Investigating the "fate" of Intellectual Capital indicators: a case study

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Abstract

Purpose – Although several frameworks for measuring and reporting Intellectual Capital (IC) have been developed over the past two decades, their actual use in practice is still limited. The purpose of this paper is to answer the call to analyze IC practices from a critical and performative perspective by investigating how and why IC indicators may end up not being used, thus shedding light on the barriers to their use.

Design/methodology/approach – The paper presents a single in-depth case study and focusses attention on the fragility of the IC indicators as well on the interactions that occur among subjects while transmitting IC indicators.

Findings – The case analysis shows how the different perspectives and expectations that are at stake when subjects engage with IC indicators can play a central role in hindering or enabling their use in practice. Expecting IC indicators to be able to accurately represent and to objectively signal the size and the growth/decline of IC, i.e. to be complete and isomorphic measures, can act as a barrier to their use. The case also shows that scores play a role in hindering the use of the IC indicators; the subjects disputed the scores when they did not confirm their perception of reality, and the lack of completeness and isomorphism of the IC indicators, i.e. their fragility, was the reason put forward to justify the subjects' refusal to accept the scores and thus, to use these measures.

Research limitations/implications – Although the use of a single case study provides in-depth and rich data, it also limits the generalizability of the observations to other companies. Moreover, the findings obtained may be influenced by the specific IC framework and indicators adopted.

Originality/value – Differently from most previous IC research, this paper focusses attention on the transmission of indicators and ultimately, on their "fate," and it contributes to the understanding of how and why IC indicators may be produced but not used, thus hindering the diffusion of IC frameworks in practice.

Keywords Intellectual Capital, Case study, Indicator fragility, Indicator transmission and use, Non-financial indicators

Paper type Research paper

1. Introduction

Intellectual Capital Accounting (ICA) has caught the attention of academics and practitioners over the past 20 years, as shown by the proliferation of frameworks for measuring and reporting Intellectual Capital (IC). Despite the abundance of the proposals, their actual adoption by companies is still limited (Lönnqvist *et al.*, 2009; Dumay, 2009a, 2012). Consequently, there has been a call for critically investigating IC practices through a bottom-up performative approach (Guthrie *et al.*, 2012; Dumay and Garanina, 2013). This call aims to shed light on what works and does not work in companies in which IC has been actually measured, reported and managed (Dumay, 2012, 2014).

While the role that narratives have in mobilizing IC has catalyzed the attention of scholars (Mouritsen *et al.*, 2001; Cuganesan *et al.*, 2007; Dumay and Rooney, 2011; Dumay and Roslender, 2013), the role played by numbers is still an area open to research

Journal of Intellectual Capital
Vol. 17 No. 2, 2016
pp. 238-254

1469-1930
DOI 10.1108/JIC-03-2015-0033

(Catasús and Gröjer, 2006; Catasús *et al.*, 2007; Mouritsen, 2009; Guthrie *et al.*, 2012). When investigating the relationship between measurement and management, organizational adages like "what gets measured gets managed" (Kaplan and Norton, 1996, p. 2) stem from the assumption that the production of indicators automatically leads to action. However, not everything that is measured is actually managed because what happens during the transmission and reception processes may deeply affect the likelihood of the indicators being used for managerial purposes (Catasús and Gröjer, 2006). In this respect, previous IC research has been predominantly focussed on proposing new frameworks for measuring IC and on the IC indicator production process, while the "fate" of the indicators has been given little attention (Catasús and Gröjer, 2006, p. 189). Therefore, this paper aims to contribute to filling this research gap by investigating the following research question:

RQ1. How and why may IC measures, once produced, end up not being used?

To answer this research question the authors present a case study of a company which has been measuring its IC for several years and in which IC indicators have frequently ended up not being used. In particular, the paper focusses on one emblematic situation referred to the transmission of an IC index built to fulfill the information needs of the CEO. Differently from previous IC research, this paper focusses attention on the interactions which developed among subjects during the IC indicator transmission process, that is, during the selection of the indicators and when they were presented to the CEO. At the core of the disputes was the issue of the fragility of IC indicators, which affected their "fate."

The paper contributes to the ICA literature by showing how the different perspectives and expectations that are at stake when subjects engage with IC indicators can play a central role in hindering or enabling their use in practice. In particular, the paper points out that expecting IC indicators to be able to accurately represent and to objectively signal the size and the growth/decline of IC, i.e. to be complete and isomorphic measures, can act as a barrier to their use.

Moreover, the paper sheds light on the role that scores can have in mobilizing IC, thus contributing to the call made by Catasús and Gröjer (2006, p. 199) in this regard. More specifically, in the case under analysis the IC indicators' scores did not match the user's expectations and the lack of completeness and isomorphism of the IC measures, i.e. their fragility, was the reason put forward by the CEO (the user) to justify his refusal to accept these scores, thus inducing him not to use IC indicators for managerial purposes.

A further contribution can be appreciated from a practical point of view, also. Acknowledging the difficulties which may arise during the transmission process and being aware of the different expectations the subjects can have when they interpret the indicators can help companies to enable IC management practices.

The structure of the remainder of the paper is as follows: Section 2 presents the literature review and the research question, and Section 3 describes the method chosen to answer the research question. Section 4 illustrates the case study and focusses on the disputes which arose around the IC indicators. Finally, Section 5 discusses the case findings and Section 6 concludes the paper by presenting its main contributions.

2. Literature review

ICA has gradually caught the attention of scholars and practitioners over the last twenty years. Using a generally accepted definition, in this paper ICA is intended as "an accounting, reporting and management technology of relevance to organizations to

understand and manage knowledge resources. It can account and report on the size and development of knowledge resources such as employee competencies, customer relations, financial relationships and communication and information technologies" (Guthrie *et al.*, 2012, p. 68).

A plethora of guidelines and models for measuring IC have been developed by academics and practitioners (Andriessen, 2004; Sveiby, 2010), the aim being to foster management practices that would increase the competitiveness of companies and improve IC disclosure. Despite this, IC measurement frameworks are not so widespread in practice (Dumay, 2009a, b, 2012; Lönnqvist *et al.*, 2009; Chiucchi, 2013a). Therefore, there has been a recent call to analyze IC measurement in practice from a critical and performative perspective (Guthrie *et al.*, 2012; Dumay, 2013, 2014). Taking a critical approach implies challenging the current taken-for-granted assumptions with the aim to critique rather than to criticize (Alvesson and Deetz, 2000; Dumay, 2009a). Conducting research adopting a performative approach to IC measurement means assuming that IC does not have a predefined essence and that it is not possible to identify a priori its form and functions or its role within an organization. Instead, it means acknowledging that IC is context-dependent and is given a meaning by subjects in the specific situation to which it is applied (Mouritsen, 2006).

The performative research agenda is directed toward investigating how IC is understood and implemented in practice (O'Donnell *et al.*, 2006; Dumay, 2012, 2014; Guthrie *et al.*, 2012), in order to understand what really happens in companies in which IC is measured, reported and managed, by providing insight on what works and does not work in organizations using a bottom-up approach (Mouritsen, 2006, p. 820), as well as on how and why successful (or unsuccessful) experiences occur (Dumay, 2012, p. 12).

Narratives and numbers coexist in all the IC measurement frameworks proposed, albeit in varying proportion according to the framework considered (Andriessen, 2004; Sveiby, 2010). Thus, performative studies on IC measurement have focussed their attention on narrating and numbering IC and on their ability to favor IC mobilization and management. In this paper, mobilizing is intended as "the process of moving an organization from a state of passiveness to a state of activeness: to mobilize is to marshal resources (of all kinds) to promote acting […]. Mobilizing is the act of summoning attention, resources and strategies for acting" (Catasús *et al.*, 2007, p. 509).

While the role that narratives have in mobilizing and managing IC has been extensively investigated (Mouritsen *et al.*, 2001; Cuganesan *et al.*, 2007; Dumay and Rooney, 2011; Dumay and Roslender, 2013), the role played by numbers is still an area open to research (Catasús and Gröjer, 2006; Catasús *et al.*, 2007; Mouritsen, 2009; Guthrie *et al.*, 2012)[1]. It is important to highlight that, when talking about numbers, the reference is essentially to non-financial numbers as IC frameworks are composed predominantly of non-financial indicators (Andriessen, 2004; Sveiby, 2010).

Scholars have investigated the role that numbers have in mobilizing and acting upon IC in practice, through a bottom-up approach, using predominantly qualitative methods. The role of IC indicators and their contribution to IC mobilization have been explored in relation to three specific phases: production, transmission and reception. Borrowing from Catasús and Gröjer (2006, pp. 188-189), production is referred to the framework chosen and to the assumptions of how and why indicators are produced, transmission regards the selection process and how and when the indicators are presented and finally, reception has to do with the relationship between indicators and action (their ability to affect management or not), in other words with their "fate." These phases are tightly connected as they develop on a continuum.

Regarding the production process, research has acknowledged the importance of involving managers in designing the IC indicators in order to let them gradually engage with IC and think and learn about it, thus fostering their understanding of this phenomenon and increasing the chances of mobilizing it (Dumay, 2011; Chiucchi, 2013b; Chiucchi and Dumay, 2015). Moreover, avoiding one-size-fits-all solutions by designing IC indicators according to the specific features of the company in which they are to be used, such as strategic objectives and key performance areas or critical processes and organizational structure, has proven to be essential to helping managers mobilize IC (Dumay, 2009a). Attention has also been paid to some aspects that can create obstacles during the production process, for instance, the complexity of the data collection and of the calculation processes (Catasús and Gröjer, 2006). These processes can entail the implementation of new procedures and often require the contribution of many information providers who are found throughout the company. Identifying the information providers and obtaining their cooperation for projects which are rarely related to their day-to-day activity is not an easy task (Demartini and Paoloni, 2013). In addition, the effects of these efforts are sometimes short-lived as measures can rapidly become obsolete because of changes in the competitive environment and/or in the information needs of the users (Dumay and Rooney, 2011; Chiucchi, 2013b).

Concerning the transmission process, research has shown that there are different means to present and select IC indicators in order to mobilize IC. A way to promote IC mobilization is by "dramatizing" indicators (Catasús and Gröjer, 2006, pp. 195-196). "Dramatization" is obtained when indicators are accepted as an expression of something relevant for the company political agenda, when they are constructed taking the subjects' points of view, are easily calculated and interpreted and are understandable so that their results can be translated into action. Finally Catasús and Gröjer (2006, p. 197) argue that it is essential that indicators are labeled in such a way that they catch managerial attention.

Creating causal maps is another way to design and also to transmit IC indicators because this tool can favor subjects' understanding of how IC works in the specific business context in which it is deployed (Cuganesan, 2005; Cuganesan and Dumay, 2009). As far as IC indicators are concerned, using the causal map as a platform for extracting a set of measures can support the measurement of the dynamic aspects of IC, i.e. the interactions among intangible resources activated in the value creation process (Marr *et al.*, 2004). Understanding the dynamic dimension of IC is essential for managers, in order for them to govern the value creation process. Therefore, the combination of causal maps and IC indicators can increase the likelihood of IC mobilization by providing information on the length of the lag and the persistence of the effects of managerial actions (Montemari and Nielsen, 2013). Causal maps can be used not only to display the role played by IC in the value creation process of companies, but also in their value destruction process: as a matter of fact, if IC is badly managed, it can lead to negative value consequences, giving rise to intellectual liabilities (Giuliani, 2013).

Moreover, the transmission process is also related to how and when IC indicators are presented to the information users. A way to promote IC mobilization is to link IC numbers to specific organizational challenges: this increases the chances of IC being mobilized as organizational subjects understand that IC itself can help them carry out their tasks or reach their aims (Dumay and Guthrie, 2007).

As far as the reception process is concerned, IC indicators, once produced and transmitted, may (or may not) stimulate actions upon IC. Mouritsen (2009, p. 154) maintains that IC measurement is "necessary" as it can foster intervention on IC in at least two ways. On the one hand, measurement helps to construct new managerial objects

which do not exist in reality but which managers have to deal with; in other words, measurement makes it possible to create visibility for IC. On the other hand, measurement can also foster intervention by extracting IC entities out of their context and putting them on hold, at a distance from processes, in a measurement system. Through their personal knowledge, managers may make sense of measurement and add their own perspective to IC, thus promoting actions upon it and changing it. In this sense, IC measurement does not create necessarily more certainty, but it makes at least some form of intervention possible (Mouritsen, 2009, p. 159).

Nevertheless, the path to reception can also be fraught with barriers. The formal knowledge represented by IC numbers can be criticized by the company's subjects; these measures are provocative because they "open new visibility and problematize deeply rooted local practices" (Vaivio, 2004, p. 61) and can provoke strong reactions from those organizational subjects whose actions are publicly exposed through these indicators. However, the IC measures can succeed in supporting the managerial decision-making process in some organizational areas by enabling the dialogue between central and local management levels concerning operational and technical problems and by promoting collectively negotiated remedial actions (Vaivio, 2004).

Furthermore, Catasús and Gröjer, (2006) hypothesize that an indicator score may have a role in mobilizing IC during the reception process as the score may emphasize, for better or for worse, some particular aspects that need attention or must be changed, especially if this matches the user's interests. The role played by the indicator score in enabling or hindering managerial actions on IC should be further explored (Catasús and Gröjer, 2006).

IC indicators may end up not being used when meeting the resistance of the users who may question the measures' relevance and validity within the organization: IC numbers can be considered too mechanistic and partial as they may fail to capture the real issues concerning the phenomenon to be measured, i.e. the company's IC (Vaivio, 2004, p. 61). Moreover, these measures may be seen as lacking objectivity and neutrality and this can cause ambiguity and conflicting interpretations of the numbers themselves (Vaivio, 2004, p. 55).

It is important to highlight that, when exploring the transmission and the reception processes, i.e. the "fate" of IC indicators, their fragility emerges. First, producing numbers entails a process involving a quantification of qualities as "the quantity that is expressed by a number is a quantity of something – and that something is a quality" (Robson, 1992, p. 688). This translation of qualities in quantities can be problematic: objects can be counted but their distinguishing qualities are no longer evident because they disappear after the quantification process (Mouritsen, 2009, p. 157). Therefore, once produced, numbers may be perceived as incomplete, i.e. not capturing all the dimensions of performance (qualities) deemed relevant (Jordan and Messner, 2012, p. 545). In this regard, Catasús and Gröjer (2006, pp. 191-192) observe that, when it comes to account for IC entities with the ambition to create legitimate numbers, managers may question the completeness of these numbers and may end up asking themselves "what are we measuring?." Even though IC measures could very well reflect the structure of the essential qualities of IC, their completeness will always be disputable because "measurement can happen against any number of dimensions none of which can claim better representation than others" (Mouritsen, 2009, p. 157).

Second, numbers cannot be isomorphic since they cannot take over the properties of the world, and the ambition to create correspondence between the real world (IC) and the world that is represented in the measurement system (IC numbers) is not realistic

(Mouritsen, 2006, 2009). This concept means that the world cannot be directly manipulated just by manipulating measurements because IC measures are fragile as "they do not have immutable referents and they can therefore not stand for robust phenomena in the world" (Mouritsen, 2006, p. 831).

In sum, the issues of incompleteness and isomorphism expose the fragility of IC indicators: measurement is not essence but convention, because IC numbers find meaning when they are positioned and contextualized inside a specific system of representation with its own conventional rules and procedures (Mouritsen, 2006, p. 824).

The literature review on the role of IC numbers in IC mobilization shows that the IC indicator production process has catalyzed Scholars' attention, whereas the transmission and the reception processes require, and deserve, additional analysis. So, the "fate" of IC measures is an area that should be further investigated (Catasús and Gröjer, 2006; Catasús *et al.*, 2007).

Analyzing situations in which the problems experienced during the IC numbers' transmission process have impeded their reception could help to understand why IC frameworks fail to be widespread in practice. Moreover, carrying out this investigation would contribute to answering the call for more performative research to investigate how IC mobilization can be fostered (Catasús and Gröjer, 2006; Catasús *et al.*, 2007; Mouritsen, 2009) and what works and what does not work in practice (Guthrie *et al.*, 2012; Dumay, 2012, 2013).

Therefore, the authors investigate the following research question:

RQ1. How and why may IC measures, once produced, end up not being used?

As Lukka (2007, p. 95) states, providing an answer to the how questions can help to explain why something happens. Thus, the paper will focus on the way IC measures are transmitted and on how this may influence their "fate." The interactions among subjects while they are engaging with IC numbers will represent the core of the investigation.

3. Method and data

In order to answer the research question, the authors propose a single, in-depth case study of an Italian medium-sized company which has been measuring its IC for several years. During the time period that is being focussed on in this paper (2005), the company had already developed an IC Report addressed to the managers and to the CEO, who was the sponsor of the project and who was gradually becoming the main user of the IC information. The following analysis will be centered on the transmission of an IC index designed to satisfy the CEO's information needs.

The case study method was chosen to answer the research question because it allows for a holistic and in-depth analysis of a complex phenomenon in its real-life context (Yin, 2003; Scapens, 2004; Lukka, 2005). Therefore, this method is particularly suitable for exploring IC, which is complex and context-dependent by nature (Mouritsen, 2006; Jørgensen, 2006). Moreover, the choice of a single case enhances the in-depth nature of the analysis because it allows the researchers to get a richer and thicker understanding of the phenomenon and the context in which it takes place – "richer" in terms of quality and quantity of information on the phenomenon under analysis (Ferreira and Merchant, 1992) as well as on the reasons that lead subjects to perform certain actions (Ahrens and Dent, 1998), "thicker" in terms of opportunities to generate theoretical reflections on the phenomenon itself (Baxter and Chua, 1998). The case was chosen purposefully (Patton, 1990) because several episodes in which IC indicators ended up not being used took place in the case company.

The data presented in this paper was predominantly collected through direct observations carried out during meetings and through document analysis (internal reports and presentations). One of the two co-authors attended the six meetings in which the IC index was selected, presented to the CEO and discussed with him. The meetings lasted 15 hours (from a minimum of two to a maximum of three and a half hours each). The researcher was not allowed to record but only to take notes. The "24-hour" rule was applied, meaning that the notes referred to observations were completed within one day of the meeting (Eisenhardt and Bourgeois, 1988; Scapens, 2004).

The trust developed during an interventionist research project (aimed at designing the company's IC measurement and reporting system) allowed one of the researchers to also have access to informal talks which took place before and after the meetings, as well as to some of the meetings in which the controller and his assistant designed the IC index. In the specific episode analyzed in this paper, the researcher acted essentially in a non-interventionist mode. For the sake of completeness, it is important to state that, when the consolidated measure had to be selected, the controller asked the researcher to suggest scientific literature he could consult to find additional consolidated indexes to integrate the ones he had already considered. Afterwards, the controller asked the researcher to verify the correctness of the presentations addressed to the CEO in which the different consolidated measures were analyzed.

At the beginning of the observational period, two semi-structured interviews were carried out with the controller and his assistant (who actively participated in the implementation of the measurement system, in gathering data, in calculating the indicators) and one with the CEO. The three interviews lasted one hour and half and were aimed at understanding the reasons for calculating a consolidated measure and the expectations with reference to it. More recently, for research aims, the two authors carried out four semi-structured interviews with the controller and his assistant in order to collect further information and their opinions on the whole IC measurement project, which also included the episode concerning the IC index. Interview data were essentially used to triangulate the observational data on which this paper is based.

The semi-structured interview was chosen as a method for collecting data because of its high degree of flexibility. The opportunity to address themes which come to light during the interview enhances the understanding of the motivations that drive the interviewee's actions as well as his/her interpretation of the reality (Kvale and Brinkmann, 2009; Qu and Dumay, 2011).

A qualitative data analysis was applied to the interview and observational data as this made it possible to focus on the meanings the respondents attributed to the IC numbers and to what had happened as well as to maintain sensitivity to the context (Denzin and Lincoln, 2000; Patton, 2002). In line with the performative approach, subjects' verbatim quotes will be provided throughout the paper (in italics and quotation marks).

4. The case study

Tolomeo[2] is a medium-sized manufacturing company, headquartered in Italy, that sells its products all over the world.

The company has been measuring its IC for several years. At the outset, the IC project was aimed at developing a measurement tool able to support the managers' decision-making process regarding IC, in a manner consistent with the business strategy. The sponsor of the project was the CEO who believed that the company's performance strongly depended on IC. He considered the project a challenge and was

aware that it meant experimenting with something that was not only new for the company, but which was also not well-established in research and practice.

The first outcome of the IC project was an IC Report addressed to all managers. Then, the project aim was changed and attention was focussed predominantly on the CEO's expectations and needs. In order to respond to his requests, the controller developed some IC measurement tools (i.e. IC consolidated indexes and a Tableau de Bord). The authors will tell the story of the IC index developed in 2005 and they will follow the subjects while engaging with the IC indicators. The focus will be on the subjects' attempts to reach agreements and compromises on the IC index. The authors choose this specific situation since it exemplifies the nature of the disputes which arose around other IC measures and measurement tools and it exemplifies their "fate" within the company, as well.

At the end of a meeting in which the new IC Report was presented to the CEO and each indicator was assigned a "traffic light" color to signal whether its trend was positive (green), negative (red), or neutral (yellow), the CEO asked: "But which color should I assign to Human, Organizational and Relational capitals? There are too many indicators and I cannot understand if my IC is doing well or not!." This question and the discussion which followed opened up new paths for the project development as the controller realized that the CEO required very few consolidated indicators, if not just one, which could be useful to express the overall growth or decline of IC and, as a consequence, could show the effectiveness of the actions undertaken for its management.

The controller explored the characteristics and the pros and cons of the different consolidated measures, both financial and non-financial, already proposed in the IC literature (e.g. market to book ratio, Tobin's *Q*, value added intellectual coefficient, calculated intangible value, knowledge capital earnings, economic value added, IC index) and, during a meeting, presented them to the CEO. Because of his background in management and accounting, he wanted to be involved in the decisions regarding the most appropriate measures to be used. In particular, a few indicators (such as EVA) were immediately shelved when the CEO raised doubts on the "extreme subjectivity" of their building process and on the difficulties in interpreting their information content. Instead, the IC index proposed by Roos *et al.* (1998) caught his attention; he found it "intelligible" and able to express the growth or decline of IC as a whole in a "completely new way" and "[…] focusing attention on the most relevant aspects of our intangibles."

The controller expressed serious concerns about the IC index by pointing out some of its limitations such as, among others, the subjectivity affecting the choice and the weight to be attributed to the indicators to be consolidated, the risk of an excessive selectivity and the difficulty in using it for comparing the company's IC with that of other companies (which was one aspect deemed relevant by the CEO). The controller pointed out that the IC index would only very roughly represent the direction of the changes in the company's IC, without tracking the IC size or growth. Nevertheless, the CEO said that he was "confident that this 'new' index could succeed where others had failed" and insisted that it should be experimented. Indeed, despite these doubts, the controller acquiesced and gave in to the CEO's information needs, thinking that if he perceived the IC index as the most appropriate indicator to fulfill his aims, this would increase the chances that it would be used. This was the main concern for the controller, since up until then, the CEO had never used the IC information produced.

In order to build the IC index, three IC category indexes were first created, one for each IC category (Human Capital, Organizational Capital, Relational Capital):

$$\text{IC index} = \text{HC index} + \text{SC index} + \text{RC index}$$

The building of the category indexes was a step-by-step process. For each category, the controller selected, from the IC Report, the most relevant indicators to aggregate according to three criteria:

- direct link between the intangible measured by the indicator and the company performance;
- capacity to express different facets of the category under consideration; and
- lack of a specific unit of measurement: in order to make the aggregation possible, only indicators expressed as percentages were considered.

In order to be consistent with Roos *et al.* (1998, p. 86), each of the selected indicators had to be weighted according to the importance that the intangible they were referred to had in the value creation process and in the industry where the company operated. Since assigning a weight to every indicator implied an in-depth knowledge of the company strategy and business, the controller decided, in the meantime, to use simple means and left this task to the CEO, i.e. the person who had the deepest knowledge of the company's strategy.

When the IC index was presented to the CEO, he criticized it from several points of view and disputes arose between him and the controller. First, the CEO showed his discontent with the building process of the IC index, justifying his position by stating that it was "too dependent on subjectivity and ambiguity." He raised doubts about the ability of the selected indicators to effectively represent the category they belonged to, wondering if it could be possible to find "more representative" indicators. The controller grounded his justification by showing that the selected indicators were simultaneously an expression of "the most relevant aspects of the company's IC and fundamental drivers of the company performance." To support his position, he explained and drafted (through maps) the cause-and-effect relationships, which linked the indicators to the company's performance.

He explained that as far as the Human Capital Index was concerned, three indicators were selected: the career tracking index, the working relationship index, and the employee loyalty index. The first one was chosen as a proxy of the trend of employees' competences: carrier advancements were not automatic at Tolomeo but linked to actual improvements in the employees' ability to carry out their tasks. The second one was selected because it was assumed that a stimulating working environment could increase the likelihood that employees exploit and share their competences and knowledge, thus increasing the efficiency and effectiveness of activities and, in turn, the performance of the company as a whole. The third one was chosen as an expression of employees' loyalty: the ability to retain the best competences was considered by the CEO to be a fundamental driver of the company's competitive advantage.

The CEO himself agreed that the criterion for choosing the indicators to consolidate was appropriate but wanted to explore the possibility of replacing some indicators with others which could more directly measure the chosen Human Capital aspects. After some attempts, the CEO concluded that the controller's choice was the best one, considering the data available.

As expected by the controller, the CEO challenged the use of simple means in building the consolidated indexes since he thought that the intangibles they represented did not affect the company's performance to the same degree. The controller caught the ball on the bounce and asked him to try to assign a weight. He refused, arguing that this procedure would have increased the subjectivity of the building process even more and added that the controller "should find an objective way to weight the IC indicators."

The controller said that it was not possible and stressed that the IC index was not a "perfect recipe" and that it would always be subjective. He insisted and tried to convince the CEO to give an approximate estimate of the intangibles' (and thus, of the indicators') weight by arguing that "It's not necessary to assign a precise weight. You should consider looking at the IC index from a different point of view […]. The IC index is a 'picture', it can give an idea of the direction of the company's IC, not an exact measure of it." The CEO did not consider this option and "accepted" simple means. In his opinion, it was a way to decrease the arbitrariness of the index and added that it was "the lesser of two evils."

Finally, the controller calculated the previous years' trend of the IC index and of the category indexes. When these trends were presented to the CEO a new dispute arose and the problems, which had seemed to have found a solution, resurfaced. Even though the consolidated measures showed a slight positive trend over the three-year period considered, the scores did not match the CEO's perceptions because the IC index was "too low and its growth too slow." He expected to see a higher growth and justified his position arguing that, over the years, he had notably invested in developing the company's intangible resources: "Those investments were aimed at increasing the level of our IC and at enhancing the productivity of employees and their capacity to fulfill the company's needs. I am sure that these investments have led to higher results." Therefore, he declared that he was "sure" that the company's IC had grown more than what had emerged from the IC index which was considered "somehow faulty because of its subjective building process."

The controller argued, again, that the variation in the indexes as well as their entity should be considered a "picture" of the category or of the company's IC and he explained: "You cannot expect the same clear and incontestable relationship that you can find among efficiency, cost, revenues and returns. This index can give you an idea of what happens and could be used as a starting point to reflect on the validity of the actions undertaken. […]. If the indexes double, this does not mean that the IC value doubles but only that, probably, it has increased. It is not the same relationship which exists between an increase in efficiency and a consequent reduction of cost or a doubling in price and the subsequent increase in turnover."

This experiment did not yield satisfactory results. The controller calculated and transmitted the indexes but they were not used. The CEO did not abandon the quest for a consolidated measure. He suggested "inventing" alternative measures potentially able to fulfill his information needs. For instance, the CEO was convinced that employees (and their competences) had a sort of "life cycle" within a company and therefore, a company could manage its personnel by finding the most appropriate balance among the life-cycles of all employees. He asked the controller to design an "employee life-cycle index." This index was built but, again, disputes arose around critiques similar to the ones previously discussed in this paper and they never were resolved.

5. Discussion

The situation analyzed in the paper was chosen, among others that the case study presented, as emblematic of the disputes which developed in the company when the CEO engaged with IC indicators. More specifically, the IC index and the indicators which formed it were criticized, during the transmission process, by the CEO who expressed his discontent to the controller with reference to the selection and consolidation processes first, and then, to the scores they provided.

The first time the IC index was presented to the CEO, the objects of dispute were the indicators chosen to be consolidated as their ability to be the most influential on the company performance was criticized. Both the controller and the CEO agreed on the criteria that those indicators had to be in a strong cause-and-effect relationship with the company performance, i.e. they agreed on the criteria to assess the completeness of the IC index. Therefore, they relied on their technical knowledge of the company to identify the most reliable indicators to reach this aim. The selection of the IC indicators to include in the IC index was a process involving the construction of the properties and the attributes of the company's IC. In our example, at the end of this selection process, the company's Human Capital emerged as a new and visible managerial object composed of employee competences, working relationships and employee loyalty, which were measured by the career tracking index, the working relationship index and the employee loyalty index. The faster careers grew, the better the working relationships were, and the more employees were loyal, the higher Human Capital was.

At this stage, the CEO criticized the selected indicators wondering whether it was possible to find other indicators which more intensely affected the company performance. The controller justified his choice by showing how the chosen indicators were linked through cause-and-effect relationships to company performance and he supported his choice by using rhetoric and artifacts (he drafted maps of the hypothesized relationships).

The CEO problematized the completeness of the IC index by wondering if it was possible to find "more representative" indicators which were able to affect the company performance more intensively. In other words, he wanted to improve the ability of the IC index to capture all the dimensions of performance deemed relevant. Ultimately, this dispute was settled as the controller's explanation was sufficient to convince the CEO that the indicators chosen were "the best" among those available to represent IC, its attributes and its relationship with the company performance; thus, an agreement was reached. This agreement was only temporary, however. The IC index was again criticized and new disputes arose.

When the weight assigned to the indicators to be consolidated in the IC index came into question, the CEO justified his refusal to give a subjective weight estimate by pointing to the need to look for an objective estimate of the influence of the underlying intangibles on the company performance. By asking for an objective way to weight indicators, he demanded an isomorphic representation of the company's IC through a set of strong mathematical variables able to stand in for IC and translate its dimensions into a number.

Instead, the controller proposed interpreting the weight to be assigned to the indicators in a more "flexible" way, emphasizing that the IC indicators should be considered similar to a "picture," that they should give "an idea" of the underlying phenomenon. In other words, he did not intend to attempt to identify a precise correspondence between IC and IC indicators as he was aware that IC measures could not precisely reflect the dimensions of IC itself in a number. The controller's concern was to provide a measure which could be used by the CEO for acting upon IC and this was the reason why he produced the IC index, despite his doubts about the limitations of this consolidated measure.

At this stage, a compromise was at any rate crafted on the use of simple means. The CEO was firmly convinced that an objective way should and could be found, but instead of providing a subjective estimate, he preferred to use simple means. Nevertheless, the situation remained uncertain and when the scores were presented to the CEO, a dispute arose again between him and the controller over the IC index.

Indeed, the scores did not match the CEO's expectations and he experienced discontent, arguing that he expected a higher result considering the financial resources he had invested in IC over the years. Using these justifications, he was anchored again to the logic of objective relationships as he expected the index to show a clear association between the investments made in IC and the IC index scores. Besides this, it is worthy of note that he expected the number to reflect not only a different (higher) result but one he judged adequate from his point of view, one which was "fair," in his mind. Since the score obtained was not the one he expected, he considered the index to be unreliable. So, the compromise reached in the previous dispute revealed itself to be only temporary because the CEO revitalized the dispute by bringing up the lack of isomorphism and the resulting weakness of the measure.

According to the controller, instead, the IC index and its scores were not an exact representation of IC, in this particular context, and this was clearly expressed by the words he used to justify his position; he stated that indicators should be considered "a picture" or "an image," "show a direction," or "give an idea of" and should be used as an input to managerial decisions rather than as a precise representation of the underlying reality.

To summarize, the indicator transmission process was characterized by various agreements and compromises which revealed themselves to be temporary. They were quickly broken at each new step in the transmission process (first, during the selection of the indicators, then, when they had to be weighted, and finally, when the scores were calculated) and when the achievements were presented and shared with the CEO.

During the disputes, in fact, the IC index was interpreted differently by the CEO and the controller. The CEO assumed that the indicator was able to accurately represent and objectively signal the phenomenon's worth and was therefore an exact measure of its increase or decrease, i.e. he expected IC indicators to be complete and isomorphic. In the end, the CEO justified his rejection of the IC index because of its lack of objectivity, while the controller considered the index to be a "picture" of the phenomenon rather than an "exact measure" of it: he was not looking for a rigorous quantification of IC, but for something which could create visibility for IC, could help the CEO reflect upon it, and promote intervention on it. In other words, there was a key controversy between the CEO and the controller which entailed a clash between two conflicting positions and expectations on measurements in general, and IC indicators in particular. The CEO was convinced that it was possible to find a measure which could correspond to an existing economic reality. This was the reason why the IC indicators' completeness and isomorphism were problematized despite the compromises reached. When the scores did not match his perception of reality, the lack of completeness and isomorphism was used to support his rejection of the IC measures. On the contrary, the controller was convinced that the IC indicators were useful as long as they created visibility for IC, promoted reflections on it and supported actions on it.

The CEO never abandoned his intent to ask the IC indicators to provide objective and precise measurements of the entity and the growth or decline of IC. The CEO was not willing to change his position as he neither shared the perspective nor accepted the explanations offered by the controller. The conflicting perspectives and expectations regarding IC numbers acted as a barrier to their use in practice.

6. Conclusions

This paper contributes to answering the call for more performative research on IC in practice (O'Donnell *et al.*, 2006; Dumay, 2012, 2014; Guthrie *et al.*, 2012) by presenting a case in which the production and transmission of IC indicators did not lead to their

reception (use) and thus, did not lead to act upon IC. In order to explore the process which led to the non-use of IC measures, the paper has focussed attention on how and why these measures became the object of disputes at the case company and on how and why they were debated.

While Dumay and Guthrie (2007, p. 114) state that the introduction of IC measures has contributed to changing managers' "cost and financial outcome mindset," the case examined in this paper shows a different outcome: the IC indicators did not promote a change in the managers' mindset. The authors found that this was due to the fact that the subjects had contending perspectives and expectations when engaging with IC indicators. Therefore, disputes were ended through compromises which were problematic nonetheless, because they proved to be temporary and prone to being broken, thus preventing the acceptance of the IC indicators. Consequently, IC was not mobilized and managed (at least not via this means, i.e. via IC indicators).

Similarly to Vaivio (2004), the authors acknowledge that IC numbers can be criticized by the company's subjects. Vaivio (2004) identifies the provocative nature of non-financial indicators, i.e. referred to their ability to publicly expose managers' actions, as one of the factors which can prevent their use. In this paper the authors found a different hindering factor: the different perspectives and expectations that are at stake when subjects engage with IC indicators. Thus, the authors confirm and refine the findings of Vaivio (2004) by shedding light on the reasons why the lack of objectivity and neutrality may cause conflicting interpretations. The case has clearly shown that expecting IC indicators to be able to accurately represent and to objectively signal the size and the growth/decline of IC, i.e. to be complete and isomorphic measures, acted as a barrier to their use. On the contrary, when IC indicators were interpreted from a different perspective, which brought into focus the fact that IC measures were not a precise and objective representation of an underlying reality but they directed attention and created visibility on IC, then they were at least accepted, if not used. Therefore, using IC numbers entails accepting a greater or lesser degree of subjectivity, uncertainty and approximation. This implies, in turn, that subjects acknowledge the fragility of IC indicators and accept the fact that IC measures cannot capture all the essential dimensions of IC and that IC indicators cannot precisely copy the size and the growth/decline of the IC dimensions themselves in a number.

Furthermore, the paper sheds light on the role that scores can have in mobilizing IC, thus contributing to the call made by Catasús and Gröjer (2006, p. 199) for more research on the "fate" of indicators. Catasús and Gröjer (2006, p. 197), in talking about "dramatizing" indicators as a way of mobilizing action, state that "the score also serves as an actor in the dramatization […] ex post after the measuring, calculating and reporting processes it seems that the score has to carry some dramatic element."

Differently from Catasús and Gröjer (2006), the case under analysis shows that the expectations placed on the scores played a significant role in hindering actions on IC: the IC index and the IC category indexes were criticized by the CEO who had expected them to confirm the results he believed had been achieved. In other words, the CEO expected the scores to reach a certain level, i.e. the level which he supposed could corroborate his idea of how high the company's IC was. The fact that the scores were not as high as expected was sufficient for him to break all previous compromises, re-activate disputes, and ultimately, not use the IC index. The CEO justified his refusal to accept the scores by again questioning the indicators; in his mind their fragility made their scores unreliable. The absence of clear and precise relationships between IC and

company value, as well as the lack of objectivity when selecting and weighting indicators, made the scores vulnerable to the CEO's criticism.

The authors maintain that IC scores were disputed because they did not confirm what the CEO expected from them, and that it is precisely the fragility of IC measures, i.e. their lack of completeness and isomorphism, that permitted the CEO to refuse the validity of the scores. In other words, the CEO was convinced that it was possible to find a complete and isomorphic measure but he was also aware that, considering all the compromises reached, the calculated IC index was not. Therefore, when the scores were not as high as he expected, the CEO used the incompleteness and lack of isomorphism of the IC index to refuse the scores and, as a result, the IC index was problematized, again. Nevertheless, the authors should point out that they do not know if the IC indicators would have been disputed if they had confirmed what the CEO was expecting from them.

The above-mentioned findings, which are referred to an unsuccessful experience, can also shed light on the obstacles that arise when using IC measures and frameworks. In this sense, the paper contributes to understanding how and why IC frameworks are not widespread in practice.

From a practical point of view, acknowledging the difficulties which may arise during the transmission process and the different expectations the subjects can have when interpreting the indicators can help companies make the transmission process itself more effective, favor IC mobilization and anticipate potential problems along the way. This could enhance the spread of IC measurement tools in practice and the actual use of IC indicators to guide managerial actions on IC.

In closing, it is important to acknowledge the limitations of this paper. Even though the use of a single case study provides in-depth and rich data, it also limits the generalizability of the observations to other companies. Moreover, the findings could have been influenced by the specific IC indicators analyzed.

Thus, it could be interesting to investigate IC measurement in other companies which have been using different IC frameworks and indicators. This would help to understand if and how the ones implemented and the specific interactions among subjects have influenced the findings, helping to enrich the analysis of the barriers to IC mobilization and to the actual use of IC measures in practice. To conclude, it is worth noting that all the observations concern non-financial indicators specifically referred to IC. It would be interesting to understand if and how the object of analysis, i.e. IC, has influenced the findings and to understand if the latter could be extended to non-financial indicators referred to other objects of analysis.

Notes

1. To avoid misunderstandings on terminology, in this paper the terms "number," "measure" and "indicator" are used interchangeably.
2. Tolomeo is a pseudonym of the case company. The use of a fictitious name is to preserve the anonymity of the organization.

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