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# FROM INTELLECTUAL CAPITAL TO SUSTAINABILITY PERFORMANCE: AN INTERVENTIONIST RESEARCH APPROACH TO MANAGEMENT CONTROL

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## Abstract

**Purpose:** This study investigates the relationship between intellectual capital (IC) and sustainability in practice by developing and testing a management control tool to enhance sustainability through IC. The case tested is a publicly listed Italian information technology company.

**Design/Methodology/Approach:** Employing an interventionist research approach, the authors actively participated in a team tasked with designing a new IC reporting system. The methods of inquiry included in-depth interviews with project stakeholders and reviewing internal documents to offer a critical and performative analysis of IC practices in action. The resulting analysis led to the development of a new management control tool.

**Findings:** The management control tool developed in collaboration with the company not only significantly enhanced sustainability performance, it also fostered integrated thinking. Specifically, the tool helped to identify, measure, and monitor firm-specific IC, including skills and competencies, knowledge and innovation, values, legitimacy, trust, and reputation.

**Originality:** Our findings contribute to the ongoing discourse on IC practices. Through new insights into the practical relationship between IC and sustainability, this paper affirms IC's significance to businesses that want to improve their sustainability. The study also presents a methodical approach to integrating sustainability thinking into corporate practices, adding to the limited literature on how management control systems can promote corporate sustainability.

**Keywords:** corporate sustainability, intellectual capital, integrated management control system, interventionist research.

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## 1. Introduction

In recent years, many of the world's economies have been facing a trust crisis fuelled by a rise in corporate accounting scandals and environmental catastrophes. Consequently, numerous stakeholder groups, including fund providers, investors, customers, suppliers, employees, local communities, and governments, are putting pressure on companies to increase their transparency and accountability. For example, stakeholders want companies to provide better and more comprehensive evidence of their business's sustainability, while analysts, fund managers, and investors are emphasising socio-environmental criteria as they construct their investment portfolios (Guthrie *et al.*, 2008; Milne and Gray, 2013; Dumay *et al.*, 2016; Battisti *et al.*, 2023). Under these societal pressures, organisations are being compelled to incorporate sustainability concerns into their business strategies. In short, they are being asked to tackle social and environmental challenges simply to remain competitive (Al Mahameed *et al.*, 2023; Riaz *et al.*, 2023).

It is therefore not surprising that sustainability reports have emerged as a powerful means of communication by which investors and other interested parties can determine a company's commitment to sustainability as a basis for asset allocation decisions. Additionally, several new indices have been developed to help financial markets evaluate a company's overall economic, social, and environmental performance, including the Dow Jones Sustainability Indices and the FTSE4Good Index (see, for example, Lòpez *et al.*, 2007 and Searcy and Elkhawas, 2012). These indices play a prominent role in sustainable investing by serving as indicators of a company's performance against sustainability benchmarks (Cerin and Dobers, 2001; Knoepfel, 2001). Further, by providing a transparent and standardised evaluation of a company's sustainability performance, these indices help investors make informed investment decisions that align with their social and environmental values.

Additionally, management control tools that measure and enhance sustainability have also gained importance (Talbot *et al.*, 2020; Asiaei *et al.*, 2022). Many managers are increasingly focused on the competitive advantages they can gain through these tools, such as reporting systems that identify, measure, and report on strategic intangible resources like intellectual capital (IC). Here, IC is defined as the knowledge, information, intellectual property, and experience held by individuals and organisations that are used to create value (Stewart, 1997). In fact, IC is a crucial resource for companies seeking a competitive advantage in a knowledge-based economy. According to Edvinsson and Malone (1997), IC supports innovation,

competitive differentiation, and organisational learning (see also Montemari and Nielsen,2013; Dumay and Roslender,2013; Zakery *et al.*, 2017; Hussinki *et al.*,2024).

Scholars have also emphasised the connection between management control systems and the environmental and social activities undertaken by organisations, with studies such as Ferreira *et al.* (2010), Henri and Journeault (2010) and Gond *et al.* (2012) contributing to such discussions. Here, management control systems refer to a set of procedures, tools, and techniques that organisations use to ensure their activities align with their strategic objectives. Some argue that to effectively translate environmental and social performance into long-term shareholder value, sustainability-related activities must be incorporated into a firm's strategic processes and that key personnel such as accountants must also be involved (Albelda Pérez *et al.*, 2007; Halari and Baric, 2023). However, to date, few empirical studies have explored how management control systems are employed in practice to promote corporate sustainability. Noteworthy exceptions include Perego and Hartmann (2009), Henri and Journeault (2010), Riccaboni and Leone (2010), and Arjaliès and Mundy (2013), who have each contributed much to demonstrate that management control systems are essential for addressing organisational sustainability challenges. Yet integrating sustainable thinking into management control systems helps managers make informed decisions about the environmental and social challenges facing their organisations, which, in turn, means they can demonstrate greater accountability (Wijethilake *et al.*, 2017; Narayanan and Boyce, 2019; Beusch *et al.*, 2022). Managers can also leverage IC practices through organisational initiatives to drive environmental, social, and governance outcomes. For instance, IC can help organisations to use their resources more efficiently, to drive innovation, to build stakeholder relationships, or to enhance the firm's reputation and legitimacy – all of which contribute to better sustainability outcomes (Perrini *et al.*, 2011).

Our contribution to this line of research involves the development of a specific management control tool – an IC reporting system – that identifies, measures, and manages environmental and social initiatives, such as environmental protection, gender equality initiatives, charitable projects, and wealth distribution projects. An assumption underlying this investigation is that embedding environmental and social aspects into a company's strategy will aid in the process of accumulating different types of IC, including skills and competencies, knowledge and innovation, legitimacy, trust, and reputation, as outlined by Perrini *et al.* (2011). The tool was developed through an interventionist research methodology where the authors actively worked alongside the firm's practitioners to design and implement a suite of management controls. The resulting tool integrates and uses IC to enhance the firm's sustainability and overall

performance. Using an interventionist research approach not only allowed us to conduct an in-depth examination of IC practices in action but also informed our subsequent critical analysis.

As our study progressed, the following question, refined during our reflective analysis, guided the final write-up of this study:

*RQ: How can implementing a management control system enhance an organisation's sustainability performance, and how effective is it?*

While prior studies have often advocated for a bottom-up performative approach to research, this study aims to further the discussion by providing empirical insights into how IC functions within a specific organisation (Dumay and Garanina, 2013; Dumay, 2013). Consequently, our research enriches the ongoing debate on practical applications for IC.

This study also documents practical links between IC and sustainability performance within a leading Italian technology firm. We found that systematically identifying, measuring, and monitoring the company's strategic intellectual resources – including skills, knowledge, innovation capabilities, organisational values, stakeholder relationships and reputation – significantly enhanced its ability to develop and implement effective sustainability initiatives across its environmental, social, and governance dimensions. The findings expand on prior literature acknowledging IC's role in driving innovation, competitiveness, and organisational learning (Edvinsson and Malone, 1997; Petty and Guthrie, 2000) by demonstrating how operationalising IC can tangibly improve corporate sustainability. Further, our findings contribute to empirical research on how managers can design management control systems to integrate sustainability into their everyday practices (Perego and Hartmann, 2009; Henri and Journeault, 2010). Overall, this paper extends the IC research stream (Mouritsen, 2006; Dumay and Roslender, 2013) into the sustainability domain.

The remainder of the paper is organised as follows. The next section provides a background to IC and sustainability and reviews the relevant literature. Section 3 outlines the methodology. Section 4 presents our findings, followed by the conclusion in Section 5.

## 2. Background and Prior Literature

### 2.1 Intellectual capital and value creation

Prior studies have argued that, in today's highly competitive and globalised environment, IC is a crucial source of competitive advantage. It enhances innovation, promotes competitive differentiation, and facilitates organisational learning (Petty and Guthrie, 2000, p. 155; Guthrie, 2001; Marr *et al.*, 2004; Subramaniam and Youndt, 2005; Ricceri, 2008; Schiuma and Lerro., 2008; Montemari and Nielsen, 2013; Dumay and Roslender, 2013; Zakery *et al.*, 2017).

IC has three categories: human capital, structural capital, and relational capital (Bontis, 1998). Human capital refers to the knowledge and skills of the individuals within an organisation. It spans their experiences, capabilities, creativity, and innovativeness (Sveiby, 1997). Although human capital leaves the firm with the employees when they depart, it still remains the most critical component of IC. This importance stems from its role as the driving force behind the other two elements, structural and relational capital, despite not being owned or controlled by the organisation.

Structural capital encompasses an organisation's processes, systems, and technology and is "what remains within the organisation when individuals leave for the day" (Roos and Roos, 1997, p. 415). It includes the repositories of knowledge integrated into systems, databases, and programs (Edvinsson and Malone, 1997). Relational capital refers to the company's relationships with stakeholders, including customers, suppliers, and investors. It highlights that firms do not operate in isolation but, rather, largely depend on a continuous interplay with their external environment. Thus, relational capital encompasses the knowledge embedded in relationships with external parties such as customers, suppliers, partners, and other external stakeholders (Roos *et al.*, 1997). Elements like brand, image, and corporate reputation are examples of knowledge within this category.

These categories enable firms to visualise, assess, and measure the knowledge accumulated within a firm. Additionally, some scholars argue that IC should also include the kind of social and environmental knowledge that fulfils social requirements, boosts a business's competitiveness, and enhances its corporate performance (Dumay, 2016). Stewart (1997) defines IC as the knowledge, information, intellectual property, and experience that can be used to create wealth. In this book, Stewart offers a framework for visualising, evaluating, and quantifying a company's knowledge assets, also known as 'intangible resources' or 'intangible

assets'. Consistent with Dumay (2016), we contend that IC should also encompass environmental and social knowledge.

Several scholars and practitioners have explored the benefits of managing IC to enhance a firm's value creation (Guthrie *et al.*, 2001; Dumay, 2016; Dumay *et al.*, 2017). However, accurately assessing how effective managing IC is at improving organisational performance in financial and non-financial terms, remains a challenge (Dumay, 2012).

## 2.2 Management control systems and sustainability

The evolution of environmental and social accounting has led to the creation of various management control and performance measurement systems. As just a few examples, academics and practitioners have introduced tools and systems such as the Performance Pyramid (Lynch and Cross, 1991), the Balanced Scorecard (Kaplan and Norton, 1992), the Performance Prism (Neely *et al.*, 2002), and the Sustainability Balanced Scorecard (Figge *et al.*, 2002; Dias-Sardinha and Reijnders, 2005; Schaltegger and Wagner, 2006; Hubbard, 2009).

What is common to all these systems is that scholars have increasingly recognised the crucial role of management control systems in promoting corporate sustainability (Schaltegger and Wagner, 2006; Gond *et al.*, 2012). Given the growing significance of sustainability issues, academics have advocated for empirical research on the interplay between management control systems and the environmental and social activities of organisations (Ferreira *et al.*, 2010; Henri and Journeault, 2010; Schaltegger, 2011; Gond *et al.*, 2012). Empirical research can provide valuable insights into how to design and implement management control systems such that they effectively integrate environmental and social performance into a firm's strategic processes.

Accordingly, Albelda Pérez *et al.* (2007) argue that managers should incorporate sustainability-driven activities into a firm's strategic processes to translate environmental and social performance into long-term shareholder value. Despite the acknowledged importance of management control systems in advancing corporate sustainability, limited empirical studies have examined their practical deployment (Perego and Hartmann, 2009; Henri and Journeault, 2010; Riccaboni and Leone, 2010; Arjaliès and Mundy, 2013). Therefore, further research is needed to explore how firms can effectively implement management control systems to foster sustainability-oriented activities within organisations. The complexity of sustainability lies in the need for organisations to balance economic, social, and environmental objectives in a way that is mutually reinforcing. This requires a holistic and integrated approach to management controls, which can be challenging to implement in practice.



Prior research demonstrates the essential role of intangible assets in bridging the connection between managing social and environmental activities and performance (Surroca *et al.*, 2009; Perrini *et al.*, 2011). These intangibles align with a company's strategic objectives and act as a pivotal driver in overseeing social and environmental initiatives. They also contribute to corporate performance, assessed through financial and non-financial metrics. Therefore, it is crucial to design management control systems with the importance of intangible assets in mind, as they play a vital role in advancing social and environmental sustainability, ultimately ensuring these initiatives contribute to long-term shareholder value. (Albelda Pérez *et al.*, 2007). Within this context, implementing an IC reporting system can potentially enhance a company's sustainability performance by facilitating the management of these crucial intangible assets. Moreover, an IC-focused management control tool may effectively integrate sustainability principles into corporate practices, particularly in aligning environmental and social activities with a firm's strategic objectives. In this regard, empirical research is indispensable for understanding how management control systems can effectively foster sustainability-oriented activities within organisations.

Several recent studies have focused on the role of IC management tools and their integration into sustainability practices. For instance, Cavicchi and Vagnoni (2018) demonstrate that intellectual capital management, particularly, human, structural, and relational capital, is fundamental to supporting strategic management, as evidenced through their case study of an Italian farm. Other studies have highlighted the critical role of IC in bolstering corporate environmental performance, with evidence suggesting that IC practices support both sustainability goals and corporate productivity (Leo-Paul *et al.*, 2021; Bananuka *et al.*, 2023; Alnaim and Metwally, 2024). More recently, research has also focused on how green intellectual capital (GIC) influences sustainable performance (Mansoor *et al.*, 2021; Wang and Jou, 2021). For example, Benevene (2021) find that firms with robust GIC are more likely to promote sustainability throughout their organisation. Khan *et al.* (2023) argue that GIC positively influences environmental behaviour and outcomes in SMEs while Asiaei *et al.* (2023) explore how organisations can derive maximum benefit from orchestrating their various green assets and capabilities. Bananuka *et al.* (2023) find that intellectual capital components – particularly human and relational capital – significantly influence sustainability reporting practices in developing economies, emphasising the global relevance of IC in driving sustainability performance.

The integration of IC into management control systems has also gained increased attention (Secundo *et al.*, 2018; Akram *et al.*, 2023; Quesado *et al.*, 2024). For instance, Ghosh *et al.*

(2019) discuss the relationship between management controls and sustainability strategies, highlighting that traditional management control systems may need to be modified before they can effectively support corporate sustainability initiatives. Meanwhile, Asiaei et al. (2022) provide insights into how an organisation orchestrates its various green resources to promote environmental performance, citing green intellectual capital and environmental management accounting as two of these resources. Overall, these studies highlight the importance of integrating IC into management control systems to support sustainability within organisations.

### 2.3 Background to the study

Against this backdrop, we aimed to develop a management control tool designed to enhance sustainability performance within a prominent, publicly listed Italian company in the electronic and information technology industry. In this way, our study seeks to add to the discourse on how IC management impacts sustainability performance within organisations. More specifically, we explored the company's existing IC reporting systems as inspiration for developing this new management control tool.

We selected this firm as the case company because its management had a keen interest in improving its IC measurement system. Further, they granted us access to the organisation and welcomed the opportunity to collaborate on the project. In fact, the company, pseudonymised IT Co., set up a unit dedicated to enhancing its IC measurement system with the stated aim of driving initiatives geared towards fostering product innovation, managing intellectual property, enhancing staff competencies, nurturing social and academic relationships, and cultivating sustainability.

Thus, the study follows an interventionist research approach (Dumay, 2010; Baard and Dumay, 2018). This means the authors actively participated in designing and implementing the management controls alongside the firm's practitioners in a collaborative decision-making process. An interventionist approach allowed all those involved – researchers and managers alike – to collaboratively assess how effective the resulting IC reporting system would be at enhancing sustainability within the case company. In terms of the assessment, we evaluated how well the system identified, assessed, and monitored environmental and social initiatives. Additionally, we worked closely with management and IT Co.'s stakeholders to: pinpoint areas for improvement; collect and analyse data; and devise interventions to refine the system.

We also drew upon theoretical perspectives to understand the relationship between intellectual capital, management control systems, and sustainability performance. As a first

step, we built on IC's performative research stream (Mouritsen, 2006; Dumay and Roslender, 2013; Dumay and Garanina, 2013), which views IC as a collection of knowledge-based resources whose transformative potential manifests through their practical application. Measuring and managing IC is a 'convention' that equips managers with a better understanding of the firm's critical intangible resources and the challenges in mobilising them effectively. Second, through the lens of upper-echelon theory (Hambrick and Mason, 1984; Hambrick, 2007), we shed light on how top management's characteristics might influence the uptake and implementation of IC-based management control practices within the company. The following section outlines the methodological approach employed in this study more specifically.

### 3. Methodology - Interventionist Research

#### 3.1 Case selection

To safeguard the confidentiality and privacy of the company and its personnel, we have not included any details about the company that are irrelevant to our findings. This study is situated within the institutional setting of Italy. Importantly, management accounting practices, particularly those related to sustainability and IC, may differ significantly in other regions such as the UK, the US, or countries in the Global South. These differences could be due to the prevailing regulatory environment, cultural attitudes towards sustainability, or the stage of IC reporting developments in that business landscape. This limitation of the study presents an opportunity for future studies to explore how IC and sustainability initiatives might be implemented and received in contexts other than Italy.

The CEO of IT Co. authorised access to the company and its data with the stipulation that we would maintain the anonymity of the company and its personnel. This precaution was essential to conducting our research without jeopardising the company's operations or reputation.

We selected IT Co. based on three considerations. First, a personal connection with top management helped give us access to the organisation. This connection also helped to establish trustful relationships with IT Co.'s management and practitioners, which led to in-depth discussions and observations about the firm's accounting processes, interactions, and organisational structures.

While personal connections with top management facilitated access and trust, we acknowledge this could potentially introduce bias, especially in terms of data collection and

analysis. To mitigate this bias, we employed several validation strategies commonly used in qualitative research. First, we used multiple data sources to validate our findings and ensure robustness (Denzin and Yvonna, 2017; Flick, 2022). For example, we cross-referenced the interview data with internal documents like strategic plans and managerial reports to confirm any observations and our interpretations of events (Point et al., 2017). Second, two authors independently analysed the data before comparing the interpretations, while the research team regularly reflected on their biases to ensure the themes accurately reflected the data. Third, to further enhance reliability, we validated our preliminary findings and interpretations with some collaborators at IT Co. who were not part of the initial data collection process. This provided an additional layer of validation, reducing the influence of subjective biases (Yin, 2018). Overall, these three measures ensured that our data collection and analysis processes were reliable and objective, despite the personal connection with top management.

The second consideration for choosing IT Co. as our case company emerged from our initial discussions with the senior executives. These conversations revealed a strong commitment to enhancing the potential of the company's IC. Last, they also demonstrated a readiness to collaborate with us on developing an IC measurement approach. The opportunity to collaborate on this project gave us the opportunity to participate in a business project that would seek to identify, measure, and manage the firm's intangible resources. Notably, introducing a new IC reporting system would require the cooperation of multiple actors, including the IT and finance departments. Plus, the system itself would have an impact on the organisation's overall culture and practices. By acknowledging these intricate relationships and interactions, we would be able to gain a deeper understanding of the challenges and opportunities of implementing an IC measurement approach in our case organisation. Accordingly, an interventionist research methodology informed our analysis and deepened our understanding of the dynamics within the company (Dumay, 2010; Dumay and Baard, 2017).

### 3.2 Why interventionist research

Interventionist research helps provide researchers with a comprehensive understanding of the dynamics associated with implementing a new management innovation in an organisation. It also offers practitioners, grappling with the challenges of executing new initiatives, the opportunity to tap into the expertise and guidance of academics while implementing organisational changes. Hence, for practitioners, the advantage lies in having academics as a knowledge and support resource during the implementation phase (Dumay, 2010). Meanwhile,

the academics involved gain valuable insights into novel management innovations. Therefore, interventionist research enhances both theoretical research and practical application.

Importantly, interventionist research extends beyond traditional observation-based case studies by involving the researcher in the problem-solving process. Thus, scholars must adopt a more collaborative approach by cooperating with people who have first-hand experience of the challenges under study. This generally fosters a more effective problem-solving partnership. Coghlan and Brannick (2010) highlight that the primary goal of interventionist research is to solve problems while simultaneously generating new knowledge. This is achieved by observing, analysing outcomes, and analysing findings with the support of relevant literature. In fact, the interventionist research approach has been shown to be highly effective for conducting research, especially in the field of management. By involving both researchers and practitioners in the problem-solving process, this method has the potential to produce more effective solutions to complex challenges than other techniques. Therefore, one of the key objectives of interventionist research is to enhance the understanding of both the researcher and the client.

### 3.3 Main roles and data collection

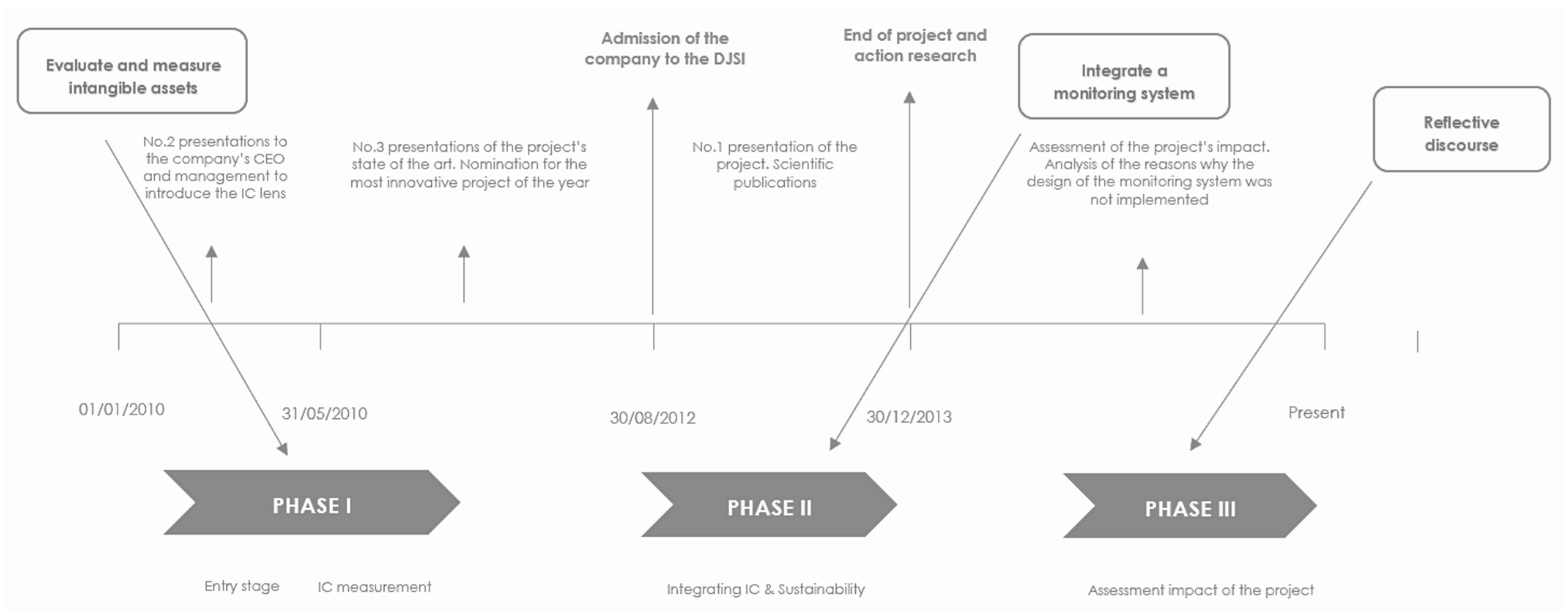
This research project spanned seven years, from 2010 to 2017. We collected data through interviews and a review of internal documents (Jönsson and Lukka, 2005; Dumay, 2010). The project team comprised three professionals from the organisational unit responsible for enhancing IC, the 'go-to' person responsible for developing participatory interactions and acquiring internal data (e.g., strategic plans, managerial reports, procedures, and protocols), and three academics (referred to as researchers). The project supervisors, who also served as sponsors and gatekeepers, facilitated access to the company. The 'go-to' person played a crucial role in helping the researchers become insiders, allowing them to participate in everyday processes and activities. Table 1 summarises the project's steps, the information collected, and the primary outcomes.

The research began by identifying perceived sustainability problems within the organisation and recognising the role of the client/stakeholder. The researchers agreed on who, how, where, and when the stakeholders would participate in the research. The first issue addressed was identifying the top management of the company as the primary user of IC information. Although disclosing IC information to external stakeholders is crucial, this study did not consider this potentiality. Rather, it primarily focused on the managerial decision-making

process, mainly because the company is a subsidiary that does not produce separate financial statements for public disclosure.

As interventionist researchers, we played a key role in introducing the conceptual IC framework and related theories to organisational members. The key role of the practitioners was to assess the usefulness of these concepts in practice. The joint project team aimed to propose a model for sustainability, i.e., measuring and managing the firm's intangible assets. Both the researchers and practitioners shared the responsibility of delivering the project's outcomes and integrating the resulting model into managerial practices to support the decision-making process.

The following figure, Figure 1, provides a chronological account of each phase, outlining the respective roles of those involved, the methods of data collection, and the key milestones achieved during the project timeline.



**Figure 1 - Project timeline**  
**Source: Authors' compilation**

### *Phase I: Designing an IC measurement system leading to the publication of an internal IC report*

A senior academic serving on the company's Board of Directors was the 'gatekeeper' facilitating access to the company. This individual was informed of the CEO's intention to showcase (and enhance) IT Co.'s recent investments into intangibles to the top management of the holding company. In this initial phase, the primary objective was to develop a model for evaluating the company's intangible assets, as validated by the company's CEO. The CEO's strong commitment enabled the project team to work cohesively and focus on a single main task, eliminating the need to align the different self-interested agendas of other organisational actors.

During this phase, we primarily used participant observation as our research method (Chiucci and Dumay, 2015). However, we also gathered data through interviews and the review of internal documents (Jönsson and Lukka, 2005; Dumay, 2010). From January 2010 to July 2012, we attended and took field notes from 33 meetings, each lasting an average of 4 hours. In addition, we recorded and transcribed semi-structured interviews with the CEO and CFO.

The project's first phase concluded after two years with the completion of its primary objective – that of securing validation from the CEO. The project team successfully gained the top management's approval to pilot the newly developed IC reporting model, which was designed to identify the actions required to enhance intangible assets deemed relevant to the company (Demartini and Paoloni, 2013). Notably, the team was recognised in the company's innovation awards for their project's success. This project, notable for its high-tech component, was in perfect alignment with the company's core business.

### *Phase II: Integrating the company's IC measurement with sustainability categories*

In response to the changes in the parent company's top management team and its inclusion in the Dow Jones Sustainability Index (DJSI), the company shifted its focus towards sustainability as a primary strategic objective. This shift led to integrating how the company perceived its IC into categories of sustainability that aligned with the holding company's strategy. Additionally, management issued a master plan for implementing specific sustainability initiatives. In Phase II, the project team undertook the task of integrating a monitoring system to test the planned initiatives for 2014.

Professionals within the company gathered internal information through meetings and semi-structured interviews. Concurrently, the researchers conducted a comprehensive literature



review to explore avenues for integrating sustainability and IC issues. During this phase, the project team actively participated in 24 meetings, each lasting an average of 4 hours. They meticulously recorded and transcribed semi-structured interviews with key company personnel, including the CFO and Patent Manager, who was responsible for developing social and environmental initiatives. Together, the researchers and practitioners were responsible for delivering the project's outcomes. They ensured the validity of their constructs and interpretations through multiple iterations and follow-ups.

### *Phase III: Reflective discourse on the overall project*

In 2014, although the monitoring system was a managerial innovation for the company, the top management opted not to advance with its implementation after the testing phase. While this choice halted the actual use of the new monitoring system, it provided an opportunity for researchers to contemplate the reasons behind the initial interest in a customised IC measurement and reporting system and its eventual abandonment. Adhering to interventionist research guidelines, the researchers assessed the initiative's impact on the organisation. From 2014 to 2017, the researchers conducted five semi-structured interviews with the former 'go-to' person to gather insights on the organisational changes that transpired and the project's effects on knowledge transfer within individuals and the organisation.

## 3.4 The emic and etic perspectives in interventionist research

The research methodology employed in this study involved a cyclical process of analysis and action, alternating between an emic (inside) perspective within the company to engage with the project stakeholders and an etic (outside) viewpoint for data analysis. This iterative process entailed observing the organisation and its operations throughout. As highlighted by Jonsson and Lukka (2006), these emic and etic experiences play a crucial role in interventionist research as “this shift between differing logics provides opportunities for new insights since the researcher wants to achieve solutions that work in the field and come back with evidence of theoretical significance” (p. 3). In our study, the researchers transitioned between these modes during Phases I and II, with Phase III involving a shift to an external observer role detached from the organisation.

## 4. Findings

This section has two subsections. The first subsection outlines the business problem we aimed to address and explains the theoretical framework and relevant literature that we drew upon to

address this problem, specifically focussing on integrating IC measurement into sustainability categories. In the following section, we describe the collaborative process between professionals and researchers, which led to the development of a novel report and monitoring system. This system aimed to assess and monitor social and environmental initiatives. It provided a significant experimental opportunity for the company and allowed the researchers to apply academic theories practically (see Table 1 for details). Note that our findings are presented in a narrative style as this is an effective means of communicating organisational complexity. It is an approach consistent with the work of Weick and Browning (1986) and Kurtz and Snowden (2003), who argue that complexity and ambiguity are best understood through the medium of language, metaphor, and story.

**Table 1- Emic - etic stages and outcomes of the research**

<i>Phases</i>	<i>Emic (inside) –problem</i>	<i>Etic (outside) – purposeful theoretical frame(s)</i>	<i>Outcomes</i>
Phase I	How to measure IC	IC Theory (Stewart 1997 and others)	Design of the company’s IC map
Phase II	How to integrate IC with sustainability categories?	Scarce literature on the construct of ‘sustainable IC’	Design of the company’s sustainable IC map
	How to monitor social and environmental initiatives? (operational phase)	Seminal works (Surroca <i>et al.</i> 2010; Perrini <i>et al.</i> 2011; Ling <i>et al.</i> 2015)	Design of an IC reporting system to monitor social and environmental initiatives
Phase III	How to evaluate the impact of the research project on the organisation?	Interventionist research guidelines	Reflective discourse on the overall project

Source: Authors’ compilation

#### 4.1 How to integrate IC measurement into sustainability categories?

After the DJSI included the holding company in its assessment, the company's top management decided to integrate IT Co.’s IC into their new sustainability strategies. Visualising intangible resources marks an initial step towards managing IC such that it aligns with strategic goals (Roos, 1998; Mouritsen *et al.*, 2001; Marr *et al.*, 2004). We, therefore, recommended that at this stage companies operating in dynamic and constantly evolving environments, where the demands for social and environmental responsibility are particularly high, should consider revising their IC maps. Several authors have integrated environmental and social considerations into their IC frameworks, characterising sustainable IC as the knowledge that an organisation

can use in environmental management to achieve a competitive edge (Parisi and Hockerts, 2008; Huang and Kung, 2011; Chang and Chen, 2012; Wasiluk, 2013).

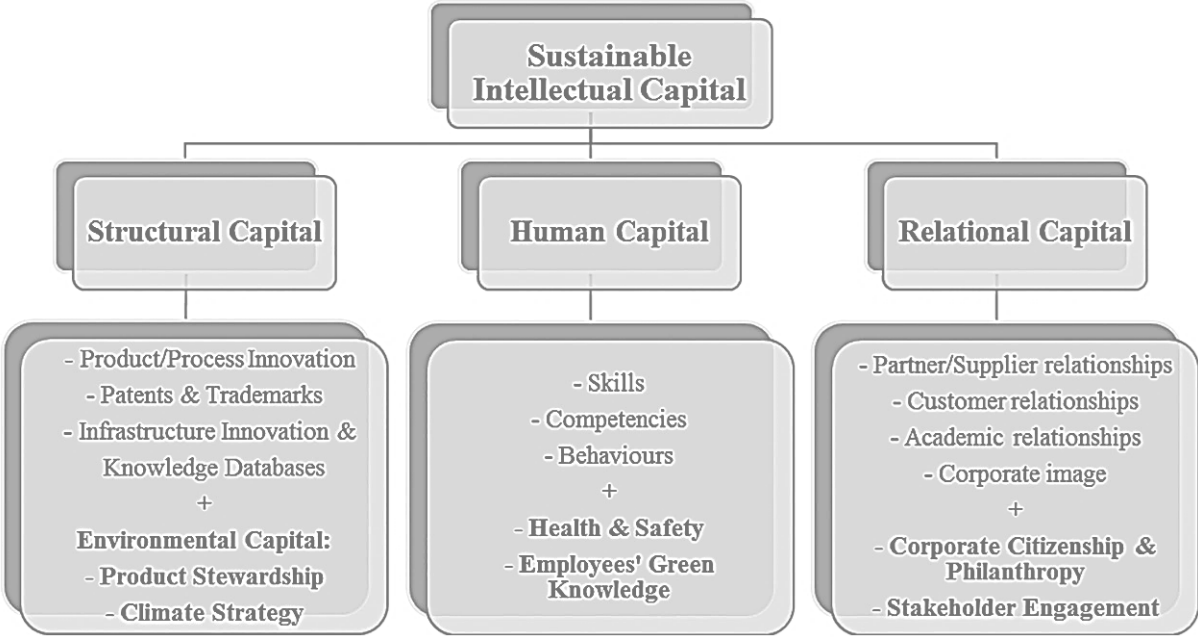
To integrate social and environmental considerations into the conventional definition of IC, we proposed a redefinition of the three pillars of IC to encompass knowledge related to social and environmental issues. Our recommendations to management were:

- (i) The definition of human capital should be expanded to include employees' knowledge, skills, attitudes, and behaviours towards social and environmental concerns. We suggested enhancing these elements through specialised training, personal development, and job experience.
- (ii) Structural capital should cover both the organisational and technological dimensions. The organisational aspect should encompass policies, processes, procedures, and routines implemented to meet social and environmental standards mandated by laws, norms, and industry guidelines. The technological dimension should involve intangible assets and accumulated knowledge related to the adoption and advancement of environmentally friendly practices, eco-design, sustainable production processes, greener facilities and machinery, and the development of new ecological products within the organisation.
- (iii) Relational capital should focus on the knowledge and information exchanged between a firm and its supply chain regarding social and environmental requirements and the company's connections to the market and the environment. This includes aspects such as eco-friendly brands, labels or certifications, the company's community reputation, and social interactions.

## 4.2 The design of the company's sustainability IC map

After analysing and sharing these theoretical frameworks with the team, we proceeded to the operational phase. It is important to note that the group undergoes an annual corporate sustainability assessment (CSA) with RobecoSAM (now conducted by S&P Global). The S&P Global CSA is a comprehensive tool used to evaluate companies' abilities to identify and respond to emerging opportunities and risks related to global sustainability trends. It involves completing a questionnaire of 80-100 questions blended across industries and tailored to specific sectors, in addition to an extensive review of the company's documentation. This CSA is the primary means of evaluating companies for inclusion in the DJSI. The results of the CSA form the basis for constructing the DJSI.

The project team thoroughly analysed the questionnaire to identify the main challenges faced by top management and determine the strategic intangibles that could support meeting societal needs. As a result, sustainability categories were integrated into the three main pillars of the IC map, as depicted in Figure 2, and discussed in detail in Appendix 1.



**Figure 2 – The company’s sustainability IC map**

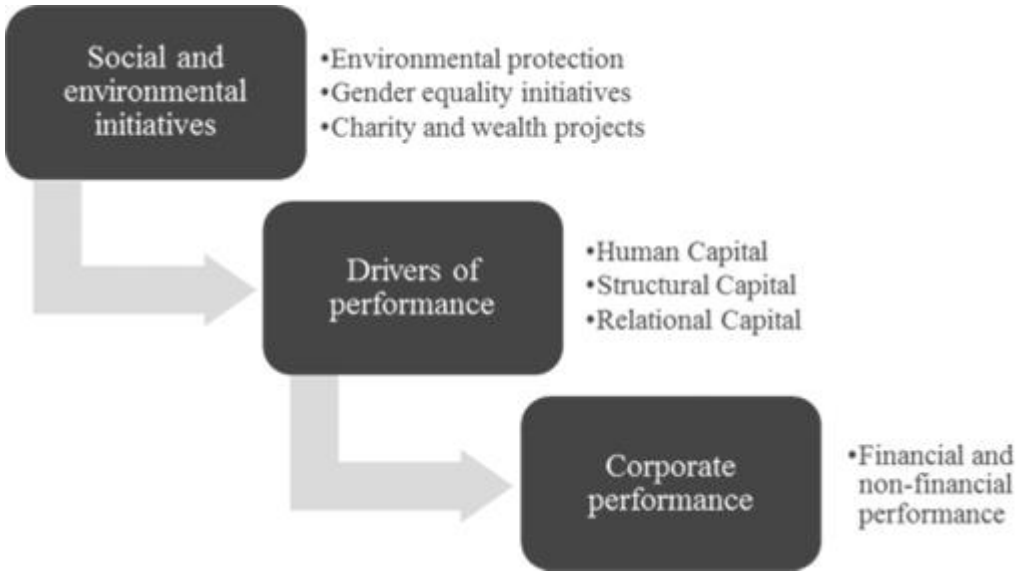
Source: Authors’ compilation

Creating a sustainability IC map was the initial stage in integrating social and environmental considerations into the company's business strategy. The map helped top management to visualise the key intangibles needed to achieve the company's sustainability goals. Further, this IC map was a powerful tool for designing a customised management control system that could evaluate and monitor IT Co.’s social and environmental initiatives. The project team developed this approach to help align strategy with operations, as explained in the following section.

**4.3 How to assess and monitor social and environmental initiatives?**

To enhance performance and address any gaps identified in the corporate sustainability assessment, IT Co. devised a series of social and environmental initiatives to be completed by the close of 2013. These initiatives involved activities like life cycle assessments (eco-design),

eco recycling, age diversity management, green communications, green procurement, and charity/welfare. However, despite these endeavours, the company encountered challenges when trying to evaluate the returns on these initiatives, both in financial and non-financial terms. To tackle this issue, the project team not only recommended that the company assess the impact of these initiatives on the strategic intangibles outlined in its sustainability IC map, but also that the intangibles be recognised as performance drivers. This analysis would provide management with insights into the indirect consequences of the initiatives on corporate performance. Gauged through both financial and non-financial metrics, these initiatives would showcase the firm’s dedication to heightened social responsibility. This method also underscored the flexibility of the IC sustainability map as a monitoring tool for overseeing sustainable performance. Hence, the project team formulated an IC management control tool for the company’s social and environmental initiatives to execute this strategy, as illustrated in Figure 3.



**Figure 3: A tailor-made model for monitoring social and environmental initiatives**  
 Source: Authors’ compilation

For further insight on how the process works in practice, please refer to Appendix 2.

**4.4 Reflections on the overall project: A critical assessment**

This section provides an overview of the research project's overall significance, while also offering insights into how interventionist research can be implemented. Table 2 presents a summary of the key aspects of this project.

**Table 2 - The overall project synopsis**

Phases	Emic (inside) problem	Etic (outside)	Role of researchers	Impact
Phase I	IC measurement	IC Theory Sense-making and Narrative Theory (Weick and Browning, 1986; Weick, 2001; Snowden, 2002)	Cultural mediators	Contamination
Phase II	Integrating IC & Sustainability management	Scarce literature	Pioneers	Reciprocal knowledge transfer between researchers and professionals
Phase III	Reflective discourse	Action research guidelines were used to evaluate the impact of the intervention on the organisation	Critical observers	Increased awareness & competence in researchers and professionals

Source: Authors' compilation

### Phase I - Researchers as cultural mediators

Phase I of the project involved the researchers acting as 'cultural mediators' who shared theoretical perspectives on the analysis (Stewart, 1997) and different methods for measuring IC, such as the market capitalisation approach (Bontis, 1998), the value-added intellectual coefficient (Pulic, 1998), and the knowledge narrative (Mouritsen *et al.*, 2001). Together, the team tested whether these theoretical frameworks suited the company context and the CEO's objectives. Thus, the team successfully built a common understanding around a set of theoretical perspectives (Weick and Browning, 1986; Kurtz and Snowden, 2003) while sharing the opportunity to use the lens of knowledge narrative theory (Mouritsen *et al.*, 2001, p. 735). Interestingly, we faced the greatest difficulties in trying to make the CEO, whose basic culture was engineering and technology, understand that we could not measure IC by means of a mere mathematical algorithm. The CEO wanted certain results, while all we could provide was a representation of the firm's knowledge resources and the transformative qualities that emerge from those resources in practice (Mouritsen, 2006). The CEO eventually validated the project, but the situation took an unfortunate turn when the CEO resigned shortly after.

Consequently, the IC representative found it challenging to gain broad legitimacy in an organisational culture shaped by engineers and technologists. This changing situation

highlights the role of top management's cultural background in influencing how firms understand and apply IC, and particularly its measurement. We found further understanding through the lens of upper-echelon theory (Hambrick and Mason, 1984; Hambrick, 2007; Gupta *et al.*, 2019). This theory posits that the characteristics of top management, such as age, gender, experience, and educational background, influence the decisions they make and the actions adopted by the organisations they lead (Hambrick and Mason, 1984). This theory is based on two fundamental assumptions. First, it suggests that executives tend to act based on their own interpretations of the strategic situations they confront. Second, the theory posits that executive behaviours are shaped by their unique experiences, values, and personalities, as highlighted by Dubey *et al.* (2019). Therefore, demographic characteristics are associated with the cognitive bases, values, and perceptions that influence a manager's decisions.

In our case, we highlight that the cultural background of top management, which was oriented toward engineering and technology, ultimately shaped the strategic choices made in this project. While the researchers were not the catalyst for organisational change, we acted as cultural mediators, building a bridge between a systematic view and a performative perspective of IC.

## Phase II - Pioneering researchers

During the second phase of the research project, the research team faced the challenge of integrating the company's IC measurement with the sustainability categories of the DJSI. At the time, this presented a challenge for the researchers, as the literature on these categories was scarce. This challenge led to an intellectual and creative effort on the part of the team to develop an IC sustainability map. The researchers evaluated the logical consistency of the proposed system, while the practitioners assessed its feasibility within the company. Given the experimental nature of the project, we entered it into IT Co.'s annual innovation awards, which are normally reserved for high-tech projects.

## Phase III - Researchers as critical observers

During Phase III of the project, we, as researchers, shifted our role from that of interventionist researchers to critical observers. Although we were no longer actively involved in the project, we were curious about why the new monitoring system was not implemented. Plus, we wanted to evaluate the overall impact of the project. What we found was that the role of a visionary leader is fundamental for spreading a new managerial culture, such as the one proposed in this

project. Unfortunately, our champion CEO resigned during the project, and so it was abandoned due to a lack of broad legitimacy within the organisation's engineering and technology culture. This is consistent with upper-echelon theory.

Nonetheless, the transfer of mutual knowledge between the researchers and professionals involved in the project proved to be invaluable. The skills and knowledge gained have been used by individuals of the project team in different contexts and organisational positions, as per the interview with the 'go-to' person. This highlights the value of interventionist research, which not only reflects upon the observations of the researcher but also the impact that interventions have on the organisation, as described by Dumay (2010). According to Downey and Kuusisto (2009), the primary benefit of interventionist research for researchers is the ability to gain insights into the implementation or non-implementation of new management innovations within organisations. Therefore, while the project did not achieve its ultimate goal, it did provide valuable insights and skills transfer that can be used in future organisational change initiatives.

## 5. Conclusion

This study examines the relationship between IC and sustainability within a leading, publicly listed Italian information technology firm. More specifically, we investigated the design of an IC reporting system intended to improve sustainability performance through interventionist research in collaboration with the company's practitioners. In doing so, we developed a management control tool to measure and manage the company's intangible resources, including its skills, competencies, knowledge, innovation, values, legitimacy, trust, and reputation, as a way of enhancing the firm's sustainability performance. Our proposed management control system is novel in that it provides a comprehensive framework for systematically incorporating sustainability thinking into corporate practice. We found that the IC measurement system within the company allowed IT Co. to develop a deeper understanding of its IC, which helped it develop more effective sustainability initiatives. Notwithstanding the fact that this framework was developed to meet the specific needs of IT Co., practitioners can still use this construct as a guide to systematically incorporating sustainability thinking into their own corporate practices, as there is the potential for this framework to lead to more effective sustainability initiatives and improved overall performance. Furthermore, from a policy perspective, this study highlights the importance of integrating intellectual capital management with sustainability efforts.



Despite its promising approach, however, the implementation of this novel system was halted following the departure of the CEO, who had been its primary advocate. Nonetheless, the exchange of mutual knowledge between the researchers and practitioners was internalised and integrated within the organisation, so as to enrich the skills of the individuals involved in various organisational contexts and positions. Notably, this study takes an innovative approach, involving close collaboration between scholars and practitioners to promote sustainable performance through improved management control tools. The findings hold significant implications for other organisations seeking to improve their sustainability efforts through similar initiatives. Moreover, this paper's critical discourse adds to the practice of interventionist research by expanding the dialogue on its application in practical, context-specific scenarios.

Notably, this study draws upon the works of Guthrie (2001), Mouritsen (2006), Demartini and Paoloni (2013), and Baard and Dumay (2018). Consistent with the performative research stream of IC, we acknowledge that IC represents a collection of knowledge-based resources that have transformative potential through their practical application. Thus, measuring IC is a 'convention' that equips managers with a better understanding of the impending challenges and key knowledge-based resources that a firm must mobilise. Grounded on this premise, our management control model presents a novel approach that provides a comprehensive structure for integrating sustainability principles into corporate operations in a systematic manner. This framework holds significant potential for fostering sustainability thinking within corporate practice and has significant practical implications for organisations seeking to enhance their sustainability efforts.

Finally, our observations and conclusions are confined to the analysed case study and are based on our interpretations of the facts. As such, caution should be exercised in generalising any of the findings outlined in this study. Future researchers should continue to explore how companies manage, measure, and report on their intangible resources to enhance sustainability. Scholars may also want to investigate how IC and sustainability initiatives might be implemented and received in various contexts, such as different industries, organisation sizes, or geographical regions. Pilot projects and case studies can serve as an effective starting point as they enable individuals involved in day-to-day activities to proactively address emerging problems and opportunities, laying the foundation for future research into the management, measurement, and reporting of intangible resources to enhance sustainability performance. Comparative studies across different institutional contexts could provide valuable insights into best practices and potential challenges in integrating IC and sustainability initiatives.

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## Appendices

### Appendix 1 - Embedding sustainability categories as per the DJSI into the company's IC map

- **Structural Capital** (*Environmental Capital: Product Stewardship and Climate Strategy*).

Product stewardship refers to a company's ability to formally include environmental elements into their R&D processes, i.e., reducing hazardous materials; reducing weight; the disassembly and reusability of products/components; recycling leftover materials, etc. It also refers to assessing the environmental impact of products through life cycle assessments. Climate strategy refers to several items – these being: a) how the company manages product-related environmental information (i.e., centralised inventory databases; tools for environmental design integrated with other design tools; environmental information integrated into product data management systems); b) how the company rewards the development of low-carbon solutions; and c) research on the long-term effects of its products on human health and the environment.

- **Human Capital** (*Health & Safety; Employees' Green Knowledge*).

Health & safety refers to the organisation's ability to reduce/minimise lost time, injury frequency rates, illness frequency rate, and fatalities, which is the combined outcome of dedicated organisational processes and employee behaviour. Employees' green knowledge concerns the workforce competence regarding environmental issues, e.g., competence in using tools to manage product-related environmental information; or staff and management training for implementing green certifications.

- **Relational Capital** (*Corporate Citizenship & Philanthropy; Stakeholder Engagement*).

Corporate citizenship & philanthropy refers to the company's ability to help improve local development and to add value to the local economy, as well as to meet national

and international charitable appeals through grants, donations, and by supporting and promoting employee volunteering programs. This category also includes relationships with specialised NGOs. Stakeholder engagement refers to a company's ability to create a dialogic communication with its stakeholders. This is generally assessed by analysing the principles that guide the company's relationship with stakeholders, which are usually formulated at a corporate level. Examples include identifying the issues and stakeholders considered to be most important for long-term success; feedback from stakeholders to the board and/or other senior directors; and the public availability of the results of engagement processes.

Source: Authors' compilation

## Appendix 2 - How the process works in practice

To show how the process works concretely, we focussed on measuring IC as well as its impact on corporate performance in terms of the *Age Diversity Management* initiatives. This initiative focuses on workers over 50. This is a relatively simple project, which straightforwardly shows how our developed management control tool works in practice.

### ***Age Diversity Management***

The aim of this initiative is to address the problems of an aging workforce in today's regulatory and economic context. On the one hand, this new regulatory context has raised the retirement age for workers; on the other, the economic environment in which the entity operates is characterised by intense competition and technological innovation, which requires corporations to maintain high levels of efficiency and productivity using an ageing workforce. To handle these issues, IT Co.'s management identified two main challenges.

The first, called "*Management and development of the senior workforce*", has to do with maintaining up-to-date skills and professional competencies in one's senior workforce. This involves planning pathways of professional and managerial development compatible with their workforce's age. The HR department was therefore involved in mapping the technical and managerial competence of the over-50 staff, comparing their profiles with the competencies and behavioural characteristics required for their positions.

The second challenge, called "*Knowledge transfer*", addressed the issue of knowledge transfer within a high-tech company from senior to junior employees. Senior workers with the ability to hand down knowledge were identified for use as 'in-house lecturers', and a lecturing and tutoring plan was developed. The transfer of knowledge is crucial when the firm-specific know-how has not been codified in manuals, procedures, portals or technological infrastructures.

However, without a management control approach focused on drawing attention to how to mobilise the company's intangibles, such initiatives may fail to foster knowledge-based

resources within the company. Thus, key indicators are used to monitor the above-mentioned management challenges.

The impact of the *Age Diversity Management* initiative on the three pillars of the company's IC map is evident, as outlined in Appendix 3.

The impact on the annual financial performance of social and environmental initiatives cannot be directly estimated, as the traditional accounting systems only track the costs related to using tangible resources, not the benefits related to an increase in intangible assets. Therefore, measuring the impact on the company's IC can be seen as a means to focus on their value creation impact.

At the same time, the initiative demonstrates the company's commitment to increased social responsibility. In particular, the management control tool shows versatility as a monitoring tool for sustainable performance on the DJSI, which highlights the positive impact a company might have on the stakeholder engagement index thanks to these initiatives.

### Appendix 3 - Indicators for the *Age Diversity Management* initiative

	<i>Driver</i>	<i>Driver</i>	<i>Driver</i>	
<i>Management challenges</i>	<i>Structural Capital</i>	<i>Human Capital</i>	<i>Relational Capital</i>	<i>Expected impact on corporate performance</i>
<b>Management and development of the senior workforce</b>	<b>Knowledge infrastructure/database</b> 1) Competency database (no. of mapped profiles and their % out of the whole over-50 workforce and out of the company's total workers) 2) No. of planned pathways of horizontal/vertical career development for employees over 50.	<b>Competences</b> No. and hours of training programs delivered to the over-50 workforce.	<b>Stakeholder engagement</b> No. and % of senior employees involved.	<b>Financial indicators</b> Expected positive effects on revenues in the medium period.  <b>Non-financial outcomes</b> Increase in stakeholders' engagement index included in the CSA.
<b>Knowledge transfer project</b>	<b>Knowledge infrastructure/database</b> N°. of planned teaching/mentoring courses for the company's academy involving in-house senior lecturers.	<b>Competences</b> Learning tests (to assess the knowledge transfer).	<b>Stakeholder engagement</b> No. and % of senior employees involved in teaching/mentoring courses.	

Source: Authors' compilation