Investigating factors of intellectual capital to enhance achievement of strategic goals in a university hospital setting

Emidia Vagnoni and Chiara Oppi
Department of Economics and Management, University of Ferrara, Ferrara, Italy

Abstract

Purpose – The purpose of this paper is to report on an action research project carried out in an Italian university hospital that was facing a strategic challenge. The role of intellectual capital (IC) for university hospital strategic management is discussed after developing and applying an IC framework to enhance the visualisation of strategic IC elements.

Design/methodology/approach – An action research process has been applied in the studied setting based on Susman and Evered's (1978) definition of the engaged research cycle.

Findings – The action research process allowed a gap between theory and practice to be bridged; the strategic control process resulted supported by new measures; a different approach to strategy management was launched, and other organisations perceived the relevance of the IC representation and wished to import it.

Research limitations/implications – Research limitations are related to those recognised for the interventionist research approach.

Practical implications – The paper contributes to the improvement of managerial and accounting technologies for practitioners managing university hospitals and discusses a university hospital's strategic goals.

Originality/value – The paper represents a methodological contribution related to the interventionist research stream of literature, and enriches the limited studies focused on IC in health care organisations. Furthermore, the paper enables appreciation of the role of academics in the convergence of theory and practice.

Keywords Health care, Intellectual capital, Management, Accounting, Reports

Paper type Research paper

1. Introduction

The expectations of the community for health services delivery by health providers have been progressively increasing during the last decades, strengthening the demand for quality and outcomes (Schwartz and Pogge, 2000). This strengthening demand requires extra financial and organisational efforts from health systems (Bordignon and Turati, 2009). However, the budget constraints of countries' health systems keep the tension between the cost of health services provision and the ability to deliver high quality, specialised and personalised treatments high. In this context, countries have often redesigned the organisational model of their health system and revised the role and goals of the various actors (Shortell *et al.*, 1994; Ruef and Scott, 1998; Lukas *et al.*, 2007). Managers of health systems search for more effective ways to deliver care (Ferlie and Shortell, 2001). In the past, the focus was on constraining growth in the cost of care, whereas emphasis is now being given to improving the quality and outcomes of care. Ferlie and Shortell (2001) report that the essential factors required for quality improvement are: leadership at all levels, a culture supporting learning throughout the

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care process, effective teams' development and greater use of information technologies. Thus, to meet the challenge of quality improvement, health care organisations will have to rely heavily on developing their ability to generate and manage knowledge.

The literature shows that it is well known that university hospitals play a key role in terms of innovation and knowledge creation in the medical sector (Hicks and Katz, 1996; Estabrooks *et al.*, 2008; French and Miller, 2012). However, their level of efficiency has been questioned (Lehrer and Burgess, 1995; Grosskopf *et al.*, 2004), and the literature concludes that university hospitals are more costly than their non-teaching counterparts (Huttin and de Pouvourville, 2001).

The university hospital model refers to an integrated organisation where academic, clinical and research functions are performed. The activity of university hospitals involves patient care, teaching and educational programmes for students, and research directed to the development of new diagnostic or therapeutic techniques. Therefore, the mission of university hospitals deals with the provision of high-quality care, especially in the treatment of rare diseases and complex patients, the production of specialised services, the use of advanced technology and scientific research. Medical education activity and students' training also characterise university hospitals; the latter invest their knowledge in the improvement of innovative clinical care (Ayanian and Weissman, 2002).

Although university hospitals represent the archetypical knowledge-based firm, traditional performance management systems have been applied to that setting (Abernethy *et al.*, 2005). However, core operating tasks are performed and controlled by medical experts, the medical-care production process is not well-understood and organisational outcomes are difficult to measure quantitatively. As a consequence, measuring and managing performance is particularly problematic. Moreover, in a university hospital setting, tacit knowledge is at risk, and the linkage between knowledge and performance success is not documented (Abernethy *et al.*, 2005).

As with other public sector organisations, university hospitals' managerial reports often lack information about the driver of their performance when related to the strategic goals that the health system draws for them. The importance of intangible assets and intellectual capital (IC) to enhance and sustain the competitive advantage and organisational performance of any organisation (including public sector ones) has been increasingly highlighted by academics, researchers and practitioners (Röos *et al.*, 1997; Sveiby, 1997; Edvinsson and Malone, 1997; Davenport and Prusak, 1998; Alle, 2000; Carmeli and Tishler, 2004). Considering the university hospital setting, intangibles and IC are the main drivers of performance, although they lack visibility when discussing organisational performance.

The accounting literature stresses the importance of measuring, visualising and reporting IC to improve management control and strategic control processes with regard to both private and non-profit organisations (Mouritsen *et al.*, 2001b, 2004; Borins, 2001; Kong and Prior, 2008; Guthrie *et al.*, 2012). Nevertheless, in university hospitals, intangible factors are silent, they lack visibility and they are rarely noted in reporting activities (Abernethy *et al.*, 2005). Kong (2010) argues that "IC is capable of adapting to the challenges posed by the contemporary non-profit environment in the knowledge economy and thus may be utilised as an alternative strategic management conceptual framework".

Based on an empirical study conducted according to an action research approach in the university hospital setting, this paper has at first a threefold aim: developing and applying an IC framework to enhance the visualisation of strategic IC; producing

change in the real setting, enhancing the use of IC visualisation for strategic management; testing of an IC framework for investigating the factors that are the foundation of the integration between hospital and university.

The paper contributes to the accounting literature by providing evidence of the effectiveness of the engagement of academics to generate changes in an organisation's practice; to this regard, the paper strengthens the case for the use of an interventionist research approach that has been neglected in recent times. The paper also represents a further step in documenting the role of IC visualisation for strategic management purposes, and the ability of IC research to contribute to the success of organisations is enhanced. Finally, in relation to the dichotomy of a university hospital (it is both a university and a hospital) the paper gives insights on the ability of IC reporting to facilitate the management of the integration between university and hospital dimensions.

The paper is organised as follows: in Section 2 a literature review is presented with regard to the role of knowledge, the IC framework and the characteristics of university hospitals. Section 3 describes the design of the study. Section 4 explicates the problem to be solved based on the detection of a strategic gap revealed in the early stage of the action research and Section 5 describes the IC report structure: in these sections the results of the action research process are presented. Then, Section 6 discusses the results, and finally some conclusions are highlighted in Section 7.

2. Literature review

The accounting literature has strongly advocated IC visualisation for management control and strategic management (Mouritsen *et al.*, 2001a; Roos *et al.*, 2001; Choo and Bontis, 2002). In recent years, the relevance of IC accounting research has been confirmed with regard to the progressive focus on the management control and strategy area (Guthrie *et al.*, 2012). In reference to the setting of knowledge-based organisations, the criticalities associated to the implementation of management control and strategic control systems have been pointed out (e.g. Widener, 2004). One basic issue is related to the fact that the knowledge which is necessary to build systems in such organisations often resides in individuals. Thus, extracting knowledge and defining a representation of its dimensions to enhance the strategic and managerial process of the organisation is a challenging pathway.

The role of knowledge

In service organisations, knowledge is considered one of the most important intangible resources. According to Magnier-Watanabe and Senoo (2008), the acquisition of knowledge involves all processes of gaining new knowledge from either inside or outside the organisation. In university hospitals, new knowledge could come from: colleagues, through informal and personal contacts; books, journals and conferences; or investments in training programmes. University hospitals are characterised by the constant generation of new knowledge through research activities, the frequent rotation of medical staff in training, and by clinical supervision sessions run by the hospital's own specialist staff. Knowledge is also improved by developing care paths and clinical protocols.

Considering the complexity of the knowledge creation process, Zigan *et al.* (2010) stress the relevance of the codification of knowledge since it allows knowledge to be identified, captured, indexed and made explicit in a form that professionals can use easily. The distribution and the presentation of knowledge are important because they

refer to the transfer and the sharing of knowledge through formal and informal mechanisms, such as meetings, relationships or via the dialogue between organisational members. Hospitals can share knowledge through seminars directed to all staff members. The transfer of knowledge is supported by the existence of good working relationships among the staff; sharing knowledge reduces training costs and builds better working relationships.

Knowledge is recognised as an organisational asset that is important to share (Joe *et al.*, 2013), and to that regard physicians play a crucial role. Sharing physicians' knowledge within hospitals is critical to the survival and prosperity of hospitals in competitive environments, and to the elevation of the quality and efficiency of care in health organisations (Ryu *et al.*, 2003).

In university hospitals, evidence-based health care imports explicit knowledge from research activities and incorporates it into practices, but the importance of implicit clinical knowledge may be underestimated. A study by Gabbay and Le May (2004) underlined the reluctance of physicians to adopt rigid formal sources of knowledge and their tendency to network activities with other professionals in order to develop "mindlines". Mindlines are tacit guidelines built by practitioners applying their experience in their interactions with each other, with opinion leaders, patients and pharmaceutical representatives.

It is important not only to keep the knowledge which is in the possession of experienced practitioners, but to support sharing behaviours too. Joe *et al.* (2013) define expertise as the capability to act with excellence in a specific subject, involving intellectual and cognitive efforts for a long period. As experts, physicians are therefore a potent source of value creation within organisations because they have a deep knowledge of a subject; they are also tested and trained, thanks to a long career. An expert demonstrates high levels of efficiency, accuracy and ability and holds subject-specific knowledge such as on methods and procedures, including knowledge of how to deal with problems and new situations. The variety of experiences that this workforce develops over time is another important component of experts' organisational knowledge. The traits of knowledge can influence its transfer; for example, explicit knowledge is more easily transferred than tacit knowledge (Joe *et al.*, 2013).

One of the main impacts of an expert leaving an organisation may be the loss of credibility of the organisation, as stakeholders may fear a reduction in the level of performance of the organisation. Another impact is the inability to replace the professional in his or her particular task, especially if it is highly specialised, with the consequent loss of customers or users (Joe *et al.*, 2013).

*z*The management of knowledge aims at maximising an organisation's knowledge-related effectiveness (Zhou and Fink, 2003) because successful management can lead to a better allocation of work and activities, to more innovation and it could raise receptivity to change, particularly in competitive markets (Bishop *et al.*, 2008). Among service organisations, health care organisations could particularly benefit from implementing knowledge-based management practices in terms of cost reduction, job flexibility and reaction to patients' needs, which can lead to better patient care (Zigan *et al.*, 2010).

According to Brailer (1999, p. 6), the management of knowledge-related elements in health services is linked to "any systematic process designed to acquire, conserve, organise, retrieve, display and distribute what is known". Considering the nature of knowledge-intense organisations, knowledge deployment in university hospitals allows at detecting the sources of the competitive differentiation with other organisations, and the opportunity to improve quality, critical paths of care, collaborative care plans,

evidence-based practice and intra-organisational networks (Zigan *et al.*, 2010). Thus, sharing knowledge, and making it explicit are relevant organisational mechanisms in the hospitals setting.

IC

Nowadays organisations manage knowledge and their intangible resources because they are aware that their value-added is linked to the development of expertise, knowledge and intangible assets (Lerro and Schiuma, 2013). The relevance of IC to create value and enhance performance, and its interaction with the accounting dimension of an organisation has been deeply underlined by Guthrie and Petty (2000).

IC accounting research has developed widely during the last decades (Guthrie *et al.*, 2012) and several definitions of IC have been provided. For example, Edvinsson and Sullivan (1996, p. 357) define it as "a stock of focused, organised information that the organisation can use for some productive purpose". Stewart (1997, p. x) describes IC as "[…] the sum of everything that everybody in a company knows that gives it a competitive edge […] Intellectual Capital is intellectual material, knowledge, experience, intellectual property, information […] that can be put to use to create wealth". Ulrich (1998) asserts IC does not only comprise the sum of intangible resources, but it is also the product of ability multiplied with commitment. Bontis (1998) considers IC to be organisational learning flows but the most important knowledge cannot be transferred through education and training. According to Mouritsen *et al.* (2001a), IC focuses on organising the knowledge resources in order to make knowledge manageable and it is about actions and activities linked to knowledge, which are not easy to represent. In that view, managing knowledge means being able to represent what is personal, questioning the idea of knowledge as an individual phenomenon.

From this brief reference to some definitional aspects, the recognition in the literature of the primary role of the human dimension of IC emerges. Attempts to operationalise the IC concept have been made: Edvinsson and Malone (1997) and Sveiby (1997) referred to human capital, structural capital and customer capital. Later, the Meritum Project (2002) contributed to the trend to distinguish between human capital, structural capital and relational capital. Furthermore, accounting researchers provided several classifications of IC (Boedker *et al.*, 2008; Guthrie *et al.*, 2007) resulting in the identification of three main IC components; although different names have been given, the three main IC components basically refer to human capital, structural capital and relational capital.

Human capital is defined as "the knowledge that employees take with them when they leave the firm" (Meritum, 2002, p. 3). It can be defined as the combination of individuals' genetic inheritance, education, experience and attitudes (Hudson, 1993), and it includes knowledge, abilities, motivation, experience and personal skills. Human capital is an important intangible asset because it enables value creation within a company (Gamerschlag, 2013), and because it is the principal source of innovation and strategic renewal (Bontis, 1998).

Structural capital consists of organisational mechanisms and structures supporting the working staff in their intellectual performance and helping them to reach their fullest potential (Bontis, 1998). Structural capital is defined as "the knowledge that stays within the firm at the end of the working day"; it is the whole amount of knowledge related to internal processes and structures, routine, organisation, procedures, systems,

culture, technology and databases, of which some may be legally protected and legally owned by the firm (Meritum, 2002, p. 3).

Relational capital concerns all the resources related to external relations between the company and consumers, users, research partners, funders and other stakeholders. It also comprises human and structural capital for the part regarding relations with stakeholders (Mouritsen *et al.*, 2001a). For an organisation, it is "the value of its franchise, its ongoing relationships with the people or organisations to which it sells" (Stewart, 1997, p. 108).

Looking at these three dimensions separately is insufficient to understand IC. It is important to note that IC does not consist of a stock of information, files or paper, and it is not just what individuals know or how they work (Grantham *et al.*, 1997). It is not even the sum of the previous items. Human, structural and relational capital can be useful for organisations only if they are linked through connectivity.

The theme of IC has been widely explored with a focus on for-profit businesses and on management control and strategy areas (Guthrie *et al.*, 2012, p. 79); the issue associated with IC disclosure on annual reports has been mainly investigated during the second wave of the development of IC accounting research. Although there were plentiful contributions from accounting scholars to the investigation of IC, some issues require deeper investigation and scholars are invited to widen the contexts of study, and engage in a more critical experience in the field (Guthrie *et al.*, 2012): how IC is used, how it contributes to an organisation's performance improvement, what are the relations between IC factors and business strategy, and so on (Lev, 2014).

First, considering the public sector organisations as the study context, only a limited number of studies analyse the IC perspective in terms of improvement of performance and competitive advantage (Collier, 2001; Habersam and Piber, 2003; Sánchez and Elena, 2006; Dumay and Guthrie, 2007; Siboni *et al.*, 2013). Borins (2001) encouraged the application of IC theory to innovate public organisations' managerial processes; and Guthrie (2001) emphasised the relevance of IC for knowledge-intensive organisations' management accounting systems, suggesting that the reporting and managing of IC should be deepened both in private and public sector settings. However, despite the tendency to draw attention to the role of IC for managing public sector organisations, most of the studies mainly focused on the measurement issue and only few insights are related to IC management (Cinca *et al.*, 2003; Wall, 2005; Schneider and Samkin, 2008; Ramìrez, 2010).

During the last decade, the IC accounting literature provided some attempts to discuss the use of IC for strategic management purposes with regard to knowledge-intense organisations, such as universities and hospitals. Leitner (2004) focuses on the use of the information delivered by the IC reports in Austrian universities for investments' decision making; Hellström and Husted (2004) use the knowledge mapping technique to highlight the utility of IC for universities' strategic management, while Sànchez and Elena (2006) provide some insight into the utility of the IC framework for a university's management based on a case study. More recently Siboni *et al.* (2013) highlight the role of IC framework for universities' strategic management in the Italian setting. Thus, the focus on IC's management has been marginal, especially with regard to hospitals and health care organisations, resulting in an understudied setting. Within the public sector, hospitals differ from other organisations because of their special characteristics: they are knowledge-intense organisations involving a large number of professionals with different academic training and experience, who work together "in favour of a high-quality, preferably error-free patients' treatment" (Habersam and Piber, 2003). Knowledge development is

a key issue with regard to hospital organisations, and even more to university hospitals (French and Miller, 2012). The latter primarily invest in intangibles, combining them to provide knowledge-based outputs such as innovative services, consultancies, publications or clinical pathways. The relevance of studying IC in the health care sector is described by Habersam and Piber (2003). The authors applied the threefold definition of IC to analyse two hospitals, and introduced connectivity as a fourth dimension of the IC framework. In that view, connectivity allows knowledge-intensive organisations, such as hospitals, to understand the whole IC emphasising the implications that the three dimensions have for each other.

Beyond accounting literature, the importance of IC for university hospitals has been also highlighted by both medical and health policy studies (Grantham *et al.*, 1997; Robinson, 1998; Ryu *et al.*, 2003). Robinson (1998) highlights that it would first be important to attract and train a new generation of physician leaders who can reconcile the conflicting expectations of doctors, consumers, regulators, partners and other stakeholders. Second, through the aggregation of physicians, organisations can improve innovation and circulation of best clinical practices, releasing the potential for constant research progress. Third, this improvement can generate a good reputation for quality and efficiency, with resulting interest from investors or users.

The literature has shown a gap with regard to both the purpose of the IC accounting research and the setting of study. First, despite the tendency to move away from the early normative approach, and to increase the empirical works, there is still a focus on the IC model implementation and on the measurement of IC. The number of studies related to the management of IC, and aiming at understanding how IC is used in the decision making process of the organisations, is limited. The literature analysis highlights the lack of engagement in the development of a model that is functional to the managerial needs of the organisation. As from Dumay and Garanina (2013, p. 19) there is a lack of knowledge related to "how IC works". Second, the literature reveals the narrowness of IC accounting studies related to the health care organisations. Beyond the article by Habersam and Piber (2003), there is no study the authors are aware, focusing on IC accounting in the health care organisations.

Furthermore, when considering the methodological approach, IC accounting research mainly focuses on reports' contents analysis related to different case studies, with the aim of detecting the main variables reported, how they were disclosed, and the defined measures (Guthrie *et al.*, 2004; Dumay and Cai, 2014). The application of a content analysis in investigating IC is usually based on the framework developed by Sveiby (1997), which reveals that the most important components of IC are not fully understood, scarcely identified and not adequately managed and reported (Guthrie *et al.*, 2004). As the third wave of the IC accounting studies focuses on IC managerial implications (Dumay and Garanina, 2013), the widespread reports' content analysis tends to remain at the second stage, where disclosing IC does not help in managing knowledge.

Even in the context of public sector IC accounting research, the methodological approach is mainly based on case studies analysis (Wall, 2005; Sànchez and Elena, 2006; Ramìrez, 2010); and content analysis associated to IC reports, performance plans documents (Siboni *et al.*, 2013), annual reports (Schneider and Samkin, 2008). Considering the call for a better understanding of how IC framework is used in the management of organisations, different methodological approaches could challenge different research propositions. The literature has highlighted the need to engage in a more critical experience when approaching the IC-based accounting research. To this

end, some authors invite to widen the study's aim to get an understanding of how IC contributes to an organisation's performance improvement, how IC is used for decision making at different managerial level, how IC enters the strategy definition and management (Guthrie *et al.*, 2012; Dumay and Garanina, 2013; Lev, 2014). To give an answer to the previous questions, a different research approach is needed. Researchers need to be involved in practice, in order to get a preunderstanding of the organisation' setting, and to observe what is the meaning attributed by the organisation to their theoretical knowledge. The need to plunge into the depths of the organisation for a better understanding of the accounting theory and to strengthen it, should motivate a different methodological approach on IC accounting research. Thus, the involvement of researchers with practitioners over issues, which actually matter to them, provides a richness of insight, which could not be gained in other ways.

Considering the above review of the literature, this paper aims at contributing to the advancement of the IC accounting studies deepening how the visualisation of the IC can foster the strategic process of health care organisations. For this purpose, an action research approach results to comprehensively meet the research objectives.

Based on their knowledge-intensive nature and complexity, routing the IC framework in the public sector organisations contribute to innovate the management dimension (Borins, 2001). As for other public sector organisations, the literature indicates that health care organisations would benefit from using innovative measurement models able to represent value creation through qualitative elements including numbers, narratives and visualisations. However, IC needs to be understood within the organisation, and used as part of the strategic decision-making process. In hospitals, the IC reporting activity has to take into account the whole system of values and the context in which they operate, thus it represents a considerable effort by the management (Habersam and Piber, 2003). However, as a knowledge-based organisation, hospitals' management would gain advantage from information about knowledge development and the use of knowledge-based assets.

3. Design of the study

The paper aims first at developing and applying an IC framework to enhance the visualisation of strategic IC characterising the management of university hospitals. Second, it aims at enhancing the use of IC visualisation for strategic management. The study also allows testing of an IC framework for investigating the factors that are the foundation of the integration between hospital and university.

As emerged from the literature review, the roles of scientific research, of internal and external relations and of professionals are key variables to define the success of a university hospital organisation. A university hospital's top managers are familiar with clinical issues and budget constraints, whereas they lack a generalised view of the intangible factors that potentially result in value creation.

Considering the complexity of hospital organisations (Mintzberg, 1983; Perrow, 1986), and moreover of university hospitals (Ament *et al.*, 1981; Sloan *et al.*, 1983; Foley and Mulhausen, 1985), a qualitative study based on action research has been conducted. The health care sector results to be an emerging setting of study when facing the use of the IC framework: the action research approach allows at fulfilling the researchers' needs to make deep observations of the organisation's process and to actively exert an influence on the organisation. By relying on participant observation and reflection, the researchers take a close look at the role of IC in university hospital for strategic management purpose. Thus, action research allows at intertwining the

emic perspective that reveals the practical needs with the relevant reflection in the literature, enhancing the theory development (Suomala *et al.*, 2010).

In the literature, several authors have indicated the need for more engagement research and the relevance of developing more empirically based interpretive and critical insight into the role of accounting within organisations (Laughlin, 1995; Humphrey and Scapens, 1996; Parker and Roffey, 1997). Adams and Larrinaga-González (2007) discussed the lack of engagement research in sustainability accounting. Malmi and Granlund (2009) recommend the use of intervention research and action research to facilitate and promote the use of accounting techniques in new contexts. Considering the gap between theory and practice in management accounting, the authors defined a research agenda to help academics provide more assistance to organisations and societies. Van Helden and Northcott (2010) highlight as a few papers in top accounting journals shows practical research implications. Considering the call for a more engaged research, different approaches have been emphasised: among them, Dey (2002) offers a discussion of ethnography as an empirical means to understand why and how accounting works in organisations; Dumay (2010) analysed the application of interventionist research methodology in accounting. Among engaged research processes, action research is probably the most well known (Ter Bogt and Van Helden, 2011, p. 58); it emphasises the co-production of knowledge by academics and professionals in organisations. Thus, action research plays a particular role to bridge the gap between theory and practice (Gummesson, 2000). Rapoport (1970) defined action research as the method which aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.

Although accounting scholars recognise that action research can contribute to the advancement of the discipline's knowledge, the literature based on the engaged research approach is still limited.

Dumay (2010), Sunding and Odenrick (2010) and Suomala *et al.* (2010) present empirical studies based on the intervention research approach in which they highlight the critical role of researchers; Ter Bogt and Van Helden (2011) use intervention constructive research to design and implement a programme budget in a Dutch local government; Chiucchi (2013) developed a constructive case study to examine IC mobilisation process in organisations.

According to Jönsson and Lukka (2006), action research is the origin of intervention research in social science. In contrast to well-established research approaches, such as case studies, the role of the researcher is essential in action research, acting as "catalyst" (Dumay, 2010, or as "liberator" (Sunding and Odenrick, 2010). Van Helden *et al.* (2010) suggest that the work of action base falls within the remit of consultant/researcher who fulfils an important role in the public sector. Action research is seen as particularly useful in researching processual problems in organisations such as learning and change (Bryman and Bell, 2003, p. 414); thus action research is the framework for the present study. This choice is based on the need for researchers to develop a critical approach, used to attain the research aims. As argued by Winter (1989, p. 44), a dialectical critique is required to understand the set of relationships both between the phenomenon and its context, and between the elements constituting the phenomenon. Furthermore, participants and researchers establish an effective collaboration, whereas there is no dominant idea. Action researchers are involved in a continuous transformation process: theory informs practice, practice refines theory. The research project results to be different from other qualitative research approaches. When involved in an action

research project it is up to the researchers to make explicit the theoretical justifications for the actions, and to question the bases of those justifications.

The authors planned the action research process based on Susman and Evered's (1978) comprehensive definition of action research in which they described five phases of the action research cycle: diagnosing, action planning, action taking, evaluating and specifying learning (Figure 1).

Even though the accounting literature has been calling for increasing studies that could bridge theory and practice, some criticism towards action research has been expressed for its lack of repeatability and for concentrating too much on organisational actions. However, action research provides a richness of insight through the collaboration with professionals that cannot be gained with other methods (Bryman and Bell, 2003). As a participatory process concerned with developing practical knowing, researchers engaged in action research seek to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people (Reason and Bradbury, 2001, p. 1). As a consequence, researchers are directly and fully involved in an interactive process with the studied organisation's members (Jönsson and Lukka, 2006). This interaction marks the difference between action research and the more traditional research approach which requires researchers to be neutral to avoid bias determined from any interaction with the studied context. Considering the action research approach, the traditional case study approach is extended by a continuous collaboration of the researchers in helping the organisation to solve problems associated with the phenomenon under investigation (Dumay, 2010, p. 47). Furthermore, researchers are required to be critical in their observations and interventions as they construct the data of the research project. Considering the relevance of keeping researchers' critical perspective, as suggested by the literature, daily research notes and tape recording have been used as the project was conducted.

The setting of the study

A public university hospital in Emilia Romagna region (UH), in Italy, has been considered a representative case from different perspectives. The UH has been revising

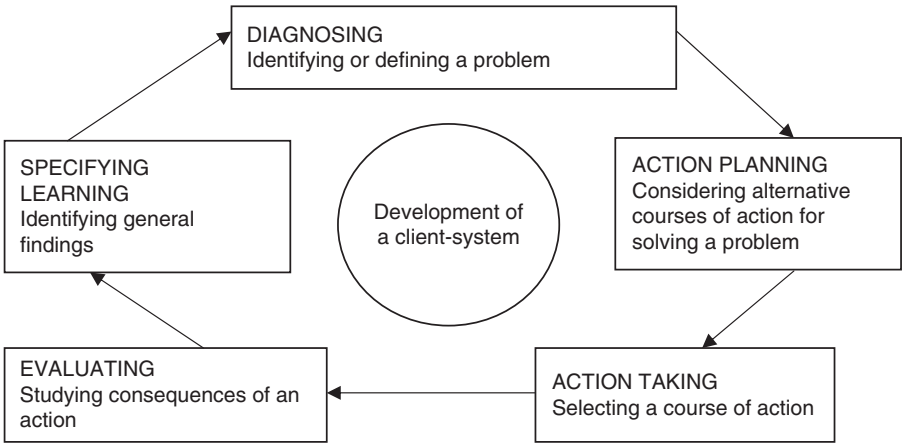

Figure 1.
The cyclical process of action research

Source: Susman and Evered (1978)

its strategy in the regional context following a move to a new building in May 2012. Furthermore, considering the recent investments made to build the new facilities, the health system policy makers, both regional and local, have stressed the need for both quality and efficiency of results. Thus, the definition of the strategic orientation of the UH has been a relevant issue for the hospital's top management, as well as a discussion of the drivers of the UH's value creation. This context motivated the UH to support an IC-based research project . Finally, the above-mentioned issues allowed exploration of the usual form of organisation and interaction between the hospital dimension and the university one.

The UH considered in the study is a 704-bed hospital, which covers 43.46 per cent of the hospital beds needed in the province. By size and level of specialisation, it is the most important hospital organisation in the territorial area, and it is recognised as a hub hospital for neuro-rehabilitation, genetics, neonatology, plastic surgery and hematology. The university, a public one, supports the UH through the academics enroled in the Medical School: 95 academics out of about 150 also work for the UH assistance process, some of them have organisational responsibilities and are involved in the managerial decision-making process. To this end, it is at the regional authority level that the rules to establish the relationship between the university and UH are defined, in accordance to national policies.

As with other public health care organisations, the performance management and managerial control history of the UH is weak. This presents an opportunity to study the value of documenting IC dimensions for managerial and strategic purposes.

Research process and data collection

The senior researcher was involved with the UH from January 2013, as a member of the strategic committee, delegated by the university's Rector. The second researcher became involved in June 2013, following an explicit interest by the President of the Committee because of the different perspective brought by the researcher. In Spring 2013 an action research plan was defined by the researcher and shared with the UH top management with the aim to contribute to an effective strategic process as suggested by the UH general director. The research process is summarised in Figure 2. All the activities to achieve the objective were coordinated by the researchers, while the UH assured its contribution to the different research process steps, to make archival data available, and to support further data collection activities. In this project, a total of 22 university and UH members were interviewed and involved in the research process. Some of them and other staff participated in the focus groups enabling discussion of data at intermediate and final steps of the research process. Furthermore, data collection was supported by other internal sources of information as outlined in Table I. The participants were chosen because they represented key people across the UH strategic decision-making process.

Archival data helped to frame the studied context and focus on the development of an understanding of the circumstances that brought the UH to question its strategic dimension.

Interviewees belong to both the university and the UH settings. The unstructured interviews mainly focused on the following issues:

- how the interviewees interpret their role in the university or UH setting;
- the vision of the state of health care organisations both regionally and locally;

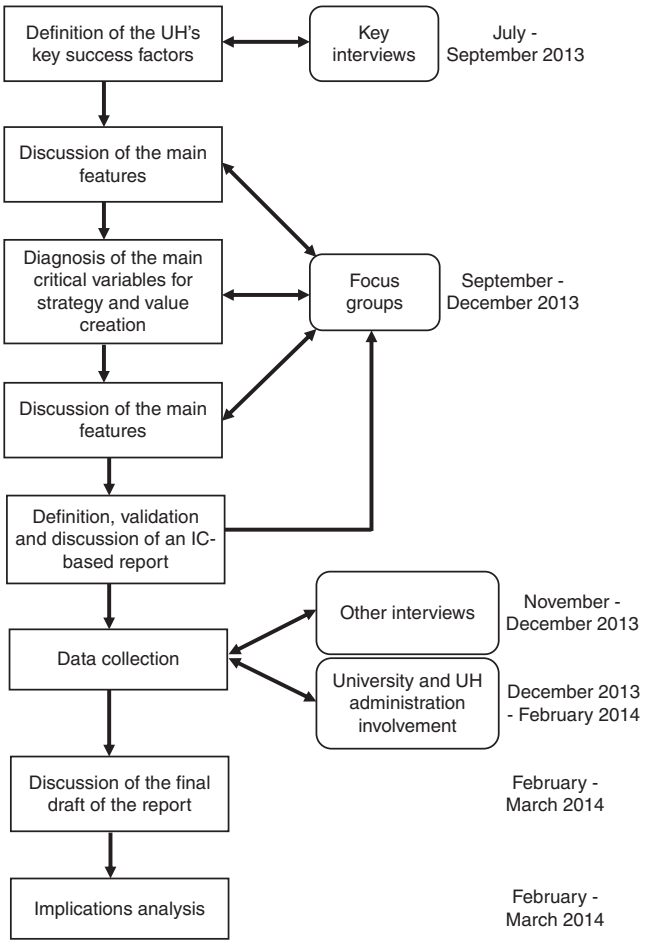

Figure 2.
Action research process

- the relationship between health care organisations and local development;
- the definition of the main drivers of success for UH;
- the features distinguishing the UH from others;
- what they thought was relevant to enhance UH development in the next three/five years;
- the activities carried on in the health department;
- the information available for decision making and participation in the strategic meetings; and
- the measures available and the missed ones.

The interaction between researchers and the action project participants was mainly based on interviews and focus group meetings. Some of the participants were interviewed several times in consideration of the need to go into some issues that emerged during previous interviews in more detail.

Data source	People/structures involved	Format	Date
Key interviews	General Director Clinical Director University Rector R&D Deputy Rector Health Affair Deputy Rector Head of the Medical School	Digital voice recordings (780) and transcripts	July-September 2013
Other interviews	Heads of the Clinical Departments (eight) Head of the Legal Medicine Unit Head of Dentistry Unit Head of Rheumatology Unit Head of Pharmacy Department Head of Genetic Unit Head of Vascular Surgery Unit Director of LTTA Laboratory Director of the Physicians unit	Digital voice recordings (1,250) and transcripts	September-December 2013
UH data collection	Quality, accreditation and research unit Human resources unit Management control unit	UH Mission Report (2012 and 2013) Strategic Health Plan (2013-2016) Financial Report (2012 and 2013)	June 2013-February 2014
University data collection	National research unit International research unit Health affairs unit, Technological transfer unit	University Education Programmes (academic year 2013/2014) University Spin off report (2013)	July 2013-February 2014
Two focus groups	Directors of the eight clinical departments in the UH; General Director, head of Medical School, head of the hospital function in the province, researchers	Digital voice recordings and transcripts	September-December 2013

Table I.
Data source

The main features that emerged from the set of interviews were discussed in two focus group meetings: one involving the General Director of the UH, the head of the Medical School, the head of the hospital function in the province, and the researchers; the other one involving the directors of the eight clinical departments of the UH. A deductive content analysis of the interviews was made to help the abstraction process supporting the categorisation of the dimensions that were considered relevant to the strategy (Guthrie *et al.*, 2004). An example of the process lying behind the IC report framework definition is provided in Figure 3.

The abstraction process allowed us to diagnose the main critical issues with regard to the relevant variables for strategic purposes and value creation. Based on that analysis a gap was identified with regard to the strategic management process.

The next step of the research process aimed at action planning. The researchers and those at the above-mentioned focus group meetings argued that it was important to fill the gap previously identified, and define actions that would contribute to solve the problem related to the strategic successful factors. It was decided to undertake an in-depth analysis of the UH with regard to the main critical variables above mentioned. Thus, the main features were codified in several variables whose representation would

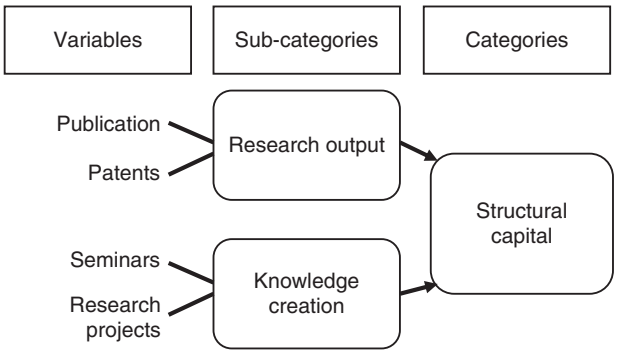

Figure 3.
Example of the abstraction process

facilitate the strategic management of the UH. The latter activity deeply engaged researchers and participants of the project; it was based on an interactive mapping approach, with the aim to represent participants' understanding of the value creation drivers of the UH. Thus, several steps were made to progress from built blocks to categories definition. This approach has been described in management control literature (see Abernethy *et al.,* 2005). Finally, participants of the action research project agreed to define an IC-based report, although researchers had never defined it as the final destination. An outline of the reporting framework was defined, discussed and validated by the above-mentioned focus groups' meetings. Defining the IC report framework required two focus groups' meetings, and the researchers' main objective consisted in having a document that the participants would have perceived as their.

Then, action aiming at reporting the UH's dimensions considered critical to value creation and the success of the organisation was taken; a report of the IC-based key variables was made considering the last three years' data. Finally, the consequences and the learning points were evaluated.

Data collection devoted to implement the IC-based report involved the university administration: both the national research unit and international research unit, the health affairs unit, and the technological transfer unit allowed us to gather data about the research process and outputs and the academics involved in the UH care process. Furthermore, data collection was supported by collaboration with the quality, accreditation and research unit, the human resources unit and the management control unit of the UH. We held 16 interviews (interviewees given in Table I) that allowed us to collect further data and information that were not available in any data set.

Beyond the focus group meetings, 2,030 minutes of interviews were conducted from July to December 2013; the interviews were recorded and transcribed to allow a more in-depth analysis and a better comprehension of phenomena. Notes and immediate reaction thoughts of the researchers were integrated with the data. Both measures and narratives were used to represent the IC variables. Dumay (2010, p. 51) considers narratives to be relevant to understand and represent how an organisation develops its IC drivers. The role of narratives was emphasised to the participants of the action research project during a focus meeting, given the general belief that only number would have entered the final report.

The final draft of the report was first discussed with the Head of the Medical School, the university's Rector and UH General Director, and second with all top-level clinical managers of the UH. The aim of the final stages was to assess to what extent the IC-based reporting process produced consequences in the organisation. Furthermore,

the ability of the report to improve the strategic management of the key variables able to leverage UH performance was considered.

During the early stages of the research process, the researchers were the most active people; they offered a different perspective and used a different language whose categories were not well known to the participants of the research. The researcher role was crucial to bring unity to the IC concept starting from a bottom-up approach: the researchers codified and interpreted the issues that emerged during the interviews and the focus groups, and later proposed encompassing them under the IC hat. Although a time consuming and difficult to handle process, it generated a fruitful exchange of knowledge and introduced the action research participants to the ethos of IC management.

4. The problem to be solved

Following national and regional policies, since 2012 the local province has been engaged in a revision of the localisation, volume and quality of health services delivery. In consideration of innovations in technology and medical science, the new policies stem from the idea that increased efficiency would be achieved through the concentration of services and economies of scale. Thus, the number of hospital beds had to be decreased, the number of local hospitals reduced, the supply process had to be managed jointly with other health care organisations in the region to improve efficiency and investments had to concentrate on recognised excellences (i.e. on those services/processes that expressed the ability to innovate and to deliver highly specialised care).

The UH and the local health unit are the two public health organisations responsible for health services delivery. In response to the external pressure to increase performance results, they jointly defined four main actions to be undertaken: "align managerial costs of health organizations to the average cost in the region through a reduction of the costs for personnel, supply, hospital and other delivery structures, etc.; align the number of hospital beds and specialist services to the average in the region; consolidate the hub and spoke organizational model; strengthen the offer of primary care, diagnostic and ambulatory care in the province despite the reduction of the number of local hospitals" (Strategic Plan 2013-2016). In that context, the debate related to the role of the UH in both the regional and the provincial health care system. The university perspective integrated the health care one, and it resulted in a shared movement to highlight the value drivers of the UH.

During a focus group, the Head of the Medical School said: "competition is now high, not only among health care organizations, but also between universities. It should be noted that just south of town there are a big-sized university and university hospital, which could easily meet our gap. This could be the beginning of a process of inclusion. So, it is essential to identify our specificity and strengths and to focus on these when thinking about the future". In the same meeting, the manager responsible for the hospital function in the province argued that: "the academic component is a relevant one to confer specificity and value to the hospital activity of UH; that is what distinguishes UH from the smaller and less complex-based small hospitals in the province".

As above argued, during the focus group meetings some problems were clearly identified; there was a widespread perception of external threats that could call into question the central role of the UH in the future. As a consequence, several organisational changes would be experienced by both hospital and university sides. Furthermore, the academics were mentioned as a component that could contribute to

generate value for UH. Value drivers had to be identified, and concerns about the future of the UH were raised by physicians, academics and some managers too.

Beyond the discussion of the Strategic Plan by the General Director of UH and the Head of the Hospital function in the province, the academics mainly highlighted the research activities that had an impact on the health care offered by the UH and the excellences of the UH.

Considering the external pressure, a problem was identified with regard to the strategic orientation of the UH: the components supporting the UH's strategy and the value drivers had to be made explicit and discussed.

The definition of the strategic gap

Before starting the process to better identify the strategic gap of the UH, a document analysis was made. The UH does not make an explicit strategy through a strategic plan; the 2013-2016 Strategic Plan covers the province area and does not focus on the strategic process of the UH. Then, both financial documents and managerial reports were considered. Tension in the achievement of financial balance was detected, and most of the documents and reports focused on identifying the determinants of the final loss. However, these were not helpful, although relevant to the definition of the current state. Among the many data reported, the so-called Mission report (a compulsory report to be annually produced by the health care organisations in the region) had a section named "strategic objectives". In that section objectives are organised according to four different topics: dignity of the individuals; accessibility, quality and safety of health care; personnel empowerment; and technological investments and accreditation. The objectives are described as managerial/operational ones and they are detailed and linked to defined organisational processes. Another section related to policies concerning "research and innovation processes". In contrast to other sections, some data about the research performance were disclosed through tables showing the number of research projects, the related funds, publications and their metrics. Furthermore, in the report it is stated that: "teaching and scientific research topics are considered one of the main areas where the integration process between hospital and university could achieve the highest relevance" (p. 193). The above analysed report is not a strategic document; however, it represents a good insight into some of the characteristics of the strategic dimensions, the activities and the services localisation of the UH.

Based on the above considerations, the relation between the hospital side and university one (made explicit through the scientific research, the innovation and the teaching processes) was raised as a relevant topic for value creation in the UH, which required an in-depth analysis involving top managers, physicians and academics. The key features lying behind the success of the UH were then identified.

As emerged from the set of interviews' analysis, there is a common belief that the role of the university part of the UH contributes to the value of the UH; both university hospital interviewees and university ones highlighted that their contribution is crucial to the reputation of the UH and its ability to satisfy patients' health care needs. Interviewees from the university side stressed the ability of the academics to "achieve scientific results", "attract research funds", "lead professional and scientific communities" and "improve the health care activities through their research results". Whereas the hospital interviewees argued that they contributed highly to "train medical students, medical doctors and PhD students", they "collaborate on research activities" both with academics and without them, some of them had a "crucial role in

the national or regional professional context allowing UH to gain reputation". The role of knowledge as a value driver underlies all claims of the interviewees. Sometimes, the ability to attract patients was stressed too.

Discussing the results of the interviews, some of the participants of the focus groups highlighted that the UH does not explicitly consider many of the issues that emerge from its strategic decision-making process. The volume of the treated patients, their level of complexity, the beds turnover, the costs, the number of staff (including the number of academics) and clinical measures were pointed out as the main data considered when debating the strategic objectives of the UH. Furthermore, in that regard the regional guidelines also have a relevant role. The research process revealed a gap in the proper strategic process when considering the institutional role of the UH and its characteristics. The UH was missing intangible information to depict the state of the art and define strategic objectives. Following the above conclusion, shared among the focus groups, the main direction of the study was to highlight the intangible value drivers of the UH and report on them.

5. The IC-based report definition

An IC-based report was discussed in regard to the relevance of the strategic gap and the intangible nature of the value drivers that emerged from the data collection. The IC-based report emerged as the solution to the identified problem. So far, the research process had enabled us to identify several drivers, such as the governance structure; the professionals and the career paths; the relations with scientific societies and professional organisations; and the relation with the local health unit, with the volunteer association, and with other academics beyond those affiliated to the UH. Furthermore, relevance towards strategy formulation and value creation was assigned to the research outputs, the process supporting knowledge creation, the teaching outputs and the impact of scientific research on health care activity.

During the previous diagnostic step, researchers catalysed the above arguments brought by the action research participants and considered that they mainly fell in the domain of the IC conceptual model.

Based on the substantial agreement with regard to the strategic relevance of the detected strategic dimensions, an IC-based structure for the report was defined, as in the following section. During a special meeting with focus groups aimed at summing up the interviews' results and defining further steps, the General Director of the UH stated: "reporting on what is called intellectual capital would allow us to define what is distinguishing this organisation from others, and this could represent the beginning of a journey, from the management perspective".

During the focus group, different positions emerged; clinicians emphasised specific knowledge associated to clinical practice, whereas the other participants demonstrated a more broad approach to filling the strategic gap: "I think it is not a matter limited to the human capital, although this is a relevant issue, but other factors have to be captured: the relations we have contributed to create value added for the UH" (The Head of the Physician unit).

Clearly there was a different perception of what the researchers mentioned as IC during the meeting. However, the willingness to define a report that would allow the UH to depict its sources of value creation was common to all participants. At that stage, based on the data collected and using an interactive mapping approach, participants of the focus group were involved in converging on an IC-based report framework. This required a deep involvement from the researchers to operationalise theoretical

concepts in order to make them close to the different participants' realities, to engage professionals and to act as a catalyst. The researchers triangulated the different drivers of value creation detected during the analysis of the interviews and proposed a categorisation. The process was a progressive one, and required several attempts before reaching an agreement on the final IC-Report framework.

From our research notes, based on the participants' comments, we considered that they were not aware of the work that had to be done to implement the IC report, and it seemed that some of them could not guess how the IC report would enter the dynamics of the strategic decision-making process. However, a tick was made; and as researchers engaged with the study we showed satisfaction with the general agreement to work on the IC report.

IC report contents

Considering the common view to use the IC theoretical concept to contribute to discussion and to fill the strategic gap, an IC-based report was developed.

The IC report framework is divided into four main sections and a concluding one; the first section concerns governance structure and strategic topics, while the other three main sections refer to the tripartite division of IC into human capital, structural capital and relational capital. A final section analyses the impact of the variables of study on the three kinds of activities characterising university hospitals: health care, teaching and research. This section takes into account a range of variables considered to be of particular interest with regards to the integration of academic and hospital professionals from a strategic perspective, which will be monitored over time.

The researchers engaged in data collection relevant to the development of the IC report. Archival data and interviews were functional to this stage of the research project. Data were organised according to the categorisation framework above defined. To this end, as already mentioned, both quantitative measures and narratives were used to enable a representation of the variables driving value creation in the UH.

The first and preliminary section (see Table II) is dedicated to the governance structure and strategic topics; it focuses on the relationship between hospital and university in the top management bodies, which emphasises the importance of shared decision making. Furthermore, some areas relevant to the UH's strategy were defined as a result of a shared decision-making process between the General Director and the university Rector.

Category		Variables
Governance and strategy	*Governance structure* General Director Board of Directors Steering Committee Board of Auditors Ethics Committee Board for Research and Innovation Quality Referrals	*Strategic topics* Planning human and professional resources Investments Scientific research

Table II.
Governance and strategy variables

The academic dimension and the hospital one intertwine across the entire governance structure in considering the composition of the boards and/or the procedure to select a member of them. The interviews enabled us to identify some strategic topics that are usually jointly discussed by the top management of the university and of the UH.

The section dedicated to human capital (Table III) refers to all of the resources available within the UH through which knowledge is expressed and the strategic objectives of the UH can be achieved. In this sense, human capital is linked both to the whole group of professionals who work within the UH and to their career paths.

It consists, therefore, of the specialised professional staff as academic professionals, and PhD students and researchers whose research and teaching activities require hospital equipment and the cooperation of hospital staff, from which relevant health care outputs are derived.

UH's relations with university, institutions, commissions or stakeholders influence either the top management strategic process or health care, technical and administrative practices.

Relations can contribute to the reputation of the UH, influence health care policies through participation in the definition of protocols and guidelines, and affect local public opinion towards the hospital service. Relational capital also affects the local health strategy, due to the role of the UH in the territory, and eventually allows the UH to have decision-making power within boards that discuss training paths, care processes and research.

For these reasons, it is important to focus on UH's relationships with regional, national or international commissions, associations or scientific societies, the local health unit, the university staff and the social context (Table IV).

Finally, the section dedicated to structural capital (Table V) involves the entire set of knowledge developed by both the hospital and academic professionals, which becomes part of UH's teaching, research and health care activity. Thus, it refers to the IC assets that remain in the UH and become part of its intellectual property.

With regard to the structural capital category, during the research process it clearly emerged as both a static and dynamic views were consider relevant for strategic purposes. Thus, research outputs' variables were reported as well as a few of knowledge creation's variables, some teaching outputs and health care outputs, and the impact of scientific research on the health care process.

Category	Variables	What is reported
Human capital	Professionals	Analysis of the number of professionals who belong to the university or to the hospital, whose activity is carried out through integration
	Career paths	Allocation of managerial positions to hospital professionals or to academics which allows improvement of integration within the UH
	Academics	The number of academics who work in the UH underlines the contribution of the university to the development of the hospital's health care activity
	Student doctors	Student doctors complete their training in the UH, while they contribute to the development of the overall health care activity
	PhD students	PhD students contribute to UH health care processes while they are supported by hospital physicians in the development of their scientific research projects
	Research fellows	The presence of research fellows at the UH is related to their scientific research, but they also actively contribute to health care activity

Table III.
Human capital variables

Category	Variables	What is reported
Relational capital	Relations with regional, national and international commissions	Concerning relations with commissions, it is important to understand the role of UH's professionals as participants or coordinators as a proxy of their decision-making power
	Relations with associations and scientific societies	Analysis of the number of professionals that have a leadership role in scientific councils, and who may guide their strategic policies
	Spin-offs	Emphasis on the networking capabilities of the UH and on its ability to generate a transfer of knowledge in the business world
	Relations with the local health unit	The integration between the UH and the local health unit leads to the creation of agreements for the production of health care services in the territory
	Relations with non-affiliated academics in university courses	Collaborations between hospital and university are held also by non-affiliated academics, who are involved in research and operative projects
	Relations with the social context and volunteering	Volunteer associations integrate the health care activity and collaborate with professionals in supporting the research economically

Table IV.
Relational capital variables

Given the complexity of the UH, and the relevance of research, teaching and health care activities, a matrix was composed to identify the linkage between each IC variable and the three main processes characterising the UH (Table VI).

The three relevant processes are not affected equally by the different variables identified as value drivers, and clearly the research process and the health care process appear as dominant ones according to the proposed IC-based report perspective.

The evaluation of the IC-based report

Once the IC-based report was completed, it was first discussed by the UH director and the University Rector, then shared with all participants directly engaged in the action research project. Both leaders of the UH demonstrated satisfaction with the result, and they engaged the researchers in a discussion about different options to use the IC-based report.

Following the previous meeting, the report has been widely distributed in the UH among clinical unit directors and the top management board. After three weeks (in March 2014) a special focus groups' meeting was organised in order to capture the immediate perception toward the delivered report. There were different reactions among the participants: some of them had increased their understanding of the action research project, whereas others – a minority – reacted in a way that clearly showed a lack of focus on the research aim. These latter were mainly centred on their activities, and less skilled in strategic thinking. However, a general satisfaction was expressed for the final outcome and for the activities conducted by the researchers.

Nevertheless, while the action researchers were approaching the end of the project, participants were required to plan further meetings, and to continue to support the process. Furthermore, considering that most of the people involved

Category	Sub-categories	Variables	What is reported
Structural capital	Research outputs	Publications	Analysis of the proportion of publications realised by hospital physicians in collaboration with affiliated and non-affiliated academics
		Patents	Output of the scientific process derived from the strategic aim of supporting research activity
	Knowledge creation	Seminars	Activities that allow the diffusion of knowledge, and foster a discussion on research findings and create positive processes
		Research projects	Integration in research activity leads to the production of new knowledge and strongly impacts health care activity
	Impact of scientific research on the health care process	Best practices	Experiences that result in innovative research outputs and development of health care pathways or networks
		Integrated research centre	Group of industrial research laboratories and technology transfer whose function is to bring the research closer to enterprises
		Guidelines and protocols	The benefits from participation in the creation of guidelines and protocols consist in the possibility to communicate experiences and to be updated on the orientations of the scientific community
		Diseases records	The possession of data is essential to define strategic goals and to promote research and heath care activities
	Outputs of teaching	Training of doctors, dentists and health professionals	Analysis of the involvement of the UH staff in teaching activity, while student doctors and PhD students contribute to research and health care
	Health care outputs	Diagnostic and therapeutic pathways	Innovative pathways, which improve diagnosis and therapeutic processes, derive from the integration of research activity
		Specialised ambulatories	Research activity lead the UH to an excellence role in some specific fields of health care

Table V. Structural capital variables

in the project were professionals and top managers, lots of time was dedicated to the project and it was rare that someone missed a meeting. This confirmed the increasing interest in the analysed subject and the professional commitment to the project.

During the final meetings, above mentioned, it emerged that reporting IC increased discussion on the relevance of intangible variables to enhance UH's performance and the results of its departments. All professionals involved in the research process were more and more convinced of the relevance of monitoring the IC variables. One of the Clinical Department's directors stated: "I had to wait for the end of my career to see data that represent the lifeblood of the UH, anyway we made it!! And I hope it will last."

			Research	Teaching	Health care
Human capital	Professionals		✓	✓	✓
	Career paths		✓	✓	✓
	Academics		✓	✓	✓
	Student doctors			✓	✓
	PhD students		✓		✓
	Research fellows		✓		✓
Relational capital	Relations with regional, national and international commissions				✓
	Relations with associations and scientific societies		✓		✓
	Spin-offs		✓		✓
	Relations with the local health unit		✓		✓
	Relations with non-affiliated academics in university courses			✓	
	Relations with the social context and volunteering		✓		✓
Structural capital	Research outputs	Publications	✓		
		Patents	✓		
	Knowledge creation	Seminars	✓	✓	✓
		Research projects	✓		✓
	Impact of scientific research on the health care process	Best practices	✓		✓
		Integrated research centre	✓		✓
		Guidelines and protocols			✓
		Diseases records	✓		✓
	Outputs of teaching	Training of doctors, dentists and health professionals		✓	✓
	Health care outputs	Diagnostic and therapeutic pathways			✓
		Specialised ambulatories	✓		✓

Note: The ✓ indicates that the IC items identified in the previous column has been considered as relevant for managing the following processes in the teaching hospital: research, teaching, the healthcare

Table VI.
Participation of IC variables in the research, teaching and health care processes

Thus, as an immediate result, the focus groups identified a number of metrics relevant for strategic management that required monitoring over time as follows.

Metrics to monitor over time:

- number of publications written by physicians and academics together;
- number of research fellows working in departments directed by hospital physicians;
- number of research fellows working in departments directed by academics;
- number of PhD students engaged in research at the UH;
- number of student doctors who work at the UH;
- number of regional research projects that involve both hospital staff and academics;
- number of national research projects that involve both hospital staff and academics;

- number of international research projects that involve both hospital staff and academics;
- number of clinical studies that involve both hospital staff and academics;
- number of study subjects that involve hospital staff;
- number of credits of courses taught by hospital staff;
- physicians and academics in leadership positions in regional, national or international associations or scientific societies; and
- number of sectors in which there are specialised ambulatories.

These indicators involve human, relational and structural capital, with particular attention to the research outputs, leadership roles in specific fields and the teaching activity that affects research.

As a result, the UH information system was enriched by non-financial and non-clinical measures, which would help the management control system to monitor the achievement of strategic objectives. This was a commonly shared requirement; however, as researchers engaged in the process, we highlighted in our notes that the management control officer did not make any suggestion to that regard, and did not seem to be enthusiastic about the idea to improve the information system. In a separate meeting, those perceptions were confirmed; the management control officer expressed the fear of being involved in a time-consuming data collection activity such as the one the researchers had made.

Finally, the information system was modified and, as expressed by the UH General Director, new technologies were available to be included in the budgeting process and in the managerial performance appraisal system. Some of the metrics related to relational capital and structural capital were included in the budget as measures related to the research development objectives.

Considering the threats context that led the UH to undertake the process of investigating IC, two different actions followed its implementation. First, in early April 2014, the UH IC-based report was discussed at the local level, and especially among School of Medicine academics. A further in-depth analysis of the research lines, and of their highlights, was undertaken in order to identify the main research areas that were relevant to the health care process and those which could be leveraged by the academics' knowledge.

Second, the IC-based report was considered best practice by the regional authority and by three other universities (two of them in the region) that decided to discuss the UH experience of this paper at their top management level. As a result, the IC report crossed the boundaries of the UH and of the local context.

6. Discussion

The study enabled some primary results; a critical issue was unfolded, the problem diagnosed, the solution identified, adopted and evaluated. To that end, IC accounting knowledge has been relevant: it contributes to the development of organisational practice.

The research project revealed to the UH practitioners that IC is a key factor in competitive advantage, and underlined the close relationship between hospital professionals and academics in the three pillar processes: research, teaching and health care.

Consistent with what has been shown by Zigan *et al.* (2010), an increasing level of competition in the health care sector led the UH to question its strategic process, and to develop and use some instruments that would allow management of the outputs of IC. The action adopted, based on the development of the IC report, represents a first step towards the representation of the contribution of UH research to improving patient care.

Although a knowledge management approach has not been used, the knowledge variable is part of the IC; the empirical study has made possible the establishment of an instrument which allows the representation of knowledge resources in order to make the knowledge manageable as argued by Mouritsen *et al.* (2001a). The research project helped the top management to focus on intangible variables, and to discuss how to route them in their strategic management process. Furthermore, the use of hard data in the decision process was offset by IC measures and narratives; this led to a sort of relieved condition for most of the physicians involved in strategic management. As researchers, a deep commitment to discuss knowledge related to their core processes and activities was perceived as closer to the physician professional background. Thus, it is possible to consider the role of IC accounting technology as a facilitator of the physicians' involvement in the strategic management process of hospital organisations.

The work has highlighted the importance of managing knowledge for strategic goals and its usefulness in assisting the UH top management in the definition of a strategy that does not rely solely on traditional quantitative variables. As argued by Leitner and Warden (2004), university hospitals' competitiveness is based on the combination of a series of variables that refer to their IC; thus, managerial instruments based on knowledge contribute to supporting the strategic decision-making process.

Considering the setting of the study, and the important role of academics in developing the UH mission, the action taken and implemented underlines the hospital-university relation as a key process to be considered to enhance value creation. The project enable light to be shed on this complex two-way relationship; the collaboration between the hospital professionals and academics was considered critical by both sides for value creation and for the enhancement of UH's reputation, as indicated by Ayanian and Weissman (2002). During the entire research project, the contribution of the academics was important; during meetings they pulled out critical issues such as the development of best practices, the use of research results for health treatments and the collaboration with the hospital's physicians without much effort from the researchers. Moreover, for researchers, both academics and physicians applied effort to contribute to the study, adjusting their diaries, involving employees and being clearly proactive in some phases.

As considered from some physicians, and reported in our research notes, understanding that accounting is wider than numbers, and benefits of different visualisation techniques, helped during the research project to narrow the gap between researchers and medical professionals; as a consequence a deeper reciprocal trust was established.

Although the researchers did not have an outcome in mind when the project started, developing and implementing an IC report was the action taken. To that regard, while involving the research project participants in implementing the report, the dynamicity of the IC prevailed on the static dimension, confirming the role of what Habersam and Piber (2003) called "connectivity". The IC report framework has

been defined through a deep participation by the UH key managers and contributes at filling the organisation's strategic management gap. The IC report model integrates both the static view of IC and the "process focus" (Leitner, 2004); the impact of scientific research on health care process and some issues related to the knowledge creation have been visualised. The report has been organised according to the UH requirement and using a model that favors the possibility to be used instead of a full compliance to the theoretical model. Thus, the IC reporting appears to be an important source for the development of management and reporting system, as argue by Leitner (2004) with regard to universities. Furthermore, in accordance with Dumay (2010) narratives have been widely used as a mean to represent IC variables allow the understanding of IC drivers have been developed by the organisation.

The IC report was used to allow successful critical factors to be visualised by a wider audience of participants in the project, and to share the view; it was not the final destination of the journey both from the researchers' point of view and from the UH General Director's point of view. At the time of writing, some activities continue, although the project was officially concluded: feedback on the monitored variables, further improvements suggested and the suitability of IC reported data to manage the relations with some stakeholders (such as private research funders). From this point of view, it is possible to argue that the action research triggered change in the strategic management process. Furthermore, as suggested by Mouritsen (2001b), the study proves that reporting IC is central to the production of a domain of IC management. Reporting IC allowed at developing appreciation of any knowledge-related activity towards the organisation's management.

Following the above discussion, the research approach seems to avoid the risk of an "evaluatory trap" as pointed out by Dumay and Garanina (2013); according to the authors, reliance on the use of IC measures and reports does not allow the conclusion that the IC report is used and contributes to value creation. Furthermore, the latter has been pointed out by academics as one of the main failures of the second wave of IC accounting research (Mouritsen, 2006; Guthrie *et al.*, 2012), that has brought into question the relevance of IC theory in practice.

Broadening the view, beyond the studied organisation, a changing process has been triggered in the university's organisation, whose medical school is investigating medical academics' activities to better understand how academics contribute to the development of UH specialisation, innovative paths of care and best practices. Moreover, three other university hospitals are deepening the pillars characterizing the experienced research process and its results, and IC – as a topic – entered the regional managerial programme for physicians. In fact, the studied context seems to be a fertile one for promoting the use of IC as useful for developing and supporting strategic management in hospital organisations.

7. Conclusions

This paper is based on an action research project focusing on the development of IC practice for strategic purposes in the real-life setting. The studied university hospital investigated its organisation's process to identify its value drivers and relocate its strategy management, using the IC approach. The project allowed observation of some changes in the organisation's practice, in terms of management accounting, strategic management process and communication with institutional stakeholders.

The action research process suggested by Susman and Evered (1978) has been followed, and it allowed the researchers' to keep their focus on the diagnosis phase and on the evaluation one, besides the action taking steps. In the study, action research and IC research have been seen as an accounting contribution to unfold a strategic issue. However, the literature calls for additional in-depth case studies for a better understanding of how IC accounting research can contribute to the development of an organisation's practices.

This paper provides a contribution in three areas. First, it contributes to prove the relevance of IC theory to improve managerial process in practice. Some academics have been questioning the future of IC accounting research, and arguing for the need to be effective towards a real-life organisation; this paper reports on a positive experience that relates to the ability of IC theory to enhance the strategic focus of a university hospital, and to get both academics and physicians involved and committed towards the identified value creation drivers. As a consequence, the paper could contribute to the so-called third wave of IC studies (Guthrie *et al.*, 2012). It focuses on how IC theory helps a defined context to solve a problem; the aim is not to apply a theoretically well-supported model for IC representation, but it has resulted in using IC theory, and its language, to visualise critical factors that were relevant from the users' perspective. Furthermore, the paper provides evidence of the use of IC to create value from a strategic perspective, as argued by Petty and Guthrie (2000). The research conducted suggests that IC can be used as a "competent strategic management conceptual framework" (Kong, 2010), and it helps organisation's top managers to appreciate that IC is among the most relevant strategic management concepts. Considering the IC accounting literature related to the public sector, some studies provide insight into the utility of the IC framework from a conceptual point of view and refer to abroad field (Sànchez and Elena, 2006; Siboni *et al.*, 2013). The present study demonstrates the importance of the IC to improve the strategic management of a single organisation, showing how the organisation's leaders and professionals related to the topic, how what is called IC in theory is understood. Focusing on the managerial implication of managing IC, through a bottom-up empirical research approach (Dumay and Garanina, 2013), the paper originally contributes to the IC accounting literature. To that end, the present study is among the third stage of IC accounting researches (Guthrie *et al.*, 2012), and represent the first study focusing on the health care setting, based on an action research approach, and aiming at investigating the use of IC for strategic management purposes. Second, the paper is related to the public sector context and, in particular, health care. The literature on IC accounting studies in the health sector is limited; the authors contributed to improving knowledge of IC accounting in health care organisations by undertaking a research project in a big university hospital, a complex knowledge-intensive organisation. To that regard, the authors' experience allow at addressing some guidelines related to the categorisation of the criteria and measures to evaluate the main aspects and issues related to the IC management in the hospital setting. The understanding of the strategic dimensions of the organisation and of its strategic success factors allows at highlighting the organisation's direction to be taken. Then, with regard to those strategic success factors, the key professionals in the organisation need to be involved in order to bring on the table all the variables that they consider relevantly connected to those factors. The IC theoretical model could then be used to help the categorisation process, considering the organisation's key managers and professionals need. A similar involvement is required to define the measures,

although the professionals in the health care context are not deeply familiar with the measurement process. Thus, measures could be suggested by the researchers, the consultants, or other practitioners, however, they need to be recognised and validated by the organisation's key professionals. Finally, the involvement process can bring to an IC report whose structure is slightly different from the one proposed by the theory, nevertheless the key professionals and managers are keen to use it, having participated in its definition. Involving the key professionals in any step of the project is an important feature for its success in any organisation, however, this is even more relevant in the health care ones, considering that many physicians play a managerial role and they perceive as important to represent and discuss the implication of their knowledge.

Third, one part of the contribution lies in the practice of the action research. Although interventionist research is widely spread in some disciplines, it is not so common in accounting studies (Dumay, 2010). Based on an action research project developed over a year, the paper allows discussion of the action research planning, the methods used by researchers and the relation between researchers and project participants. The mutual trust among the researchers and the organisation's participants, as well as the organisation's General Director's leadership, was key to the continuance of the project. Being one of the researcher well known in the context of the study, this facilitated the access and kept limited to a few months the time required for the project definition and its beginning. A further advantage gained from the trust relation was perceived during the project development. Most of the data visualised in the IC report had never been shared before and the medical context is a complex one; however, the level of participation was very satisfactory. The organisation's leadership was also determined to contribute to build a high level of commitment from participants in a short period of time.

Furthermore, a clear definition of the research steps and methods, and balancing project management skills and research skills, has been crucial. From the first meeting, the organisation was given the message that no predesigned solution was in the researchers' mind. Researchers spent the time required to achieve the project results, were deeply committed to evaluate the early consequences of the adopted solution, and they are still kept involved in the process at the time of writing this paper.

The research approach was considered satisfactory from both sides: researchers and organisation. It allowed the organisation to develop an innovative strategic management process, and the researchers to taste the level of usefulness of their study. However, the great amount of time required could be highlighted as the main disadvantage of the action research approach; the diagnostic step and the action taking one were particularly time consuming. Furthermore, trying to summarise in a researcher (or in a few of them) many different skills required could result in a limitation of the study.

Finally, the paper proposed action research as an approach to analyse in depth how IC accounting is used in practice. This helped the researchers to avoid the "evaluatory trap" risk recently highlighted by Dumay and Garanina (2013), and had an effect on the course of the event. Lastly, the paper aimed at addressing new field of enquiry in a neglected setting of study among IC accounting scholars, employing a poorly used methodological approach. In doing so, the research work has accepted the challenge from Guthrie *et al.* (2012), to provide empirical studies of IC in action and help develop broader theoretical research.

Considering the research approach, the limitation to generalise associated to the methodology used can be highlighted. Nevertheless, further research is required to contribute to the understanding of how IC is rooted in the accounting and managerial practice of organisations, and for which purposes. The attitude towards IC technologies from the perspective of different professionals in the organisation should be analysed to identify impediments and/or facilitators of the use of IC by accounting/managerial-based professions and others, such as the medical professionals in the studied context.

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About the authors

Emidia Vagnoni, PhD, is a Professor of Management Accounting and the Director of the University Research Centre in Health Management and Economics. Professor Emidia Vagnoni is the corresponding author and can be contacted at: vgnmde@unife.it

Dr Chiara Oppi, MSc, is a Research Assistant on Management Accounting.

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