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Unlocking intellectual capital

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Abstract

Purpose – The intellectual capital (IC) literature argues that introducing the IC concept into a company focusing on measuring can be detrimental and lead to IC "accountingisation". Using Chaminade and Roberts' (2003, p. 747) concept of IC accounting "lock-in", the paper asks "is it possible for an organisation initially to implement and "lock-in" IC accounting practices and subsequently "un-lock" IC through a more strategic managerial approach?" The authors also investigate if and how, after IC has been "un-locked", can a new IC "locking-in" process occur? The paper aims to discuss these issues.

Design/methodology/approach – The authors present an interpretive case study of implementing a system for measuring and reporting IC in an Italian public sector utility company. The analysis uses Actor-Network Theory (ANT) to analyse data and discuss findings which is an appropriate theory for case studies using an interpretive approach.

Findings – The findings are contrary to Chaminade and Roberts (2003, p. 733) because the authors challenge the notion "that a dominant accounting perspective can lead to an excessive focus on measurement issues and little attention to management processes". The evidence from the case study shows how at times a dominant focus on accounting for IC is necessary, especially to allow newcomers to take stock, and make sense, of IC. The analogy is much like comparing accounting vs managing IC to the concept of the chicken and the egg: what comes first?

Research limitations/implications – Because the study looks at IC over time, it allows the authors to develop different insights into IC "because IC is not an event, but a journey" (Dumay *et al.*, 2015). Thus, the critique of Chaminade and Roberts (2003) and other IC research based on a short time period is that it does not allow researchers to fully follow the IC's impact on an organisation. Additionally, the authors also highlight the role academic researchers can play in understanding how IC works inside organisations, especially when the authors examine how deeply (or not) a researcher intervenes in implementing solutions (see Dumay, 2010).

Practical implications – The research exemplifies how IC can make a difference for public sector organisations because there is a need for studies such as the authors which exemplify how to introduce the IC concept into public sector organisations and at what point should the IC concept "enter" the organisation (see also Secundo *et al.*, 2015). Doing so re-emphasises that IC is not an ostensive concept. Rather, "IC is part of a configuration of knowledge management and actively mobilised to condition effects" (Mouritsen, 2006) and to make a difference (Tull and Dumay, 2007).

Originality/value – This paper is a must read for academics and practitioners seeking to understand how to introduce the IC concept into an organisation.

Keywords Case study, Interventionist research, Third stage IC research, Actor-Network Theory, IC accounting, Measuring, Mobilising and managing IC

Paper type Research paper

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1. Introduction

Intellectual capital (IC) as an innovative management technology is topical in the academic literature and practice. Over the years, IC research has progressively changed its focus. Initially, researchers were concerned with theory building and raising awareness, but more recently, IC research has turned to gathering evidence to justify the use of IC as a management technology (Guthrie *et al.*, 2012). The most recent approach is performative, aimed at analysing how IC works in organisations, how it manifests itself, and how people, processes and relationships are mobilised in relation to it (Cuganesan, 2005; Mouritsen, 2006; Cuganesan *et al.*, 2007; Dumay, 2009). This critical approach has been called the "third stage of IC research" (Guthrie *et al.*, 2012; Dumay and Garanina, 2013).

Recent studies investigating how organisations work with IC when it enters from the accounting perspective have made useful observations (Chaminade and Roberts, 2003; Cuganesan, 2005; Cuganesan *et al.*, 2007; Dumay, 2009). For example, Chaminade and Roberts (2003) highlight that the IC concept's entry point in companies that do not have previous experience with IC, strongly influences IC's development trajectory. If accounting is the entry point, then the focus will be on IC measurement and little attention will be initially paid to IC management processes. These organisations are "locked-in" to the accounting domain, in which actors' attention predominantly orients towards measurement rather than management issues. Chaminade and Roberts (2003, p. 745) point out that more benefits accrue when using a strategic entry point for "building new routines around knowledge-based value creation" instead of measuring and reporting.

Research conducted by Cuganesan *et al.* (2007) and Dumay and Rooney (forthcoming) sheds further light on the IC "lock-in" to accounting phenomenon. In studying the IC "codification-ambiguity paradox", the research shows how IC ambiguity can help prevent a "lock-in" phenomenon. Ambiguity, in fact, allows managers to apply IC to their problems (Cuganesan *et al.*, 2007) and to achieve their individual goals (Dumay and Rooney, forthcoming). These authors also call for further research to understand in more depth the role of IC ambiguity and how this ambiguity helps to mobilise IC practices rather than IC measures.

In keeping with the third stage IC research, this paper responds to the call for performative IC research. We investigate if it is possible for an organisation initially to implement and "lock-in" IC accounting and measuring practices and subsequently "un-lock" IC through a more strategic managerial approach. To answer our research questions, we present a case study based on implementing IC in an Italian public sector utility company. Using ANT, we will follow the actors as they "lock-in", "un-lock", and then "lock-in" to an IC accounting framework. The longitudinal analysis untangles the dynamics that are at the basis of "locking-in" and "un-locking" IC.

2. Literature review

Research into IC as a management technology has taken a turn towards understanding IC in practice in what Guthrie *et al.* (2012) identify as the third stage of IC research. Initially, Petty and Guthrie (2000) outlined two stages associated with developing IC research. The first focuses on raising awareness and understanding IC's potential to create and manage competitive advantage. The research helped create IC discourse, frameworks and guidelines. For example, the Skandia Navigator (Skandia, 1994), and the MERITUM (2002) and Danish guidelines (Mouritsen *et al.*, 2003). Typically, early academic papers argued "intellectual capital is something significant and should be

measured and reported", without referring to specific empirical research (Petty and Guthrie, 2000, p. 162).

In contrast, second stage IC research established IC as a legitimate management technology, gathering evidence to justify its use (Petty and Guthrie, 2000, pp. 155-156). This research focused on applying IC frameworks to create value, by increasing profits and share prices. Unfortunately, this argument began to falter as earlier proponents and participants abandoned their initial enthusiasm for IC, for example, Skandia (Dumay, 2012). Thus, the espoused benefits of managing IC have often not been realised (O'Donnell *et al.*, 2006).

Third stage IC research emanates from the reluctance of organisations to take up IC practices, which caused some pundits to declare IC at "a crossroads of relevance" (Chatzkel, 2004; Marr and Chatzkel, 2004). Subsequently, there is an increasing interest in investigating how organisations use and adopt IC, especially when the IC concept enters an organisation from the accounting perspective (Cuganesan, 2005; Mouritsen, 2006; Cuganesan *et al.*, 2007; Dumay, 2009). Thus, third stage IC research calls for "critical field studies which will provide empirical studies of IC in action" (Guthrie *et al.*, 2012, p. 79).

During second stage IC research, Chaminade and Roberts (2003) investigate how the IC concept enters firms. Their research compares two different projects, in Spain and Sweden, aimed at firms introducing an "intellectual capital management system" (Chaminade and Roberts, 2003, p. 737). In their research, Chaminade and Roberts (2003, p. 747) highlight that IC is a vague concept for IC newcomers, being companies that do not have previous experience with the IC concept, and its meaning evolves as they start experiencing IC in practice. Chaminade and Roberts (2003) observe that if accounting is the entrance point and the initial objective is to measure IC, then the focus will be on measuring not on managing IC.

Conversely, if the IC concept is introduced with a strategic managerial intent, for example, to develop new practices for creating value through the exploitation of knowledge, then the IC concept is used as a means of transforming IC resources. In the process, firms aim to discover how to create value from IC and to reflect on how they can further influence its creation. Thus, the objectives that drive the introduction of the IC concept and give meaning to IC projects affect the way the firm develops IC (Chaminade and Roberts, 2003, p. 743). More specifically, Chaminade and Roberts (2003, p. 748) found that when the IC concept enters from the accounting perspective, a "lock-in" to accounting takes place. Therefore, the firm is functionally "locked-in" towards measuring IC rather than managing IC, which can be detrimental because it reduces the "potential for change and novel management actions" (Chaminade and Roberts, 2003, p. 747). For this reason, "accounting seems to be a wrong anchor when dealing with IC (or knowledge) management issues for the first time" (Chaminade and Roberts, 2003, p. 734).

The IC "lock-in" to accounting phenomenon is similar to what Dumay (2009, p. 205) calls the "accountingisation of IC", whereby accountants apply accounting solutions to management challenges in an attempt "to make the intangible tangible". To lessen the negative effects of IC accountingisation Dumay (2009, p. 205) highlights the need to focus attention on measuring IC interactions rather than just quantifying IC stocks. Dumay (2009, pp. 205-206) also stresses the importance for practitioners and researchers to learn and utilise new skills, such as "the ability to apply alternative modes of investigating IC by utilising complexity, narrative, numerical, statistical and visual techniques". More recently the accountingisation phenomenon, its dysfunctional

effects and the possibilities to reduce them has attracted other researchers' interest. For example, Habersam *et al.* (2013, p. 322) outline "if top management stipulates too much focus on separate aspects of connected activities, indirectly important aspects and activities may thus be hampered, which in turn hampers overall performance along the value chain".

The IC literature does focus on specific elements that can reduce the accountingisation phenomenon. Some examples are studies on connectivity (Skoog, 2003), the use of narratives (Mouritsen *et al.*, 2001; Dumay and Rooney, 2011; Dumay and Roslender, 2013) and trying to understand how IC contributes to value creation through visualisations (Marr *et al.*, 2004; Cuganesan and Dumay, 2009; Jhunjhunwala, 2009; Montemari and Nielsen, 2013). However, these studies are silent on the process leading to IC accounting "lock-in" and on if and how it is possible to "un-lock" IC. For this reason, we ask "is it possible for an organisation initially to implement and "lock-in" IC accounting practices and subsequently "un-lock" IC through a more strategic managerial approach? Besides being interested in exploring the process leading to IC "locking-in" to accounting and then, to "un-lock" IC from it, we are also interested in understanding the reverse process; if and how, after IC has been "un-locked", can a new IC "locking-in" process occur? By answering these questions, we contribute to the debate on IC accountingisation by reflecting on if and why accounting dominance can have positive or detrimental effects.

Building on Chaminade and Roberts' (2003) IC accounting "lock-in" we refer to the process of introducing the IC concept for accounting reasons which leads to focus actors' attention predominantly on IC measuring and reporting issues *per se*. In other words, when accounting is the point of entrance for the IC concept, the latter risks to become somewhat "stuck" to measurement routines. When using the expression "un-locking" IC from accounting we refer to the reverse process, which leads to freeing the IC concept from accounting "strings" and to focus on managing IC. Finally, when we refer to a system for measuring and reporting IC, we mean a system that accounts for IC using narratives, numbers and images (Mouritsen *et al.*, 2001; Meritum Project, 2002).

3. Methodology

To answer the research questions, we present a case study based on implementing a system for measuring and reporting IC in an Italian public sector utility company. The case study uses an interpretive approach (Scapens, 1990; Ahrens and Dent, 1998; Denzin and Lincoln, 1998). A case study methodology is appropriate because introducing a system for measuring and reporting IC means introducing a new concept and a new accounting technology, with characteristics and underlying logic that are new for the actors involved. The interpretive case study approach permits us to "hear the voice" of actors and to understand the meaning they attribute to IC (Bukh and Kjærgaard Jensen, 2008).

Since we are interested in exploring the process of introducing the IC concept and its subsequent journey inside an organisation, it is fundamental to follow the actors experimenting with IC and to understand where they focus their attention, on accounting or on managing. For this reason, we use ANT to analyse data and discuss findings and more specifically the four translation moments identified by Callon (1986): problematisation, interessement, enrolment and mobilisation. Additionally, ANT is useful for longitudinal studies following actors over time (Bukh and Kjærgaard Jensen, 2008, p. 148).

Translation is particularly suitable to analyse the case. Callon originally uses translation to follow three researchers and their intervention in attempting to

domesticate scallops in St Brieuc Bay, France (Callon, 1986, p. 203). In Callon's story, he follows the researchers working with scallop fishermen to lay the lines for the scallop larvae to attach, which ultimately fails. Similarly, we follow a researcher intervening in the field and getting other actors to "comply" with her (Callon, 1986, p. 201) in building a system for measuring and reporting IC. Therefore, our story also follows a researcher working with a manager in an attempt to lay the foundations of a system for measuring and reporting IC, with the hope that other managers will "attach" themselves to IC. Thus, we use Callon's (1986) four moments of translation as described next.

Problematisation refers to an actor formulating a question (a problem) that other actors may be interested in taking up to achieve their specific interests. Solving the problem serves as an obligatory passage point (OPP) for the actors to reach their aims. The actor formulating the question also determines the actors in the network, defines their identity, interests and problems and links between them. Thus, this actor "speaks for the others" and is the network's centre (Callon, 1986, p. 214). To get actors to "pass through" the OPP, the central actor uses interessement devices. These devices build consensus between each entity and the network's centre and breaks other links between the entities that propose a competitive problematisation (Callon, 1986, pp. 208-209).

Interessement is successful if the entities accept the proposed roles and form an alliance, and thus enrolment occurs. The dissenting entities do not enrol and do not take part in the network. Once the alliance forms, it is temporary, and all links need to be continuously stabilised. Therefore, translation never ends. To translate means "to displace" entities from where they originally are and, through a series of transformations, mobilise them to form an alliance with other actors, to reassemble at a certain place and point in time (Callon, 1986, p. 216).

The case study site is CompanyB, a public utility company in Italy, managing and maintaining water supply (potability, wastewater treatment, sewers), energy distribution (sale of natural gas and energy, energy savings, etc.), environmental services (waste collection and disposal, street cleaning, composting) and public lighting. CompanyB is medium-sized and has 300 employees; its shareholders are 21 Italian municipalities. Over the last decade, radical changes have occurred in the Italian local public utility sector due to the progressive deregulation of traditional monopolies. As a consequence, competition for supplying public utilities has increased, and utility companies have searched to take advantage of new growth opportunities. Hence, CompanyB identified that IC was one way of identifying new growth opportunities through leveraging its IC.

Consistent with the interpretive approach, we adopt a narrative approach to tell the *story* of IC "lock-in" and "un-locking", along with diagrams to visualise the links among entities and clarify aspects crucial to forming a network (Callon, 1986). The key figure in our narrative is Ms Scholar, the researcher, whose role is central to the study's outcomes because the research is conducted using an interventionist research approach. This is a case study, whereby the researcher, Ms Scholar, cooperates with the host organisation, promoting solutions to actual problems, contributing to theory at the same time (Kasanen *et al.*, 1993; Lukka, 2000; Jönsson and Lukka, 2005; Dumay, 2010). As Jönsson and Lukka (2005, p. 4) explain:

> In this sense interventionist research is field experimentation where the researcher, not having complete control over the design of the experiment, seeks to determine the experimental situation through observation, acts on that situation in concert with the host organisation, observes process and outcome, and analyses findings in view of the relevant literature.

In our story, Ms Scholar's involvement occurs in three distinct phases:

- Phase I – from the middle of 2004 to July 2005: designing, developing and implementing an IC measurement system leading to publishing an external IC report;
- Phase II – from late 2005 to the end of 2007: CompanyB worked with IC; and
- Phase III – from the beginning of 2008 to July 2008: writing a new IC report.

In Phase I, the researcher uses a "strong" interventionist approach (Jönsson and Lukka, 2005, p. 23). Therefore, Ms Scholar cooperated with CompanyB, designing and implementing a system for measuring and reporting IC. This interventionist approach permitted Ms Scholar to make both practical and theoretical contributions (see Kasanen *et al.*, 1993; Lukka, 2000; Jönsson and Lukka, 2005; Dumay, 2010). Ms Scholar had already constructed a similar system in another company, and this gave her the opportunity to refine and test its usability (Kasanen *et al.*, 1993; Lukka, 2000).

During Phase I, Ms Scholar was a "member of the team", so she was involved in decisions and actions aimed at achieving objectives with CompanyB's managers. Ms Scholar's involvement is consistent with an interventionist approach, in which participant observation is the main "research weapon" used. Nevertheless, data is also collected through interviews and reviewing internal documents (Jönsson and Lukka, 2005; Dumay, 2010). In our research, Ms Scholar attended project meetings and spent 35 days working on designing and implementing the IC system. Additionally, Ms Scholar conducted, recorded and transcribed 21 semi-structured interviews along with field notes (Eisenhardt and Bourgeois III, 1988, p. 741; Scapens, 2004, p. 267).

In Phase II, the intervention mode changed from "strong" to "non-interventionist" allowing CompanyB to learn how to use IC. The interviews and discussions aimed at understanding how actors were using IC and focused attention on what to do next. Ms Scholar intervened by providing her view on the changes, although any decisions were ultimately made by CompanyB. However, we cannot exclude that during the interviews and discussions Ms Scholar stimulated the change process by increasing IC awareness. In Phase III, the intervention mode changed back to "strong", to help design and produce an external IC report.

To ensure construct validity we sent the case study to Dr Couch, who read and corroborated our findings. He confirmed that our story is true and fair account of what happened. This procedure, confers construct validity to case study research, as outlined by Yin (2014, p. 198) who recommends having the case study report reviewed "not just by peers (as would be done for any research manuscript) but also by the informants and participant in the case".

We consider it useful to focus on developing the IC system rather than critiquing it or espousing its merits because we are concerned with introducing IC as is internalised, interpreted and mobilised. As Callon (1986, p. 201) advocates:

> […] the observer must consider that the repertoire of categories that he uses, the entities that are mobilised, and the relationships between these are all topics for actors' discussions. Instead of imposing a pre-established grid of analysis upon these, the observer follows the actors to identify the manner in which these define and associate the different elements by which they build and explain their world.

Thus, the story begins ….

4. The CompanyB story

CompanyB's story unfolds from 2004 to 2008 over three phases, (2004-2005, 2005-2007 and 2008). The first culminates in producing an internal and external IC report, and the third an IC external report. Here we unfold a story of how entities form a network to "lock-in" IC to account for IC and then how the network transforms, allowing IC to be "un-locked". We first outline CompanyB's motivation to measure IC in Phase I, and then continue the story of IC in the subsequent phases. We also outline the movements of an IC researcher actor (Ms Scholar), through constructing ("lock-in") and deconstructing ("un-locking") IC using Callon's (1986) four translation movements.

4.1 Why IC?

Against a backdrop of radical change in its industry CompanyB decided to undertake an internal growth strategy leveraging existing synergies among its core businesses by entering into new markets such as renewable energy. It also improved process efficiency. Developing these new markets matches the desire by senior managers to maintain CompanyB's culture consistent with its core value of "doing things well". In this regard, Dr Couch, a central actor in our story, who is the manager who engaged Ms Scholar to help develop IC in CompanyB, outlines:

> Over time, we have tried to establish and perform a strategy coherent with our culture and our values. More specifically, we pay great attention to social values and, among these, to correct and fruitful relationships with suppliers, whether they are big or small-sized companies, public or private […] without forgetting the need to control costs […].

In 2004, Dr Couch launched the project to measure and externally report IC. Besides the responsibilities for developing CompanyB's human resources and information technology, he also developed the ISO 9001 quality system and was the promoter and supporter of CompanyB's sustainability report. Having read some IC articles, he concluded that measuring and reporting CompanyB's IC was the "natural development" of managing "softer" resources, a process begun in the 1990s:

> The IC report should show what we have done, in the last few years, to develop CompanyB personnel and our information system, to improve the knowledge management process, to try to fulfil our customer needs. […] Measuring IC should help me to show that all efforts made, in the last years […] have generated benefits for us and for the stakeholders (Dr Couch).

Dr Couch's aim in publishing an external IC report was to complete CompanyB's external reporting system, complementing the financial and sustainability reports. He believed the synergistic use of these three documents could provide CompanyB and its stakeholders with a 360-degree view of how the organisation utilised its financial, environmental and intangible resources, linking this to how CompanyB created value for its stakeholders.

4.2 Phase I – Accounting for IC: "locking-in" the IC report (2004-2005)

Problematisation. As Callon (1986, p. 203) outlines, the first translation moment is problematisation, or how a researcher becomes indispensable. Dr Couch contacted Ms Scholar in early 2004 after hearing about an IC project she had carried out in another Italian company. They met five times so that Ms Scholar could develop an understanding of CompanyB's needs and know more about its business and strategy. Additionally, Dr Couch acquired knowledge on what it means to measure and report IC. He also wanted to know more about different ways of measuring IC and of the

characteristics of the IC model designed by Ms Scholar and used in the other company, as he outlined in an early interview:

> I want to make a conscious choice of the best way to measure CompanyB's IC. I have heard about the possibility of expressing IC value in one single financial measure. Is it possible? How can I understand which part of it is attributable to each intangible resource, to competencies, for example? (Dr Couch).

Discussion continued by phone and e-mail, with Ms Scholar being provided with a range of company documents. In return, she prepared IC PowerPoint presentations, and ad hoc documents, specifically to resolve Dr Couch's doubts about measuring and reporting IC. A further meeting with the project leader of the first company adopting Ms Scholar's IC model took place because Dr Couch wanted to "hear the voice" of somebody who had undertaken a similar project. He needed to be sure that Ms Scholar could successfully deliver the IC project considering time constraints and data availability:

> There is not much time, and we should not underestimate the fact that we usually use financial measures to control company performance, turnover, costs, investments […] I saw the ones the other company used, and we do not have many of them and we cannot ask for the help of the controlling function, they are too busy (Dr Couch).

Thus, questions remained. Did CompanyB have enough data to measure IC? Did they have the resources to measure IC? Would their people cooperate and help measure IC? Could they find enough IC measures to justify an IC report?

From reviewing internal documents, Ms Scholar confirmed that financial measures drove CompanyB's high-level management accounting and control systems. However, at a local departmental level the management accounting and control systems predominantly used non-financial measures. For example, local managers produced figures on customer numbers and satisfaction. Additionally, the existence of a quality assurance system and sustainability reporting provided data for measuring IC. Ms Scholar could now help to answer Dr Couch's questions.

Ms Scholar helped by measuring IC because the local managers found measuring difficult despite having data. Thus, Ms Scholar, through providing an "IC measurement model" became the network's OPP, because everything needed to pass through her. Problematisation was complete as Ms Scholar became indispensable to the project (see Callon, 1986, p. 204).

Because Ms Scholar plays the central role in the alliance, she is the network head, the one who speaks for "others" (Callon, 1986, p. 214). In fact, she is the only actor with experience measuring and reporting IC and thus, without her, the network would falter. Therefore, she can define the other actors who participate in the network and more specifically, how the actors combine to form the network. Thus, Ms Scholar defines the actors in our story as follows.

Dr Couch: is pleased with the implementation of the Quality Management System and Sustainability Report and this makes him curious about the opportunities offered by measuring and reporting IC. He is eager to improve IC management, to show the value of investing in people, technology, knowledge and understanding customers. Additionally, he believes CompanyB needs to improve corporate disclosures.

Mr Testa: is the President of the Board of Directors. Without the support of Mr Testa, the IC project could not occur. His symbolic support influences departmental

managers to participate. Additionally, Mr Testa is interested in the economic benefits that measuring and reporting IC could provide. Mr Testa also trusts Dr Couch, adding additional validity to the project.

Local managers and their subordinates: Dr Couch needs three operational department heads (Manager 1, Manager 2 and Manager 3) and their employees to cooperate because they are the gatekeepers of the data required to measure IC. Their local management accounting and control systems contain the data required for developing the first IC report. In turn, they needed to be convinced that the project is worthwhile and that they will benefit from their participation.

Intellectual Capital: Ms Scholar includes IC as a non-human actor because IC's concepts, frameworks and theories are essential for binding the network together. IC imparts itself on the network to answer the questions and help communicate the value created by measuring and managing.

Apart from identifying the network's actors, Ms Scholar realises she cannot make progress towards communicating IC value until she measures and reports. Thus, a "holy alliance" (Callon, 1986, p. 206) is formed: Ms Scholar, Dr Couch, Mr Testa, Manager 1, Manager 2 and Manager 3, along with IC (Figure 1) to enable the project.

Not all of the actors involved rally around a common objective because each actor has different desired goals and obstacles in achieving them (Figure 2). Therefore, to ensure the network remains stable, Ms Scholar needs to ensure that all actors achieve their outcomes by overcoming the obstacles.

Interessement. The next translation moment is interessement because now the network has hypothetical qualities. As Callon (1986, p. 207) outlines:

> At this point in our story, the entities identified and the relationships envisaged have not yet been tested. The scene is set for a series of trials of strength whose outcome will determine the solidity of our researcher's problematisation.

Thus, we are interested in whether actors become part of the network? Actors progressively become part of the network through interacting with other actors even though the network, its problematisations, and the entities' outcomes, obstacles and goals are conjointly formed during action (Callon, 1986, pp. 207-208). For example, to start the project, Dr Couch decided it was essential to gain Mr Testa's support, which he did by showing him how an IC report communicates to stakeholders, and the benefits related to IC disclosure. Thus, the purpose here is to understand how the network stabilises, or in our case "locks-in" IC accounting with other actors.

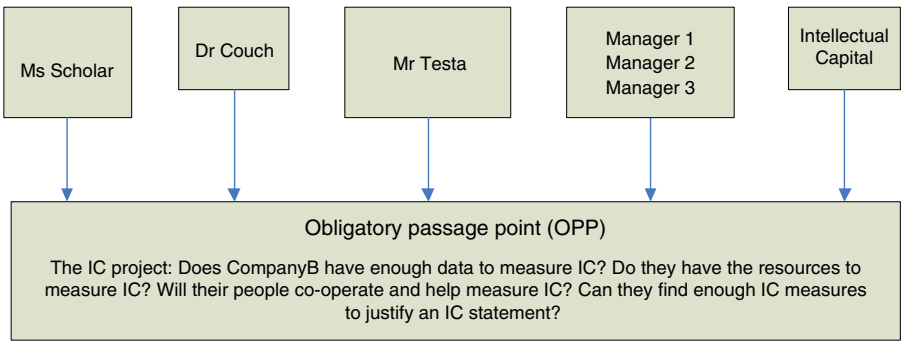

Figure 1.
Entities in the network Phase I

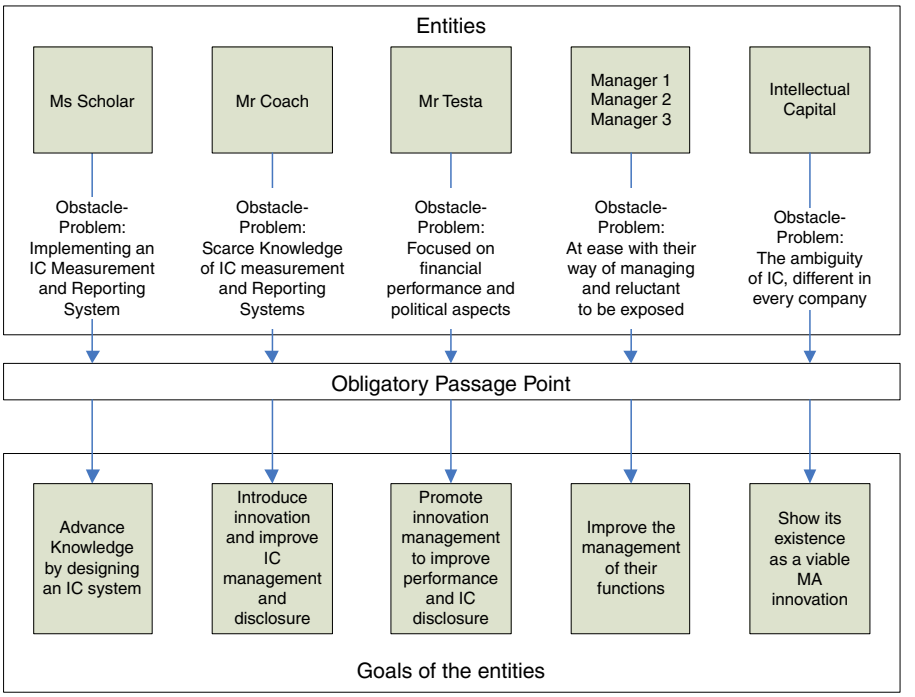

Figure 2.
Entities, goals and obstacles in the network Phase I

Even though Mr Testa officially sponsored the project the other managers referred to the project as "(Dr Couch's) Project". Because of this Dr Couch had difficulty getting other managers to engage with project:

> It is very difficult to involve people other than those who are in my department in the project. I have realised that the possibility of including other people in the design and implementation of the system and its use depends on the "organisational power" of the project leader. In any case, we can continue even without the cooperation of some of the managers (Dr Couch).

However, critical relationships with customers, suppliers and Technical Municipal Officers (TMOs) were controlled by managers belonging to other departments. Therefore, to design and implement the IC system, Dr Couch needed them to join the network:

> I believe that CompanyB, and mostly my colleagues, the other managers, could benefit from IC. We usually use financial measures to control our performance, and these measures cannot grasp the real value of good relationships that have to be expressed in a different way (Dr Couch).

To do so, Ms Scholar announced the project through the CompanyB newspaper. Ms Scholar also spent time in CompanyB's offices with Dr Couch, which gave her the opportunity to begin talking about the project with the managers. In the meantime, Dr Couch seized any opportunity to talk about it, but with little initial impact.

However, the most important opportunity to talk about IC and engage managers was during interviews Ms Scholar conducted with managers. Ms Scholar organised the semi-structured interviews (Qu and Dumay, 2011) as follows. First, she provided a

project presentation (e.g. its characteristics, aims, steps). During the presentation, she illustrated IC as a concept and where IC is located within CompanyB, fostering two-way talk during the interview. She probed interviewees with questions such as "What do you think about it?", "Do you find similar problems/needs in your company?" Ms Scholar also probed managers to talk about their activities, how they managed intangible resources and knowledge.

When illustrating the project, Ms Scholar informed managers she would involve them in establishing and discussing all the elements for measuring IC. She did this to show them how IC could help them improve managing their department's activities. After the interview, Ms Scholar sent an email summarising the issues discussed and requested another interview aimed at further discussing emerging critical issues. Other emails and informal meetings followed these interviews, with Ms Scholar gathering relevant documents and data. Through these interviews, Ms Scholar engaged the managers in the network because they were able to see that IC is relevant to them.

Enrolment. Enrolling managers was more difficult than anticipated despite Dr Couch's belief that IC was beneficial. Most managers reacted differently to his expectations:

> I can give you all the documents you need; I can help you to accomplish your task in this way. I really believe that [the IC] project is very interesting, and I am sure it would give you many hints for understanding human capital and managing knowledge. However, you see, I am very busy, and I cannot participate further in the project (Manager 1).

> I have all the information I need to do my job at best if you want I can pass it on to you, no problem. Of course, it cannot all be published in this new sustainability report (Manager 2).

At first, these managers were "external spectators" and seemed not to see benefits for themselves. The quotes also show how managers confused IC with human capital and sustainability reporting. However, with persistence Dr Couch and Ms Scholar succeeded in involving some of them in the project:

> The relationships with the municipalities, which are our shareholders and whose citizens are our clients, is very complex and thus very difficult to be monitored […] I need this information […] because this relationship is crucial for CompanyB. We can select a group of Technical Municipal Officers and draw up a questionnaire to be sent to them to gather information on their satisfaction and obtain suggestions to improve our operational activities (Manager 1).

Manager 1, "accepted the transaction", defining his identity and goals in the manner Ms Scholar proposed (Callon, 1986, p. 207) and thus enrolled in the network. The manager enrolled when he understood that the IC measuring and reporting system was an opportunity to investigate the relationship with TMOs and gather data about suppliers offering services directly to customers.

TMOs are in charge of the Municipal Technical Departments, responsible for infrastructure in the townships served by CompanyB. To effectively deliver services, CompanyB must provide data about the infrastructure and the suppliers must follow the standards established in the service contract, for example, maintenance checks on gas and water lines. The TMOs are responsible for ensuring contract fulfilment. Additionally, TMOs judge how CompanyB performs when technical problems arise, so their opinion influences their municipalities. Therefore, the TMOs opinions are important for the municipalities and the citizen-users of CompanyB's services. During the IC project, to monitor this relationship, a questionnaire was sent to the TMOs and

data collected. This data proved important for Manager 1 and Dr Couch to show where the relationship needed improving:

> Thus, among the stakeholders, our suppliers are crucial to providing high-quality services to our clients. The Heads of the Technical Municipal Department, in the questionnaires, showed a lower satisfaction as the parts of the services provided by our suppliers are concerned. On the contrary, the parts of the services directly provided by our employees got a higher evaluation. IC has given us a good hint! Thus, we have just decided to take into consideration these bad aspects when we will "structure" the contract for cooperating with these suppliers (Dr Couch).

Finally, Mr Testa enrolled because he was sensitive to improving performance and to the external communication issue and trusted Dr Couch. During the project, he participated in key meetings such as the initial meeting with the Board of Directors and to present the external IC report to the Board of Directors and the wider community.

Mobilisation. Dr Couch and Ms Scholar completed Phase I in one year. During this period, they launched several initiatives for measuring IC by identifying IC resources and activities, and establishing and calculating IC indicators. Examples of the initiatives launched are the following: an analysis of employees' competencies, a company employee climate survey, a satisfaction survey for TMOs, and information technology user satisfaction. Besides gathering important data, these initiatives kept IC alive, including employees not actively enrolled.

As part of measuring and mobilising IC Dr Couch and Ms Scholar produced internal IC documents, culminating in an internal and external IC report. Numbers, narrative and images from the IC reports help make sense of IC. Initially, Dr Couch was interested in measuring IC and was worried CompanyB did not have enough quantitative and qualitative data to develop an IC report. Therefore, he asked Ms Scholar to evaluate this potential problem.

However, in the IC report, there is not a quantitative or qualitative IC data shortage. The first IC report is 100 pages long and contains 19,157 words, 79 indicators and five images. Dr Couch cooperated in writing the IC report and revised all the drafts. He also designed the images used to connect software, process objectives and company value, to represent employee satisfaction and IT influence on company processes:

> If we cannot show, using numbers, how the different software affects certain company objectives, processes and therefore company value, let's try to make it visible through pictures! (Dr Couch).

Now the actors began to question the usefulness of just numbering IC. The increased relevance that narratives and images have for Dr Couch, in our opinion, signals the beginning of "un-locking" IC from accounting. As Dumay (2009) and Habersam *et al.* (2013) highlight, these aspects help reduce the negative effects of IC accountingisation:

> When the word "capital" is attached to the adjective "intellectual", an explosive cocktail is created. The word "capital" is misleading because you think you have to give intangibles a monetary value. […] Now I am sure that it is not necessary, that it would be better not to use a single measure, you lose all the facets of CompanyB's IC, of all the actions undertaken to develop IC. […] At first you think that IC is something that has to be put on a balance sheet; then when you see all the possibilities you have to describe its nuances, a single monetary measure becomes so reductive (Dr Couch).

4.3 Phase II – Working with IC: "un-locking" IC from accounting (2005-2007)

After completing the IC report project, the interventionist research between Ms Scholar and CompanyB finished. However, Ms Scholar and Dr Couch kept in touch and continued to discuss and reflect on the project. They both wrote articles and spoke at conferences about the IC project. Additionally, Ms Scholar wanted to know whether the IC project was still influencing managers and if they were working with IC. Similarly, Dr Couch wanted updates on IC measuring practices and was eager to discuss managing IC.

Although no IC report appeared in Phase II, IC remained alive, enabled by the actors who participated in the first project, through initiatives aimed at improving critical issues identified by measuring IC, for example, the launch of new policies for spreading knowledge. Additionally, the TMO survey showed that CompanyB's sub-contractors did not meet expectations. Therefore, CompanyB paid more attention to selecting them and controlling their activities.

Additionally, during this period, Dr Couch kept IC alive through narratives in internal company reports. In these reports, IC traces are present as explicit connections among IC elements or between the IC report and initiatives undertaken by CompanyB. We provide two examples.

Identifying a new business partner. During this period, changes in Italian law made it necessary for CompanyB to look for a new business partner (a privately owned company), to cooperate in managing the water and sewage service and its associated maintenance. The selection of a compatible working partner was a key issue because CompanyB needed to guarantee its current high-quality service standards as Dr Couch explains:

> In establishing the criteria for evaluating the new partner, we have tried to establish two objectives. Evaluate the new partner's technical and organisational competencies [and] establish procedures that could favour the integration between the two of us before the start of the cooperation […] The deployment of the bid is characterized by maximum transparency, coherent with the accountability effort we put out in publishing the Sustainability and the IC reports […] (Dr Couch).

Therefore, selecting a new compatible business partner relies on effectively integrating competencies, processes and data, and not just technical and financial considerations. To help integrate the new business partner CompanyB included criteria based on IC, such as human capital policies, IT system characteristics and corporate culture. These criteria complement, or even compete with, more traditional technical and financial criteria:

> We have tried to make the prospective partner understand who we are and what we expect from him […] (Mr Testa).

> […] we are a delicate organism and there are some elements that have to be considered when merging together: our employees, the way we manage them, the way knowledge is disseminated, the way we are used to doing our job. All in all, the IC report should help our "Chieftain" make the colonizers understand that we are not exactly cavemen (Dr Couch).

The criteria for choosing the partner is novel, especially considering CompanyB operates in the public sector where selection criteria and evaluation methods must be publicly available. Normally, in this environment, the public sector buries evaluating aspects such as strategy, organisational structure, proposals for integrating IT and human resources and corporate culture in undifferentiated and generic quantitative

data. Thus, through understanding the role intangibles play in CompanyB, potentially a better fit between the company and a new business partner is possible.

Developing human capital policies. Data from the employee climate survey highlighted that some projects undertaken contrasted with company culture and personnel boycotted them. For example, the employee incentive system, based on individual competencies, went against the strong group character spirit of CompanyB's organisational culture:

> One of the most useful considerations brought up about IC is the following: personnel in our company have "bought in", in a certain sense, through the employment contract, a company where things are done well and where people get along and now they think that we are changing the terms of the contract. Any changes concerning these priorities create a strong resistance, the more deeply rooted the value the stronger the resistance (Dr Couch).

Thus, several initiatives were brought in to deal with the problem. For example, when launching a new policy that potentially clashed with corporate culture, "ad hoc" meetings were organised to have open discussions with employees:

> Starting from 2005, we have decided to launch some initiatives aimed at helping personnel to internalise the organisational changes that are in stark contrast with company culture. To this aim, for example, in 2006, managers organised meetings with employees to give information about the most important company commitment: the bid for choosing a new partner (CompanyB's IC report).

The above examples show that after the first project, the network did not collapse, but rather existed in a state of flux. During Phase I managers engaged with a new non-human actor, IC. During Phase I the network built a relationship with IC that continued to exist, at varying levels in Phase II. After Phase II, IC was the reason Dr Couch and Ms Scholar continued to meet and discuss the IC project, progress with measuring IC and initiatives undertaken. Ms Scholar was particularly interested in understanding if initiatives related to gaps highlighted from measuring IC, and/or knowledge developed during Phase I.

Additionally, Ms Scholar wrote articles about the IC project, giving her the opportunity to reflect upon the effects of measuring and reporting IC. Similarly, Dr Couch wrote articles, internal documents and made presentations about the IC project. These provided stimulus for discussions with Ms Scholar. Dr Couch was especially curious to know about evolving IC theory and updates on other projects Ms Scholar was conducting. IC was also the basis of discussions between Dr Couch and other company actors.

Therefore, a state of flux existed because some of the old associations between actors were broken and replaced by new associations between actors, being CompanyB's managers, its employees, a new potential partner as interessement with IC took place (see Callon, 1986, pp. 208-209). Therefore, after completing the IC project, the entities were still bound together due to IC's continuing existence, mobilised through finding a new business partner, developing human capital policies, writing articles, reports, presentations and the discourse between Ms Scholar, Dr Couch and other actors. Thus, the network transformed its associations rather than collapsing because the network had achieved its originally intended purpose. The remaining associations allowed the network's continued existence.

4.4 Phase III – IC "re-locking-in" IC report (2008)

Problematisation. In Phase II, CompanyB did not produce an IC report:

> The initiatives that originated from the first IC internal report were so numerous and demanding, that we decided to concentrate on them instead of publishing a new external IC report (Dr Couch).

However, in 2008, Dr Couch decided to write another external IC report and asked Ms Scholar to help. Similar to Phase I, questions concerning whether CompanyB had enough IC data arose triggering a new review by Ms Scholar:

> I am not sure we can write another company IC report. Over these last three years, we have not produced all the information that was in the previous report so it would be impossible to make a comparison as many IC aspects are concerned. Moreover, many things have changed and the new report would probably contain aspects that did not appear in the first one and vice versa […] The initiatives undertaken are many, but numbers referred to them are scarce (Dr Couch).

During Phase II, even though CompanyB did not produce an IC report, individual managers, continued to measure IC. For example, the Human Relations Office continued to measure employee competencies. Therefore, even though the project ended, IC remained in CompanyB.

After completing the review, Ms Scholar produced a report illustrating a rough index for a new IC report. The report and discussions with Ms Scholar convinced Dr Couch there was enough data to publish a new external IC report. Writing a new IC report needed new strong intervention by Ms Scholar because the actors had to reassociate around a problematisation related to IC accounting. As in Phase I, Ms Scholar continued as the OPP and became indispensable because of her knowledge about how to report IC. To accomplish Phase III old alliances are revitalised (Figure 3), new actors enter (Manager 4, Manager 5 and the potential business partner) and others leave (Manager 1) centred around a new problematisation: "Can IC be used to improve the integration with a potential business partner?"

IC, freed from accounting during Phase II, acquired a different identity due to changing associations in Phase III, and was again "locked-in" to accounting. The "lock-in" was necessary because a potential business partner was likely "new" to IC, and therefore needed to understand what IC is, where IC is found and what IC has to do with CompanyB. Similarly, any associations with new actors must also be "locked-in" to IC accounting.

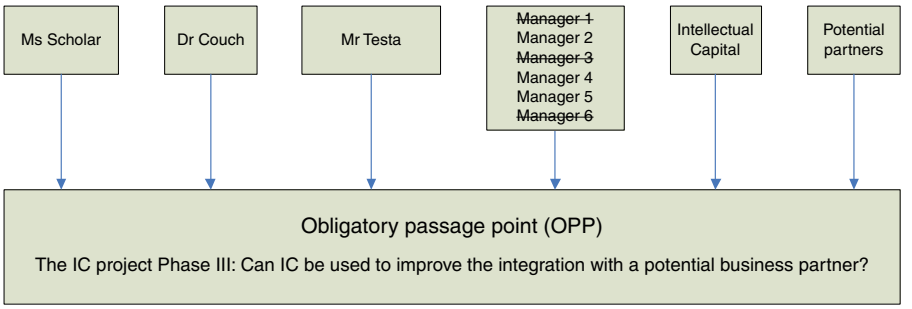

Figure 3.
Entities in the network Phase III

As in Phase I, Ms Scholar defined the entities, their identities and their aims (Figure 4). The network included the potential partner because the IC data reported considers what CompanyB wants to disclose to the potential partner. The potential partner was the most important IC report "reader". Additionally, the potential partner needed the IC report because CompanyB expected it to provide similar data. The main obstacle here was the likelihood that any potential business partner would have had little or no interest in IC until considering going into business with CompanyB, and may not have similar IC data.

Interessement and enrolment. To engage actors in the network Ms Scholar used the same means from Phase I, such as interviews, talks and ad hoc documents to illustrate IC's benefits. When Phase III began, the IC controversy revitalised. Some old IC supporters, Dr Couch and Mr Testa were easily enrolled in the network because they had seen and experienced IC benefits. However, one manager decided not to take part in Phase III:

> I got useful information from the previous project but, I am sorry; I have many things to do, and I do not have enough time to participate in the new project. All in all, I got all the information I need and I am still working to improve the relationships in the direction shown by the questionnaire (Manager 1).

Similarly, old IC detractors refused to participate in Phase III, continuing not to see any advantages in it:

> Ah yes, I remember the presentation of the report you made some years ago, it was 2004 or 2005, wasn't it? It was interesting […] I guess it was useful for managing human relations, Dr Couch always mentions it, but believe me, it is of no help to me, and my job is different. I am satisfied with my stuff (Manager 6).

Nevertheless, two new managers enrolled in the project. Their interessement and enrolment is based on Ms Scholar showing them that by understanding and leveraging IC led to delivering effective and efficient services. Developing understanding with the managers offered an opportunity for the managers to make visible their performance:

> I cannot affect company turnover that much, but I can influence company costs. During the last few years, I have been making many cost savings, especially when it comes to launching the door-to-door waste collection but, I mean, it is difficult to express them in monetary terms. So if I can use numbers and if I can comment on them, then the project can help me in making the others understand what I did for CompanyB (Manager 5).

The potential partner enrolled because it needed to understand CompanyB's IC before it could disclose its IC as requested by CompanyB. Actually, CompanyB asked the potential business partner for data about its technical resources along with data about organisational structure, management systems and strategy to determine how well it could integrate with CompanyB as part of the interessement. For example, to assess human capital, CompanyB requested data about personnel management systems, employee competencies, employee climate surveys, and customer and supplier satisfaction. Additionally, the potential partner was asked to suggest how it would integrate with CompanyB (Chiucchi, 2008). Therefore, the potential partner needed to read and understand CompanyB's IC report in order to provide information about its own IC.

Mobilisation. All enrolled actors, except the business partner, were directly involved in producing the second IC report. In the process, Ms Scholar interviewed and helped

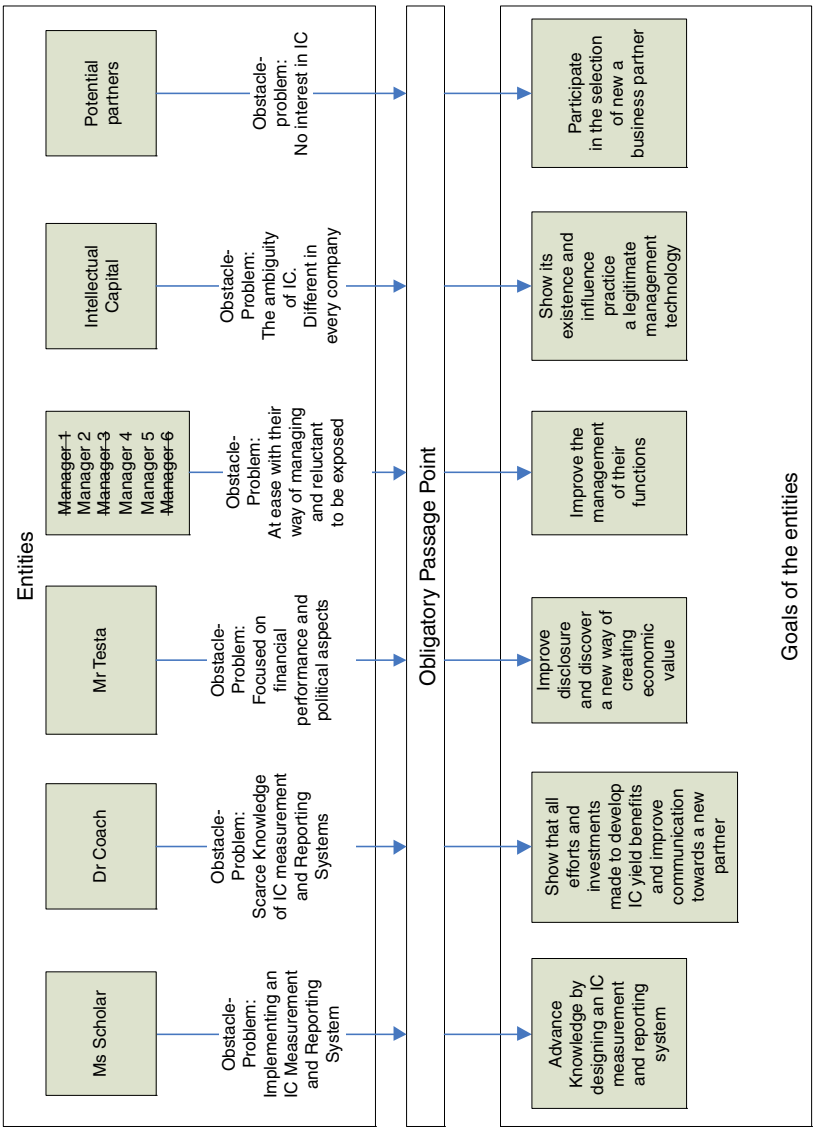

Figure 4.
Entities, goals and obstacles in the network Phase III

them to identify the intangible resources and activities under their control and indicators to account for them. Frequently, the numbers available to disclose specific IC elements were scarce. Instead, the managers produced narratives to describe the activities.

Many initiatives from Phases I and II continued in the new IC report, making explicit links with measuring IC along with links between IC and entities in the network:

> I believe that the continuity between the two IC reports can be guaranteed by showing initiatives undertaken to face critical aspects that had emerged in the first IC project. This would also justify why, in the new report, new IC aspects arise, and others disappear or are given less importance (Dr Couch).

For instance, the new IC report made evident how the old policy for communicating data throughout CompanyB based on databases changed over the three years. In fact, the current IC indicators showed the decline in database use. Alternately, the climate survey highlighted that direct and informal data exchange and personal experience and expertise within small working groups were the most useful means for sharing knowledge. Therefore, CompanyB began using databases only for specific strategic purposes:

> Structuring the information through databases has been kept only for reference to specific situations, for example, those related to structuring basic information useful to new-entry employees or those related to very innovative activities that need to be systematized. Next year, for instance, we are going to realise a knowledge management database aimed at structuring information related to renewable sources of energy. Knowledge in this area is "under construction" and is possessed by very few people. Therefore, we think that knowledge structuration can speed its diffusion and its use to increase the personnel competencies (CompanyB's second IC report).

Here we highlight how recently Dr Couch, while reviewing this article, has commented on the importance of narrating IC by arguing that:

> Narratives were essential since they helped company actors to understand and reflect upon their role in the process of managing IC and in implementing company strategy. This aspect together with the exchange of knowledge between me and you [Ms Scholar] is the expression of a sense-making activity which is essential when accounting for IC in order to try to overcome actors' resistance and in order to pass from accounting to managing. The IC concept is a different way of interpreting the company, a different way to give a sense to it.

Additionally, CompanyB used IC narratives intentionally in the new IC report, instead of numbers, because narratives are more appropriate for showing links between IC and creating value (see Dumay, 2008). For example, the first IC report contained a list of 70 "excellent employee competencies", which were considered a fundamental lever in CompanyB's growth strategy. Since these competencies are vital, the IC report identified the number of employees possessing "excellent" competencies, their years of experience and the number of employees trained in these competencies. For example, in the new IC report narratives described how some competencies were mobilised to provide new services related to renewable energy sources. The narratives highlighted how employees shared knowledge and competencies, how employees organised their work, and the relationships activated to generate and sell the new services:

> Among the "excellent competencies" identified in 2004, three of them were strictly connected to renewable sources of energy. The attention paid to their development brought about, on the

> one hand, an increase in the level of these competencies and, on the other hand, their diversification.
>
> Company organisation was used as a lever to promote these competencies' development. Employees who possess these competencies were "located" in the same department to promote knowledge sharing through a socialization process and through people interaction in small groups. Since these competencies are used to provide services related to the "core" business and since they are possessed only by a few people, CompanyB is now planning to structure the relevant information through a database (which will use Wikipedia's logic) (CompanyB's second IC report).

Thus, fewer competency indicators were present in the new IC report.

CompanyB used narratives to illustrate how it developed new services by combining human, organisational and relational capital:

> The implementation of a door-to-door service to carry out the differentiated collection of waste is a clear example of how CompanyB has exploited its IC to create a virtuous circle leading to value creation. The increase in the collection of differentiated waste from 38% to 76% is a proof of this.
>
> Before analysing the quality of the relationship with door-to-door service clients […], it is interesting to present how CompanyB built the relationship with the clients of the door-to-door service. An intense interaction between human, organisational and relational capital was activated which led, in a short time, to develop and provide a new service (CompanyB's second IC report).

Thus, compared to the first IC report, narratives played a more significant role. As Table I shows gradually the lack of quantitative data and the scarcity of comparative information, which was a major concern for Dr Couch before starting the project, became less important in his eyes. Therefore, while Phase III still "locked-in" accounting for IC, we find more evidence of IC becoming more accountable for managing CompanyB because managers now utilised IC.

5. Discussion

In this section, we discuss the answer to our research questions: "Is it possible for an organisation initially to implement and "lock-in" IC accounting practices and subsequently "un-lock" IC through a more strategic managerial approach?" and "After IC has been "un-locked", can a new IC "locking-in" process occur?" In answering these questions, we argue that our findings contrast with those of Chaminade and Roberts (2003) because our research is longitudinal. In Chaminade and Roberts' (2003) research, the timeframe involved only one iteration, similar to our Phase I. In our case we see IC evolving according to the challenges faced by CompanyB. This highlights, how, as a

	First IC report	Second IC report	Variation (%)
HC indicators	28	19	−32.14
OC indicators	29	13	−55.17
RC indicators	22	20	−9.09
Total indicators	79	52	−34.18
Words	19,157	23,952	25.03

Table I. Content differences between the first and the second IC reports

sense-making device, the IC concept is powerful. When combined with IC narratives, necessary for mobilising IC:

> […] measures […] help make sense of whether or not [a company] is improving their IC. But these are not concrete measures and may not need to be used again […] This is not because the measures are not useful, but because […] reporting needs evolve based on the bespoke nature of its business, political expectations and changing business plans (Dumay and Rooney, 2011a, p. 352).

Our research contributes to understanding the "un-locking" process by highlighting that, for IC to be "un-locked" from accounting, the way the actors enrol in the network, including interessement and mobilisation, is important. Specifically, designing and implementing the IC measurement system plays a pivotal role because it plants the seeds for "un-locking" IC during the "lock-in" process. Our research shows how measuring and reporting IC are powerful tools for actors to make sense of IC, and IC is powerful enough to maintain relations once the network achieves its initial goals.

This finding refines what Callon observes. He advocates that, for the network to form, it is necessary that the actor who defines the problematisation succeeds in disassociating from competitive problematisations (Callon, 1986, p. 208). We agree that it is important to enrol the entities, and when the alliances form, it is necessary that each actor be free to associate with IC and build his or her own meaning. Allowing each actor to develop his or her own meaning allows IC to gain an autonomous existence and to survive afterwards if the alliance temporarily or permanently breaks. In this way, IC lives beyond the network and its initial goals.

Simultaneously, our work contributes to IC research by showing how important interessement devices, such as interviews, meetings and talks, are to "lock-in" and "un-lock" IC from accounting. First, to "lock-in" IC the interessement devices permitted Ms Scholar to create associations between IC and the actors involved, giving each actor the opportunity to internalise the IC concept and attach meaning to it. The interessement devices made managers familiar with measuring IC and called for their direct involvement in designing the IC report. Similarly, this process is utilised to lessen the effects connected to the "accountingisation of IC" because it shows how managers can use IC in specific contexts rather than just measure it. Therefore, IC is initially "locked-in" to accounting by the majority of the managers, but it does not remain because after publishing the report they can "un-lock" IC to address issues with which they are concerned.

In contrast to Chaminade and Roberts (2003), we argue that it is important for managers to understand that an initial "lock-in" to accounting is not detrimental and can be a necessary first step in introducing the IC concept. In our case, "lock-in" was necessary because taking stock of CompanyB's IC acted as a sense-making device and helped enrol actors into a network to mobilise IC. While some contemporary IC research argues that more is achieved through managing IC than measuring IC (Chaminade and Roberts, 2003; Catasús *et al.*, 2007; Dumay and Rooney, 2011), we argue that measuring IC is strategically necessary. Therefore, measuring IC when commencing a major strategic change in direction is necessary, because managers need to take stock of IC and reflect on what IC is present and how they can improve it.

An initial "lock-in" to accounting does not cause the IC concept to become lost, provided the seeds are planted to "un-lock" IC for use in day-to-day management activities. One problem with measuring IC is that it sometimes becomes the domain of "experts", mainly accountants who through the accountingisation of IC (Dumay, 2009)

preclude other organisational members from the IC discourse. As Weick and Browning (1986, p. 249) outline, "only experts can debate experts, which means that non-experts are spectators". Therefore, if the IC concept is introduced and subsequently gets taken over by the experts, it is up to senior managers to ensure they do not retain control, and plant the seeds allowing IC to grow and become managed by the non-experts, after mesuring IC.

6. Conclusion

Our findings are contrary to Chaminade and Roberts (2003, p. 733) because we challenge the notion "that a dominant accounting perspective can lead to an excessive focus on measurement issues and little attention to management processes". On the contrary, we believe the evidence from our case study shows how at times a dominant focus on accounting for IC is necessary, especially to allow newcomers to take stock, and make sense, of IC. The analogy is much like comparing accounting versus managing IC to the concept of the chicken and the egg: what comes first? In our view, for some newcomers to IC such as CompanyB, it was essential to take stock of IC by measuring it, thus "locking-in" IC to accounting so those enrolled in the network could relate it to their day-to-day challenges. Once done, IC is free to be "un-locked". Our findings have implications for IC research, IC researchers, public sector IC practice and from an ANT perspective.

Implications for IC research

The research contributes to third stage performative IC research (Guthrie *et al.*, 2012; Dumay and Garanina, 2013) by exemplifying how research into IC practice delivers insights into the interplay of IC within the organisation. The problem with more ostensive research into IC is that the findings are generalised to be applicable for all organisations rather than understanding how IC works in specific contexts. In this case we challenge the ostensive findings of Chaminade and Roberts (2003) using a single case, because we delve into how IC is used over time, rather than in a specific instance.

Because our study looks at IC over time, it allows us to develop different insights into IC "because IC is not an event, but a journey" (Dumay *et al.*, 2015). Thus, our critique of Chaminade and Roberts (2003) and other research based on a short time period is that it does not allow researchers to fully follow the IC's impact on an organisation. For example, when Dumay and Guthrie (2007) wrote one of the first articles about implementing IC in the New South Wales Department of Lands they recognised that the model used to analyse the impact of IC, based on Laughlin (1991) offered a "static view of change in that he advocates that organisations go through a schizoid state before returning to a state of dynamic balance". Therefore, some theories of change are better used to analyse change over longer time frames, such as those offered by Strucuturation Theory (Gurd, 2008; Tull and Dumay, 2007) and ANT (Mouritsen, 2006; Bukh and Kjærgaard Jensen, 2008).

By performing a longitudinal case study based on ANT, we follow the actors over time which allows us to observe an IC journey that is never static. Therefore, we cannot draw the conclusion that accounting for IC is better than managing IC or vice versa, or one has more advantages or disadvantages over the other. However, we do uncover how IC is used in practice by actors in a specific context from which we learn that IC continues to be dynamic based on the strategy and what user (actor) values because the

IC concept has the "ability to accomplish something" (Mouritsen, 2006, p. 824). As we have discovered in our story, the actors all need to accomplish something, and ANT allows us to follow how the human actors did (or did not) accomplish their goals. Therefore, to perform third stage research, IC researchers need to consider their frame of analysis carefully and ensure that they study IC journies rather than events (Bukh and Kjærgaard Jensen, 2008).

Implications for IC researchers

We also highlight the role academic researchers can play in understanding how IC works inside organisations, especially when we examine how deeply (or not) a researcher intervenes in implementing solutions (see Dumay, 2010). In our paper, Ms Scholar initially took a strong interventionist approach to developing an IC measurement and reporting system in CompanyB. Her intervention was necessary because, when introducing the IC concept, we cannot expect managers to already have an IC education. As one of our colleagues suggested, IC suffers from the problem of proliferation in practice: "it's not being practised by managers far as much as it's being preached by us academics". We argue that because a researcher carried out this activity it could have contributed to the "un-locking" process. While reviewing our findings, Dr Couch stressed that the transfer of theoretical knowledge from the researcher to him as well as the intense study he did on how to measure and report IC were fundamental in making him a knowledgeable actor who is able to actively cooperate in constructing the measurement system, and then to use the information to act upon IC.

Thus, we argue future IC research and practice relies on academics getting out of their "ivory towers" and getting their hands dirty with practice (Dumay, 2012). This research project, and other recently published IC research (Dumay, 2010, 2011; Dumay and Rooney, 2011; Giuliani and Marasca, 2011; Chiucchi, 2013a, b), shows how researchers can intervene without compromising academic integrity. While some more modernist approaches to qualitative research may argue against this view, we argue that more interventionist approaches are necessary to help create IC believers who practise what is being preached alongside the preacher.

Implications for public sector IC practice

The research contributes to IC from a public sector perspective to show that the measurement and the management of IC is relevant (Mouritsen *et al.*, 2004; Wall, 2005; Bukh and Kjærgaard Jensen, 2008). As Dumay (2014) outlines, there is an opportunity to develop research "as a result of the paucity of published research on public sector IC". We admit the current paper does this fortuitously as the research commenced long before 2014. However, this paper does address the paucity of public sector based IC research and contributes to fulfilling the gap.

Additionally, because this article presents a longitudinal study of public sector IC it also contributes to understanding how IC develops public value. The longitudinal nature is important because as Dumay *et al.* (2015) outline, because "most public sector entities do not have the same short-term myopic financial pressures of publicly listed companies, they have the opportunity to implement IC based management and strategic practices". Therefore, there is a need for studies such as ours which exemplify how to introduce the IC concept and at what point should the IC concept "enter" the organisation (see also Secundo *et al.*, 2015). Doing so re-emphasises that IC is not an

ostensive concept. Rather, "IC is part of a configuration of knowledge management and actively mobilised to condition effects" (Mouritsen, 2006) and to make a difference (Tull and Dumay, 2007). Therefore, this research exemplifies how IC can make a difference for public sector organisations.

Implications from an ANT perspective

From an ANT perspective, our research shows how the translation process is continual and not staged. The network formed during Phase I did not collapse as we might expect after achieving the initial aim of producing the IC report. Rather, IC continued to survive but in a state of flux since the associations among the actors, developed during Phase I, changed. Some actors built a direct and strong association with IC, and IC played a pivotal role in building associations between human actors such as Dr Couch and Ms Scholar, while other actors disassociated.

Therefore, the network continually evolves and stabilises only temporarily around a new problematisation. It was because of a new problematisation that the network revived. New associations developed, as interessement around new actors took place (a business partner), as others returned to the network (Mr Testa), and others abandoned it (Manager 1). In this evolution, a crucial role is played by IC, keeping the network alive and contributing to building its identity. Because traces of the network survive, when the next IC report project commences, it is easier to revive the network than build a new one.

Limitations

To conclude, the paper has two major limitations. First, the study is limited to one Italian company, and thus readers should not generalise these results to other organisations. Second, the results are influenced by the active interventions of an IC researcher. Therefore, Ms Scholar has influenced designing and implementing the IC measurement and reporting system. Another researcher's interventions will have had different effects.

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