies to adopt rigorous controls for both data sources and data gathered. Finally, Variability concerns the changeable meaning of some data.

Few studies have dealt with Big Data in accounting and corporate reporting. O'Leary (2013) discusses the potential applications of Big Data and advocates the continuous monitoring of accounting information enabling errors and/or potential fraud to be detected and enhancing the quality and validity of that information. He suggests broadening the base of data to include blogs, message boards and other types of information while analysing corporate data *"as a part of continuously monitoring financial information"* (O'Leary, 2013; p. 61). He claims that this inclusion would call for data from a larger than corporate context and multiple sources (e.g. the social media discussions of employees in finance and accounting and employees or anyone who mentions the financial information of a particular company; p. 62); moreover, he notes that Big Data would require the monitoring, integration and analysis of increased volumes of information with diverse structures that are more rapidly generated than before.

In defining accounting as "*the art of recording business operations and reporting these results*", Moffit and Vasarhelyi (2013; p. 9) suggest that accountants, who are responsible for gathering and reporting information, have a crucial role in Big Data. They argue that accountants may benefit from a wide range of data that offers insightful information to measure corporate value rather than financial transactions alone. In particular, they acknowledge accountants as corporate members able to apply new analytic technologies to corporate data allowing data mining and improving *"recording of events, reporting to regulators, and enforcing internal controls*" (p. 9).

Bhimani and Willcocks (2014) note that new technologies accelerate the transformation of corporate information and require the integration of data from several corporate departments. Accordingly, they argue that a combination of a data scientist's and an accountant's mind-set is essential to fully exploit Big Data, since it allows accounting data, information, and knowledge to be brought together. More specifically, they suggest that a data scientist's mind-set assists in both asking specific questions to extract information from the available data and providing information from an understanding of statistical models. They also acknowledge that an accountant's mind-set plays a major role in defining what questions to ask to deal with specific corporate issues due to her/his understanding of the financial flows moved by corporate departments (e.g. research and development, marketing and sales, manufacturing). Bhimani and Willcocks (2014; pp. 486-487) call for "*research focused on issues concerned with […] the panoply of financial reporting and management accounting consequences tied to advances towards Big Data and business analytics activities*". In the same vein, Griffin and Wright (2015) underline that researchers, as inquirers, have a great responsibility in generating evidence about how managers and stakeholders may benefit from Big Data. They also point out that academics, as educators, are required to revisit their curricula to deliver the necessary skills for Big Data into the accounting profession. Similarly, Janvrin and Watson (2017) suggest incorporating Big Data into degree programmes in order to preserve the primary goal of accounting (i.e. to create and provide information to both internal and external decision makers) within companies investing in this new technology.

Warren et al. (2015) maintain that in making new types of data accessible, Big Data changes accounting. They speculate on the implications Big Data will have in management accounting, financial accounting, and financial reporting. They suggest that it may develop management control systems, improve the quality of financial accounting, and support financial reporting transparency. In particular, Warren et al. (2015) point out that financial reporting transparency may be enhanced by non-financial information that can supplement financial report through video, image, audio, and textual data.

Vasarhelyi et al. (2015) criticise the asymmetry between real-time processes supporting companies and the anachronistic aggregations that (quarterly and/or annually) report their performance. They argue that Big Data may lead to real-time reporting and transform traditional financial reporting, by including "*more relevant and graphic disclosure, and support[*ing*] the analysis and provisioning of management, auditor, and stakeholder dashboards*" (p. 385).

Arnaboldi et al. (2017) problematise Big Data as "*revolution or hype*" and recognise three important characteristics "*for exploring and speculating on the accounting-relevant concerns of [B]ig [D*]*ata*" (p. 764): externality, abductivity, and inexhaustibility. Externality concerns the fact that companies do not have full control or ownership of information used by Big Data given that such information is not specifically generated for corporate purpose. Abductivity underlines the role of the data scientist in moulding data (as a resource) through hybrid inductive-deductive reasoning; this characteristic conflicts with the accounting requirement for stable rules and structures. Finally, inexhaustibility refers to the promise of Big Data not to represent a sample, but the whole population.

In focusing on the financial reporting process, Avallone et al. (2016) analyse the effects of the mandatory adoption of XBRL by unlisted Italian companies. They find that while some actors (e.g. financial analysts) have understood the potential of XBRL in terms of savings, others (e.g. auditors) do not see any consequences or problems in integrating this language into their practice. Al-Htaybat and Alberti-Alhtaybat (2017) empirically inspect the impact of Big Data on corporate reporting by interviewing accountant and non-accountant experts. They capture perceptions about the role of accountants in the adoption of Big Data to reshape corporate

reporting and find that accountants serve as gatekeepers of tacit accounting-based knowledge, which prevents corporate reporting based on Big Data from leading to misrepresentation, false information and unfair decision-making. They also identify four paradoxes that emerge from using Big Data in corporate reporting (empowerment versus enslavement; fulfilling versus creating needs; reliability versus timeliness; and simplicity versus complexity) and conclude that Big Data begins a new stage in corporate reporting characterised as dynamic (exchange of information between companies and stakeholders) and prospective. Moreover, Al-Htaybat and Alberti-Alhtaybat (2017; p. 868) acknowledge that "*the prospective element of corporate reporting [*is*] also emphasised by the new integrated reporting development*".

Regarding integrated reporting, few studies (Lodhia and Stone, 2017; Al-Htaybat and Alberti-Alhtaybat, 2018) have emphasised that Big Data and related Internet-based technologies may support IR adopters to develop forward-thinking and prospective (financial and non-financial) planning. For instance, Lodhia and Stone (2017) address the role of Internet-based technologies (e.g. social media) in integrated reporting and define a set of features (e.g. immediacy, language variety, multiple cues, personal source, externally recordable) that link such technologies to the guiding principles of the International Integrated Reporting Framework (IIRC, 2013). Concluding, they note that more research is needed to assess the extent to which Internet-based technologies are employed in integrated reporting processes.

Similarly to integrated reporting, Big Data is considered a new hope for intellectual capital. Some scholars have studied how Big Data may be transformed into corporate value; for instance, La Torre et al. (2018a) argue that intellectual capital highlights some value drivers of Big Data (e.g. data quality and privacy issues) and claim that intellectual capital reporting and measurement help to understand how human competences and skills, as well as corporate procedures and knowledge, make new value from Big Data accessible (or not). Secundo et al. (2017) advise that Big Data and intellectual capital both deal with data, information, knowledge, or intelligence contributing to the creation of intangible assets. In developing a conceptual framework, they indicate four areas of inquiry: "*why*", i.e. motivations, objectives, and opportunities to incorporate Big Data into intellectual

capital strategy and practice; "*what*", i.e. the intangible assets that Big Data creates; "*who*", i.e. stakeholders involved in and impacted by Big Data in intellectual capital practice; and, finally, "*how*", i.e. corporate procedures, approaches, and practices that enable value to be created from Big Data and intellectual capital. Drawing on a socio-economic characterisation of value, La Torre et al. (2018b) analyse the breach of intellectual capital by Big Data and propose Voracity as a further attribute. According to the authors, Voracity represents the dark side of Big Data. It stems from a continuous search for data that pushes companies beyond legal and ethical limits and threatens both intellectual capital and the interests of stakeholders.

As integrated information architecture, Big Data might support IR preparers in dealing with some existing issues of integrated reporting (IIRC, 2016, 2018). For instance, it might enable the identification of new paths into the value creation process, by helping preparers to find new relationships and correlations among specific forms of capital. Further, Big Data might connect corporate members to the information they need, cutting through the organisational silos. The above literature highlights the growing interest in Big Data of both accounting and corporate reporting studies. This interest is also confirmed by several special issues launched by authoritative peer-reviewed journals (e.g. *Accounting, Auditing & Accountability Journal*, *Accounting Forum*, *Critical Perspective on Accounting*, *Meditari Accountancy Research*, *Journal of Intellectual Capital*, and *Journal of Accounting Education*). However, current studies have not yet engaged with members of companies adopting Big Data nor have investigated how such members rely (or will employ) Big Data in their reporting processes. This paper seeks to address this gap by conducting an exploratory analysis on the extent to which corporate members might rely on Big Data while preparing the IR. Thus, it contributes to the literature on Big Data in corporate reporting, by offering preliminary insights focused on the flourishing integrated reporting process.

3.3 Theoretical frame

In his "*Lay Epistemic Theory*", Arie W. Kruglanski (1989) formulates the process of knowledge construction. He refers to knowledge as a set of propositions

in which an individual has a given degree of confidence. Knowledge is not defined once and for all, but it is subject to change. In particular, the social psychologist provides a theoretical basis for explaining the way through which people acquire and construct knowledge about themselves and the surrounding world. He introduces the concept of *epistemic authority* to define the source of information which can strongly influence the process of knowledge construction. Kruglanski et al. (2005; p. 351) explain that epistemic authority "*addresses the extent to which an individual is prepared to rely on a source's information and to accept it*". Accordingly, epistemic authority acts as a source of information with which an individual may put trust in her/his attempt to acquire knowledge on different topics.

To serve as epistemic authority, a source of information should possess general or specific characteristics. An epistemic authority may be based on a general feature of the source (e.g. appearance in print of a book or a newspaper) or a specific feature of the source (e.g. considering a particular newspaper reliable). Assigning this authority may be simultaneously influenced by informational and motivational factors that lead an individual to construct knowledge. Therefore, like knowledge, the authority of a given source is not established once and for all, but changes over time and/or in relation to a specific topic.

Kruglanski et al. (2005) maintain that epistemic authority is a construct that helps clarify the effects of a given source of information in the construction of knowledge; such effects might be so powerful as to influence both the individual's judgments and her/his behaviour. In particular, Kruglanski et al. (2005) explain that the effects of epistemic authority on information processing can be summarised in three phases. The first phase refers to *assessment of sources of information* and concerns the development of the individual's ideas and/or opinions about whom to rely on (or trust) with respect to what and when. The second phase relates to the *identification of epistemic authority for making sense of information given* and focuses on the informational and motivational factors that lead an individual to draw on a source of information and frame the information given. The third, and last, phase consists of the *acceptance of knowledge constructed* and leads an individual to behave and take decisions consistently with the recommendation provided by a source. Kruglanski et al. (2005) underline that to advance from one

phase to another, the *energy* (e.g. time, efforts and resources) that an individual is willing to devote in continuing the epistemic activity is crucial. Moreover, they argue that both the *context* and the *self* have a role in recognising the authority of a source of information. In other words, the realm of interest (e.g. education, politic, or economic context) and the individual's beliefs and background are involved in the assignment of epistemic authority, since both influence the individual while assessing the reliability and credibility of a source of information. In this exploratory study, what is meant by *context* is the set of circumstances in which interviewees work (i.e. the department in which they work); whereas what is meant by *self* is the interviewee's educational background and previous job experience.

Big Data has fostered a deep change at the level of epistemology (Boyd and Crawford, 2012). More specifically, it has created new ways to process a huge amount of information and has required new approaches to engage with information. Given such changes, epistemic authority provides an insightful lens for addressing how "*Big Data reframes key questions about the constitution of knowledge* [and] *stakes out new […] methods of knowing*" (Boyd and Crawford, 2012; p. 665).

For the purpose of this study, epistemic authority is expanded from the socio-psychological domain and applied to the specific IR preparation process. It allows to elucidate the extent to which corporate members directly or indirectly involved in IR preparation (i.e. IR preparers) might rely on Big Data as a (new) source of information and knowledge concerning the corporate value creation process.

3.4 Methodology

This study adopts an exploratory approach (Schutt, 2011) in investigating Big Data within a practical setting, i.e. the IR preparation process. Such an approach "*tends to tackle new problems on which little or no previous research has been done*" (Brown, 2006; p. 43) and addresses "*phenomena without explicit expectations*", so catching 'what is going on here?' (Schutt, 2011; p.13). In this study, the exploratory approach helps gain knowledge and understanding of the

extent to which IR preparers might rely on Big Data, as a source of information, while constructing their report.

A purposive sampling procedure (Saunders et al., 2009) of companies operating in the Italian banking industry is undertaken to identify a company that both issues IR (according to the Integrated Reporting Examples Database) and adopts Big Data. The banking industry is chosen for two main reasons. First, it pioneered Big Data (Brown et al., 2011a; Brown et al., 2011b; McAfee et al., 2012; IBM Institute for Business Value, 2013) under the pressure of some operating factors (e.g. rapid data growth, regulation, fraud detection, and marketing analytics; Deutsche Bank, 2014; Datameer, 2016; Capco, 2016, 2017). Thus, it is expected to have already mastered the recent advent of Big Data in corporate reporting. Second, banking managers recognise the critical role that Big Data plays in achieving successful performance (Deutsche Bank, 2014), given that their industry is at the forefront of data generation and storage (e.g. video, image, audio and text/numbers; Brown et al., 2011a). Moreover, a focus on the Italian banking industry provides an analysis of an underexplored setting in both integrated reporting and Big Data studies.

From the purposive sampling procedure, three companies are identified. The company under investigation (or the Bank) is selected as being the first IR adopter among the companies identified. It operates in seven different countries and is a sub-holding specialised in the provision of financial advisory services. The Bank has issued annual IRs since 2013 and belongs to a Group promoting the Big Data project. Therefore, interviews were conducted at both the Bank and Group levels.

Table 3.1 – Interviewees

• Bank financial reporting officer and corporate social responsibility manager (2 interviews)
• Bank data office manager (1 interview)
• Group data scientist manager (1 interview)
• Group data evolution manager (1 interview)
• Group data officer (1 interview)

As shown in Table 3.1, six semi-structured interviews were carried out with members who have worked for the Bank or the Group for periods ranging from three to twenty-five years. Specifically, interviewees are employed in three different departments: financial reporting (i.e. the department that coordinates IR

preparation in the Bank), data evolution and data office (i.e. two departments involved in the Big Data project at the Group and Bank levels, respectively). The interviews were conducted between January and July 2018 and lasted about sixty minutes on average. During the interviews, the effort was to understand the process of IR preparation and how corporate members consider Big Data as a source of information for integrated reporting purposes. Albeit far from the average number of twenty-six interviews recommended by Dai et al. (2019), six interviews (at the time of the study) appeared to achieve the sense of saturation regarding the aim of this (narrow) analysis.

Bank confidentiality policy prevents any direct quotations from interviews. Accordingly, interviewees remain anonymous and departments are described by referring to their functions within the Bank and the Group. Such a stringent confidentiality policy, which might appear as a limitation, enabled interviewees to talk and express their thoughts freely.

The issues covered during the interviews derive from the concept of epistemic authority as introduced by Kruglanski et al. (2005) and include the role that interviewees' beliefs and backgrounds, as well as their work context, play in assigning authority to Big Data in IR preparation. The analysis of transcribed interviews was particularly dedicated to capture interviewees' ideas and opinions about Big Data and how the process of integrated reporting might benefit from it. Such analysis was preceded and followed by an in-depth reading of the IRs issued by the Bank (between 2013 and 2017) as well as other documentary sources (e.g. YouTube video clips, other documents shared on corporate websites, and interviews published in newspapers) related to Big Data initiatives at both Group and Bank level. As noted by Al-Htaybat and von Alberti-Alhtaybat (2018), these documentary sources afforded a preliminary understanding of the company under investigation and also provided empirical data for the analysis.

3.5 Findings

The findings are set out in the next three subparagraphs. They first focus on the Big Data project and the IR preparation process separately, and then they explore

the practical possibilities that Big Data might offer to IR preparation. The findings are structured so as to highlight the roles of corporate members' backgrounds (i.e. the *self*) and their departments (i.e. the *context*) in the assignment of authority to Big Data (i.e. source of information).

3.5.1 The Big Data project

At the Group level, the Big Data project started in 2015. It was triggered by the necessity to provide feedback relevant to the stringent and multiple controls enforced by banking regulation, aimed at maintaining financial stability, reducing the risk of disruption and protecting bank creditors. As the interviewees underline, regulatory controls by the European Central Bank and the Bank of Italy require a systematic and prompt view of the phenomena under inspection (e.g. corruption, terrorism, and money laundering).

The Big Data project has led the Group to set up a dedicated department (i.e. data evolution department) resulting from the development of an organisational service aimed at managing a data warehouse for reporting purposes. At the beginning of the project, the data evolution department was under the financial reporting area, directed by the chief financial officer (CFO). This organisational area was chosen because it transversely monitors the phenomena under regulatory control. In 2018, the data evolution department was moved into the information technology area, directed by the chief digital & innovation officer. This organisational area was considered the most appropriate for a department that relies on innovation, transformation and digitisation, as its pivotal elements.

The interviewees working in the data evolution department have a Master's degree in Accounting and have worked in information systems, management control, and advanced analytics. One of them has enriched his educational background by obtaining a PhD in Statistics. The members of the data evolution department believe that data represents a key asset of the banking industry, but also that data is "*dumb*", i.e. data is essentially neutral; thus, according to practitioners the possibility to exploit Big Data in corporate reporting and decision-making depends on supervising data quality. In other words, the quality of data as informational asset is crucial to extract knowledge about the company and enhance

its value. In this vein, the members of data evolution department maintain that the Group is committed to the implementation of organisational procedures and computer devices to assure the quality of the data collected.

The data evolution department recognises that the Group has been able to transform the initial Big Data project - an investment required to meet regulatory requirements - into further activities aimed at creating value. It argues that a successful combination for the future comprises data and techniques (i.e. algorithms) for dealing with data. Such a combination shall contribute to the achievement of the overall objective of the Big Data project, i.e. to create value from data. According to the members of data evolution department, "*value*" does not assume a financial nature only, but it is more generally embedded in the increased ability to satisfy corporate and stakeholders' needs. They point out that value creation through data stems from the knowledge extracted from a huge, high-quality amount of data; hence, the Group is developing internal skills to use data in ways that allow to interpreted and satisfied corporate's and stakeholders' needs. In undertaking the Big Data project, the Group leveraged on capabilities already available and further reinforced through training and learning initiatives. It considers the Big Data project highly strategic to the point that it has established a corporate Big Data School with courses aimed at ensuring a unique training process for the experts (e.g. data scientists) who will work within the Group. The data evolution department has a business-oriented nature and actively participates in changing the Group business model. Accordingly, many engineers, physicists and mathematicians work in the department side by side with some accounting and business specialists who provide the essential skills to obtain the knowledge to support the department objectives.

Moving from a traditional view of banking data that requires the particular protection of client data, the Group Big Data project is slowly trying to cover the paths identified by the 3Vs model (i.e. Volume, Velocity and Variety). Each path has reached a different level of maturity. Because every bank is a continuous data generator, Volume is at a more mature level, whilst Velocity and Variety are still under development. At the time of the interviews, the Group is building a "data lake" by pooling all Group data (including those of the Bank). As emphasised by

the members of the data evolution department, they are dealing with the creation of conditions to extract knowledge from data and to make the revolution of Big Data real in their Group. In particular, they state that this revolution stems from the expansion of computing power beyond the past limits by increasing the Volume and Variety of data.

Data evolution department activities are finalised to turn data into information, and information into valuable knowledge through advanced analytics. The latter develop algorithms that interpret data in order to achieve a specific output or objective. Thus, the department extracts information from Big Data and then turns this information into knowledge that is useful for corporate purposes. The data evolution department carries out its activities by drawing on the so-called "*challenges*" or "*use cases*", i.e. issues that the data evolution department has to face in an effort to propose alternative, valuable solutions in conducting existing operations (and/or solve problems). Such challenges are usually submitted by other departments to data evolution, which analyses Big Data and suggests new ways to perform activities. In line with the meaning of value cited above, members of the data evolution department define the value created in overcoming some challenges not only as a financial value, but also as a value for stakeholders. One example of a challenge already faced is the recharge service for automated teller machines (ATM). In this case, the department has developed an algorithm which, in providing prospective information, has improved the efficiency of the ATM recharge service, with cost savings, positive effects on cash flows and an improved service to the banks' clients.

Members of the data evolution department claim that other challenges in Big Data advancement try to adopt a proactive approach. In other words, such challenges are not submitted by other departments, but are anticipated by data evolution department. For instance, the data evolution department is seeking to develop solutions to prevent corruption, terrorism, and/or money laundering by extracting information from Big Data. This turns Big Data into value by producing useful knowledge, solving problems by impacting significantly on the risk of criminal offences and improving both the corporate reputation and financial value. However, a Group data manager points out that a number of constraints limit the

processing of algorithms. He refers mainly to access denied to some types of data for privacy and ethical reasons. He also mentions the difficulty of measuring the value created by algorithms supporting the Group in anti-corruption, anti-terrorism, and/or anti-money laundering.

According to the data evolution department, the Big Data project will take many years to include all Group data. It is feeding a "data lake" by gradually involving Group departments and companies. When all the Group data has been included, members of the data evolution department assume that Big Data will provide direct support in corporate reporting. At the time of the interviews, they maintained that their department is an indirect contributor to IR preparation for the Bank. In particular, they identified information related to anti-corruption, anti-terrorism, and/or anti-money laundering as important for the IR preparation process. Finally, they believe that the IR will benefit from the more direct contribution of Big Data, once the related project is further advanced.

3.5.2 The Bank integrated reporting

The Bank is the only company in the Group that prepares an IR. In the Bank, the financial reporting officer promoted the implementation of integrated reporting. Since 2010, he has carefully studied the IIRC proposal which led to the first IR in 2013. In IR adoption, he sees an attempt to reduce the complexity and the number of pages of traditional financial reports, in the aftermath of a wave of mergers and acquisitions in the Italian banking industry. He maintains that integrated reporting is an efficient and effective process that results in a document able to obtain the trust and confidence of the various stakeholders. Since the Bank is wholly owned by the Group (sole shareholder), the company uses the IR to communicate with its stakeholders, who are mainly private financial advisers and clients. Other important stakeholders are financial analysts who might see IR as a more transparent report for assessing corporate performance, with a positive effect on share prices.

Integrated reporting is considered an efficient process because it provides a single official report submitted to, and approved by, the Boards of Directors of both the Bank and the Group. Moreover, it reinforces the dual relationship between, on the one hand, the Bank and private financial advisers and, on the other hand, private

financial advisers and clients. Such a relationship aims to increase the market presence of the Bank and to reduce stakeholders' distrust towards Italian banks in the aftermath of several misconducts brought to light and bankruptcies occurred between 2013 and 2016. More specifically, in the relationship between the Bank and private financial advisers, IR helps recruit private financial advisers; moreover, in the relationship between private financial advisers and clients, it supports to depict a complete picture of the Bank to clients, drawing on the financial and non-financial competences of private financial advisers.

In the Bank, sustainability is understood as sustainability of the relationships with clients (or relational sustainability), i.e. sustainability that affects the long-term relationship in which the greater a client's loyalty to the Bank, the greater the financial value the Bank obtains from the client and from private financial advisers. In this regard, the financial reporting officer maintains that IR enables the Bank to recover the communications function with stakeholders originally performed by financial reports. He particularly suggests that IR has transformed a statutory requirement i.e. the financial report, into a document able to strengthen the relationship with stakeholders by representing information not generally shown in a traditional financial report. For example, under the prompting of the Group chief executive officer (CEO), the financial reporting department has included a table in the IR to show the Bank's competitive position compared to its competitors (albeit anonymised). However, the ability of IR to support relational sustainability does not depend only on the document itself, but also on the capabilities of private financial advisers to effectively represent the value creation story portrayed in the report.

The financial reporting officer strongly believes that for a company like Bank IR is essential for two reasons. He maintains that their clients are not only interested in financial performance, but also in how the Bank carries out its activities, related risks, its market position and competitors. In other words, he claims that when clients take investment decisions they go beyond financial capital and consider also other forms of capital, such as intellectual, human, social and relationship capital. Therefore, IR is a document that the Bank provides to private financial advisers in order to build a long-term relationship with clients. Moreover, the financial

reporting officer argues that the Bank is an emblematic example of a public-interest company taking advantage of IR preparation. He particularly refers to the ability of IR to generate a virtuous cycle, where, due to the relationship between private financial advisers and clients, the Bank collects savings which are invested in investment funds, which, in turn, contribute to the development of a specific product sector rather than a specific geographical area, supporting overall economic growth.

Since 2013, the Bank financial reporting department has carried out stakeholder engagement activities helping to initially identify the contents of the IR. These activities have involved suppliers, clients, managers, employees, and private financial advisers through interviews and questionnaires. The IR contents are annually updated according to the results of ongoing meetings of members of the financial reporting department who supervise Bank activities, including in relation to the strategies and objectives established by the CEO. They also benefit the dual role of the financial reporting officer, who is also the corporate social responsibility manager for the Bank. As noted by interviewees, in playing such roles, he acts as an intermediary between the two souls of corporate reporting that merge in the IR, i.e. financial and non-financial reporting. He thinks that his dual role and the streamlined organisation of the Bank facilitate the IR preparation process.

When the IR contents are defined, the financial reporting department identifies the information needed and requests this information from other departments (e.g. operations, risk management, compliance, marketing and sales). It coordinates the IR preparation process and prepares the IR centrally, while other departments contribute by sending the information needed. In particular, within the financial reporting department, a four-members team including the financial reporting officer and three employees combines, homogenises, mixes, enriches (or simplifies), and balances information to construct the Bank's value creation story. Then, the financial reporting department submits the IR draft to the Board of Directors and the CEO, who, generally, approve it with some minor changes.

The logic followed in preparing the IR is based on a linear representation of the Bank's value creation story, which has numerous chapters. In particular, the first chapter introduces the Bank, focusing on the description of its business model; the

second chapter clarifies what the Bank aims to do in the future by explaining its strategies; the third chapter describes where the Bank operates, by identifying the operational and market contexts of its activities; the fourth chapter tells the main activities carried out by Bank the previous year, and includes the results achieved; finally, the fifth chapter deals with Bank governance, offering an overview of its organisational and ownership structure. The logic involved in preparing the IR has changed over time and has influenced its structure. For example, details about the Bank's growth prospects were in a single chapter until 2016; in 2017, this information was included as a paragraph in the chapter dedicated to operational and market contexts, an example of how the financial reporting department has sought to represent the Bank's value creation story as clearly as possible.

The logic followed in preparing the IR is emblematic of its functions. IR aims to communicate with both private financial advisers and "*lay*" (current and/or future) clients, by explaining to them, without technicalities, who the bank is, how it operates, and how it is organised. Thus, it carries out not only a marketing function in supporting private financial advisors from a commercial viewpoint (e.g. through photos of Bank buildings and offices), but also a financial education function to "*lay*" clients (e.g. a glossary that defines the technical terms). In performing its functions, the financial reporting officer states that the IR supports Bank growth, despite the (not negligible) costs of drafting and printing the document. A hard copy of IR is on every private financial adviser's desk and is used to communicate the value creation story to clients. Moreover, private financial advisers appreciate the IR to the point that they have asked for another, more concise, version. Accordingly, the financial reporting officer speculates about issuing two versions of the IR: a first version (i.e. the current one) with in-depth information intended for a "*curious*" stakeholder (e.g. financial analyst), and another one (a so-called mini-IR) of ten to fifteen pages setting out the most important key-performance indicators (KPIs), data, and information about the Bank. For example, the mini-IR might be addressed to clients and/or private financial advisers.

According to the financial reporting department, the IR preparation process may benefit from the Big Data project in the construction of so-called Golden KPIs

and the enhancement of the information aimed at supporting the sustainability of the relationships between the Bank, private financial advisers and clients.

3.5.3 Big Data in integrated reporting

The Bank financial reporting officer believes that the Big Data project is ambitious, since it takes up time and resources to upload all the data gathered. Although still in a prodromal stage (i.e. mapping of both information and information flows across the Bank), he believes that the Big Data project is both valuable and complex. The complexity lies in the construction of a single container for all Bank data, which needs to be continuously updated to avoid obsolescence; indeed, he says, in an industry like banking, data changes every hour. He also believes that Big Data is not a novelty for people with experience in management control and financial reporting, because such practitioners have always had a complete view of data, especially in the banking industry. Furthermore, in the past many of them were called to face issues like data warehouses failure to gather all corporate data. Nevertheless, the Bank financial reporting officer acknowledges that the main contributions of Big Data to traditional data warehouses are technological and organisational in nature. In this vein, he considers Big Data important for the Bank because it realises the dreams of every financial reporting department, i.e. to have all data updated and available in a unique place.

The organisational evolution triggered by the Big Data project is shown by the establishment of the Group data evolution department, which interacts with the Bank data office department and especially transmits its experience in data governance.

In the Bank, the data office department is responsible for three activities: data governance, advanced analytics, and methods and tools. With many years of experience in management control in the industrial sector, the Bank data officer defines his job position as extremely modern, transverse, and states that the banking industry is shifting from an old-style to a cutting-edge industry. Within the Group, the data office department has moved from the CFO area into the chief digital & innovation officer area, whilst in the Bank it remains under the CFO supervision.

At the time of the interviews, at the Bank data migration has just begun; for instance, it does not feed Big Data with non-financial information.

In the Bank data office department, the main project area related to Big Data concerns data governance, mainly referred as data quality. The Bank data officer identifies the main pillar of data governance as the construction of an organisational model of data that requires a change leading to the identification of a corporate member responsible for transmitting portions of Bank data and mapping the related information. In particular, the data owner is a business representative, who knows the characteristics of the data and the procedures by which they are produced. In the Bank, the data owner is placed side by side to an Information Technology (IT) representative and is identified through a specific application system (or legacy). In particular, the data owner processes, certifies, uses and releases a specific kind of data to other departments. In carrying out this role, the data owner should be involved in the IR preparation process.

In mapping information, data governance also aims to identify (approximately) one hundred KPIs (i.e. Golden KPIs) that are crucial in enabling the Bank to create value. A Golden KPI is a particular KPI constructed through data that results from rigorous quality control processes. Moreover, it must be interpreted and used by all Bank members in the same way. In other words, for each Golden KPI, the data office department seeks to identify a unique characterisation, so that all corporate departments, albeit with different needs, refer to a KPI constructed with the same data. Thus, in interpreting the indicator, all departments have a coherent view of the phenomenon represented. At the time of the interviews, only some Golden KPIs are included in the IR preparation process (e.g. gross deposits and net deposits). The Bank data officer considers the IR preparation as extremely valuable for the Bank, since it results in a single document, submitted to the Board of Directors, provided to supervisory bodies and used to make business decisions.

The Bank data officer sees Big Data as a repository, a huge combined database collecting all Bank data and including data from outside the Bank (so-called open data). He thinks that the Group Big Data project is remarkable and offers two potential advantages for IR preparation. The first relates to the reduction of the need to interface with numerous departments and databases, since all data is available in

one place. The second advantage is the ability to make each department independent from (or minimally dependent on) the IT department, given that whenever a Bank department needs data, it will find it in Big Data.

The Bank data officer believes that the crucial issue with the Big Data project is to order data in the overall data architecture of the company by developing advanced data governance, pivotal for today's banking industry. He also believes the project is not related to meeting the needs of the IT department which uses data through a classic statistical model; rather, the project satisfies the requirement of the Bank business which needs to access data in an easier, faster, and combined way. By Bank business, he means corporate members who ask the IT department for information while performing sales, accounting, and forecasting activities, or the integrated reporting process.

Big Data is considered able to create value for the Bank through the information and knowledge extracted by analysis. To extract this knowledge, since Big Data was established in 2015, the Bank data office department has promoted initiatives aimed at developing Bank members' skills. It has organised internal meetings with consulting firms where corporate members learned about technologies applied to analyse Big Data, i.e. advanced analytics. Bank members have also participated in external meetings and conferences on these topics. Although advanced analytics are not yet fully implemented in the Bank, both the Bank IR 2017 and the Group business plan identify the transformation of the Bank into a digital champion as a strategic objective.

After the first internal meetings, the Bank data officer realised that Big Data requires a process of advanced analytics to extract knowledge and, in turn, that advanced analytics takes two steps to create value from the knowledge. The first step relates to the identification of the phenomenon to be investigated; the second step refers to the development of hypotheses on how to explore the identified phenomenon. When these steps are taken, advanced analytics provide some sophisticated algorithms that help make predictive analyses of the phenomenon and extract knowledge.

Internal meetings also help the Bank data officer in developing ideas about how to use Big Data and advanced analytics to prevent some complex Bank issues. The

interviewee mentioned one such issue: fraud. He suggested that advanced statistical analysis may improve the risk management of the Bank regarding fraud by processing algorithms that reduce the number of false positive signals of fraud. In this way, the Bank may reduce the costs of inspecting multiple signals and preventing cases of fraud.

The Bank data officer is also enthusiastic about the analysis of Big Data enabling the Bank to put forward new business models. For example, he argues that the sale of investment products is often based on the segmentation of clients according to the amount of assets owned. He suggests that the Bank might exploit Big Data to understand clients' interests and/or hobbies and to classify clients accordingly and in innovative ways. Further, the Bank data officer is confident that Big Data will foster more effective and efficient Bank activities than in the past (e.g. analysis of fraud). However, he acknowledges that, in the banking industry, each phenomenon (e.g. fraud) is linked to several activities, data, procedures, and legacies; thus, the concrete applications of Big Data are very complicated, need a number of years and are difficult to predict. At the time of the interviews, the Bank does not apply advanced analytics to Big Data. In other words, the Bank is in the prodromal stage of the Big Data project and needs to improve its capabilities and skills before developing algorithms able to "*work like a miner within data*" (so-called data detection) and to extract an unexpected knowledge from data. For this purpose, the Group Big Data School is a hope for forthcoming data detection.

The Bank data officer is optimistic about a future where corporate reporting benefits from Big Data. Accordingly, he maintains that the IR preparation process will be supported by Big Data in terms of information and knowledge. His department contributes to preparing the IR both directly, by providing information (e.g. the savings collected during the year), and indirectly, by validating information provided by other departments (e.g. the number of Bank clients). Thus, the data office department contributes to enhance the overall quality of the IR preparation process by verifying data and the information processed within other departments and by ensuring coherence between the internal information (i.e. management analysis) and the information included in the IR (e.g. the number of Bank clients).

In pursuing this coherence, the data office department aims to afford all Bank members an effective and efficient use of data, irrespective of specific informational needs. It provides homogeneous procedures and instruments by capturing the peculiarities of a specific phenomenon. The department carries out these tasks as part of another activity for which it is responsible, i.e. methods and tools. The latter highlights the transverse nature of the department that deals with issues shared by different corporate departments as well as having extensive knowledge of the available data. For instance, it seeks to identify a common characterisation of clients, mediating between the client as a family unit (that invests its savings in the Bank) and/or the family member (who has periodic meetings with a private financial adviser).

Overall, the interviewees from different departments of the Group and the Bank are confident about the potential of the Big Data project for the IR preparation process. They acknowledge they have much to learn and improve to fully exploit Big Data potentialities as a source of corporate knowledge in the IR preparation process and argue that Big Data does not place value on the choice of data, but on the fact that all data can potentially be connected. Accordingly, one of the interviewees' objectives is to transfer to Big Data information on human, intellectual, and social and relationship forms of capital, because otherwise it is not "real" Big Data. Despite their difficulty in predicting a specific term, the interviewees maintain that more direct contribution by Big Data to the IR preparation process should be pursued. Thus, in advancing toward further stages, they want to go beyond the current, indirect contribution of Big Data to the process of IR preparation (e.g. information related to anti-corruption, anti-terrorism, and/or anti-money laundering).

3.6 Discussion and conclusion

In the corporate reporting literature, Big Data is underexplored from an empirical stance. Most studies have dealt with Big Data without investigating how it can practically support companies as a (new) source of information for corporate reporting. In the attempt to address this gap, the present study has adopted an

exploratory approach in dealing with the extent to which IR preparers might rely on Big Data while producing their report. Specifically, it offers some preliminary insights into the usability of Big Data in the flourishing process of IR preparation. This process was chosen as the setting for the analysis, since it is supposed to catch the particular benefit of Big Data, for instance, through a deeper understanding of the value creation process (IIRC, 2016, 2018).

The exploratory findings suggest that the authority of Big Data as a source of information is still under development in the Bank. While the interviewees are confident and optimistic about the future possibilities that the Big Data project will provide for IR preparation, they acknowledge that the complexity of the banking industry requires further time and effort for this project. Thus, using the frame of Kruganski et al. (2005), interviewees are still in the first phase of assessing the informational source.

The findings suggest that the epistemic authority of Big Data in IR preparation might stem from two elements theorised by Kruglanski et al. (2005).

The first element pertains to the role of both the *self* and the *context* in the assessment of Big Data as a reliable source of information. Exploratory analysis suggests that the interviewees' educational backgrounds and departments (i.e. the *context*) do not impact on their acceptance of Big Data; on the contrary, the interviewees' previous job experience seems to strongly influence their ideas and opinions about the usability of Big Data in IR preparation. Although the interviewees have the same educational background (i.e. Master's degree in accounting), only those with job experience in management control do not see Big Data compared to a traditional data warehouse as a novelty. In particular, they maintain that if Big Data promises to offer a cross-view of corporate data, as management controllers, they have always had this kind of view, whereas interviewees with job experience in advanced analytics maintain that the possibilities brought by Big Data compared to traditional data warehouse lie in the huge increase of computation power, enabling new corporate knowledge to be extracted.

The second element refers to the *energy* that the companies devote to developing the Big Data project. The Big Data School is an emblematic example of

corporate efforts (in terms of time and resources) in continuing epistemic activity (i.e. the interpretation of data and acquisition of knowledge creating value). The establishment of a school dedicated to training data scientists suggests a strong corporate commitment to the development of skills and "*methods of knowing*" (Boyd and Crawford, 2012; p. 665). The *energy* also emerges from (internal and external) meetings and conferences the Bank organises in order to introduce Big Data and advanced analytics to its members.

In line with Kruglanski et al. (2005), this analysis proposes some informational and motivational factors that might lead IR preparers to draw on Big Data while producing their report. These factors include the identification of prospective information and, in particular, the construction of performance indicators (i.e. Golden KPIs) as well as the development of risk preventing solutions (i.e. initiatives aimed at avoiding corruption, terrorism, and/or money laundering).

The exploratory findings also underline the crucial part accountants might have in connecting data and information (Moffit and Vasarhelyi, 2013) to extract corporate knowledge from Big Data (Bhimani and Willcocks, 2014). Thus, they add insights into the successful combination between the mind-sets of accountants and data scientists (Bhimani and Willcocks, 2014; Griffin and Wright, 2015; Janvrin and Watson, 2017).

In accordance with the IIRC purposes, Big Data might help the report in strengthening the relationship with stakeholders. In Bank, it particularly might support relational sustainability by enhancing the relationship between the Bank, private financial advisers, and clients. Once the Big Data project moves into the advanced stage, the Bank might benefit from real-time reporting and prospective information (Vasarhelyi et al., 2015; Al-Htaybat and Alberti-Alhtaybat, 2017) to add content to the IR functions, i.e. marketing and educational functions. For instance, the company might convey a much more complete picture to its clients and define new investment products by applying advanced analytics to data captured through "*tracked visits and clicks in websites, online questionnaire responses, location information captured through cell phones, client telephone calls, and video captured from surveillance cameras*" (Moffit and Vasarhelyi, 2013; p. 11).

The exploratory findings suggest that the regulation of the banking industry generates two opposite effects on the usability of Big Data in IR preparation. In particular, regulation is described by interviewees as both a trigger and a limit for the Big Data project. A trigger because it initially pushed the Group towards Big Data to comply with regulatory controls. Later, the project advanced thanks to the foresight of the Group, which has undertaken new activities that create value (e.g. the Big Data School) and change some organisational procedures (e.g. data governance). However, regulation is also a limit to the Big Data project due to the need for increased oversight. This limit, in particular, can be seen in Voracity (La Torre el al., 2018b) i.e. reasons of ethics and privacy that restrict the acquisition of knowledge from Big Data.

This study provides early empirical support for the importance of corporate members' skills, capabilities and motivations in innovating and transforming data into information and knowledge (La Torre et al., 2018a). The study speculates about the existence of a link between Big Data and intellectual capital (as conceived in the International Integrated Reporting Framework); a link that might be crucial in enabling the contribution of Big Data to IR preparation.

This study makes a number of contributions to the infant literature on Big Data in corporate reporting. While Al-Htaybat and Alberti-Alhtaybat (2017) analyse the perceptions of experts regarding the impact of Big Data in corporate reporting, this study explores the realm of a company operating in the banking industry to gain insights into the potential usability of Big Data in the process of IR preparation. In particular, it provides preliminary insights into the possibility of counting on Big Data as a source of information for IR preparation (e.g. to construct performance indicators and/or to develop risk preventing solutions and/or to strengthen the relationship with stakeholders). For this purpose, the analysis introduces the concept of epistemic authority as a theoretical frame for corporate reporting literature. Moreover, this study responds to the call of Rinaldi et al. (2018) for research at the micro-level of IR practices. It particularly contributes by adopting an exploratory approach that paves the way to further investigations on how Big Data might support IR preparers in producing their report.

This study has two main limitations. First, it restricts the analysis of the usability of Big Data to the integrated reporting process; thus, it does not consider Big Data as a source of knowledge in other corporate reporting processes. Second, being focused on a case-study, it provides findings that are neither conclusive nor generalizable. However, it does make some preliminary evidence and offer starting points for future research that might inspect the same companies after some time, when the Big Data project is at a more advanced stage of development. Future studies might also compare the IR preparation process before and after the adoption of Big Data, to explore what (new) knowledge is obtained. Finally, future research might enlarge the scope of this study by investigating the epistemic authority of Big Data in other reporting processes (e.g. financial reporting), and/or for other IR adopters in the banking industry and/or other industries.

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Concluding remarks and future research

This thesis explores the process of IR preparation from an insider point of view with the aim of gaining knowledge and an understanding of how corporate members deal with IC and Big Data while constructing their value creation story in the IR.

With regards to IC, the thesis provides empirical evidence that expands the analysis of the subjective ontology of IC. More specifically, it adds to the existing literature by demonstrating that, in the specific context of integrated reporting, the existence of IC depends on the function that IR preparers assign to it. In assigning this function, the IR triggers collective reasoning about the modes of existence of IC. Moreover, the thesis contributes to elucidating the underexplored interplay between IC and integrated thinking. In particular, it sheds light on the role of integrated thinking in the definition of IC ontology. It validates integrated thinking as an underlying mechanism that arises during IR production and allows IR preparers to gain an enhanced awareness of IC. When the value creation process is centred on IC, integrated thinking helps IR preparers develop a common understanding of the ways in which IC supports such process. Additionally, integrated thinking permits the identification of a procedure for scrutinising what can be considered IC in an integrated reporting context. Such procedure particularly draws on the connectivity map and the key performance indicators and value creation table, which ensure an objective identification of IC in relation to its contribution to the value creation process.

The thesis also pioneers the adoption of a performative approach to the investigation of IC resulting in empirical evidence. It reveals that the performativity of IC strongly relies on the business model content element and the connectivity principle established by the International Integrated Reporting Framework. The business model content element and the connectivity principle offer IR preparers useful reference points to develop IC narratives within their report, when the quantification of IC is disputed. Further, the thesis demonstrates that the IR

preparation process may have a prominent effect on how IC is 'performed' within an organisation, that is how IC affects the management of organisations.

Future research might expand the scope of this thesis and explore IC ontology as well as its performativity in other reporting contexts (e.g. financial reporting and/or sustainability reporting). Future research might also adopt an outsider point of view, in order to focus on users' understanding of IC value creation.

With regard to Big Data, the thesis contributes to the infant literature on Big Data in corporate reporting by offering exploratory insights. The construction of performance indicators, the development of risk preventing solutions, and the strengthening of the relationship with stakeholders provide early avenues that Big Data might offer in IR preparation.

The thesis also introduces the concept of epistemic authority to the corporate reporting literature. The concept offers an insightful theoretical framework that helps interpret the usability of Big Data, as a (new) source of knowledge, in IR preparation. Finally, the thesis provides empirical support for the importance of corporate members' skills, capabilities and motivations in innovating and transforming data into information and knowledge. Accordingly, it speculates about the existence of a crucial link between Big Data and IC. Such link that might enable the contribution of Big Data to IR preparation.

Future research might inspect the same companies when the Big Data project is at a more advanced stage of development. It may also compare the IR preparation process before and after the Big Data project, to explore what (new) knowledge is obtained. Finally, future research might enlarge the scope of this thesis, by investigating the epistemic authority of Big Data in other reporting processes (e.g. financial reporting), and/or for other IR adopters in the banking industry, and/or other industries.

Overall, the thesis contributes to existing literature by undertaking an "in practice" approach to the investigation of integrated reporting. It advances the understanding of integrated reporting by moving closer to the very process of IR preparation; it also offers original insights on IC and Big Data, by benefitting from the practical experience of corporate members involved in the production of IR. To conclude, this thesis advocates that, in IR preparation, the effort to report on IC both

facilitates the rise of integrated thinking and it is facilitated by integrated thinking. It also presumes that Big Data, and its intertwining with IC, will enrich the value creation story told by the IR, adding new knowledge.

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"Il termine utopia è la maniera più comoda
per liquidare quello che non si ha voglia, capacità,
o coraggio di fare. Un sogno sembra un sogno
fino a quando non si comincia da qualche parte,
solo allora diventa un proposito,
cioè qualcosa di infinitamente più grande."
Adriano Olivetti