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INTANGIBLE ASSETS AND VALUE CREATION

MEASUREMENT AND METHODOLOGICAL ISSUES

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ISBN
979–12–5994–868–7

FIRST EDITION
ROMA 7 MARCH 2022

To my family

Contents

Introduction

The balance sheet has traditionally provided the vehicle for reporting the aggregated valuations of tangible together with some intangible assets. However, before the beginning of the new century, various studies, for example that of Gröjer and Johanson (1998), pointed out the very large differences that exist between the market value of the firm (as indicated by its market capitalisation) and its net book value (as expressed in its balance sheet). Quantifying the extent of these differences is straightforward; researchers have found differences totalling, for example, 1 trillion dollars in the US corporate sector as a whole (Lev, 2003). The difference between the two can be seen as comprising, wholly or in part, some element of intangible assets and then it is but a short step to attempt to capture, identify and quantify the 'missing' asset value.

Traditional accounting only reveals bare transaction values, which have either been realised or are close to realisation. Almost all intangible factors are treated as belonging to the category of 'black box' (an expression used, for example, by Power, 2001, and by Lev and Zambon, 2003) operations — the discerning know that such operations are significant to the operation of the firm, but the box is not opened unless briefly when a transaction throws up an accounting difference in the form of goodwill.

Ignorance of a company's intellectual capital causes investors to have doubts about what may happen in the future of that company and, so, to vary the price of its shares. Furthermore, a company with low levels of tangible assets has a lower capacity to guarantee debts (Sotomayor González *et al.*, 2005). This may cause investors to conclude that the company has a high level of risk and, thus, they might not invest in it, making it difficult to access this kind of financing. Hofmann (2005) says that the cost of capital is too high for knowledge intensive companies. Therefore, by displaying their invisible assets, firms might manage to reduce the apparent risk they present to investors and, in turn, the rate of return required by stakeholders (Sveiby, 1997b).

There is an analogous problem in management accounting: that of the emerging visibility of factors of production, such as human, structural and social capital, that are forced into the limelight by those who wish to manage and to control them. One of the advantages frequently claimed for increased reporting of intangibles and intellectual capital is that, in making these factors visible they then become manageable. Without such management, it is asserted, suboptimal decisions about resource use will be made (van der Meer–Kooistra and Zijlstra, 2001). Furthermore, if intellectual capital remains invisible, it may be carelessly lost: for example, Lynn (1998) cites the case of a multinational which, in the process of downsizing, inadvertently lost one employee's access to 'competitive knowledge of marketing processes and plans worth many millions of dollars to the company'. In the case of Skandia, commended in Edvinsson (1997), the effort to make human and structural capital visible in the accounting system was part of a mission which aimed to 'cultivate and channel intellectual capital through professional development, training and IT networking' (Edvinsson, 1997). There are at least two dimensions to the notion of manageability: first, the hidden factors are revealed to managers so that they at least know what there is to be managed, and second, once the factors are visible, managers are incentivised to manage them 'properly' because the consequences of management failure are now also visible.

The need for information about the rapidly escalating stocks of intellectual capital organisations possess, and the realisation that it is unlikely that it will be possible to meet that need by using financial valuations, has resulted in the advocacy of many new accounting approaches (see Andriessen, 2004a, 2004b for a review). It is quickly apparent that, in this context, accounting encompasses two complementary activities: measurement and reporting. These are 2 distinct (although not necessarily mutually exclusive) activities and it is possible to disclose information relating to intellectual capital (IC), without attempting to assign any monetary value to it. In this case, for example, we are dealing with narrative accounts of intellectual capital in which eventual indicators, if present, have just a complementary role. Among examples, the most widely known is that of the Danish government initiative that began in 1997 and, in 2000, resulted in the publication of "A Guideline for Intellectual Capital Statements". If IC, or some elements of it, is regarded as an asset which has a value in use, and is productive of income streams, it is logical to attempt to measure its

value and to recognise it. Two approaches have been adopted with this aim:

- One approach is that of the use of hard number metrics. Within the intellectual capital field, two of the early metrics were Tobins'q and the market–to–book ratio, both of which had their origins in finance literature (Andriessen, 2004b). New metrics were soon included: the CIV (calculated intangible value) of Stewart (1997), the IDE (intangible driven earnings) and the OC (organisation capital) of Lev (2001 and 2003) and, finally, the VAIC (value added intellectual coefficient) of Pulic (2000a; 2000b). Each of these provides a means of demonstrating the growth in a business's stocks of intellectual capital in a single, readily understandable way, one that might be combined with other similar metrics in an external report to shareholders and capital markets alike.
- Another approach is that of scoreboards populated by sets of softer indicators, the most iconic of which is the Skandia Navigator (Edvinsson, 1997). Edvinsson argued that it might be possible to explore the «hidden value», a business's stocks of intellectual capital, by using the Skandia Value Scheme. Hence, the Navigator model, which encompasses five aspects. Within each of the five spaces so created, Edvinsson challenged the profession to identify company–specific indicators, which, in total, give an account of intellectual capital assets and, more crucially, their growth over time (see also Mouritsen *et al.* 2001b). The overlap with the Balanced Scorecard model of Kaplan and Norton (1992), initially formulated to report new management accounting information, is immediately obvious. Some years later Kaplan and Norton (2001) began to make reference to the utility of their scorecard for reporting intangibles.

This work picks up on the literature according to which Intellectual capital metrics can be invented, but they bring with them a host of problems which have to be considered and, therefore, the aim of this book is to highlight some of the more important problems raised by Intellectual capital metrics.

In the first chapter in particular, there is reference to some of the notions of intellectual 'capital' as they are frequently used in the literature. The notion of intellectual 'capital' is used in the great majority of works as an incomplete terminology that emphasises only certain aspects of intellectual assets, failing to take into account the 'dark side' of the asset base, intellectual liabilities or intellectual contingent liabilities (Gowthorpe, 2009). Furthermore, still within the first chapter, reference is also made to those works whose focus is on the application of IC measurement in management control and the problems that the creation and employment of IC metrics raise, particularly from an ethical standpoint.

Accounting for IC via either incorporation of values within financial statements or by additional disclosures by management becomes a source of yet more information (or, at least, data) within the annual report. One of the possible problems that may arise is that the bigger the annual report, the more 'noise' will surround those values that are relatively objective, and the easier it is for unscrupulous managers to divert attention away from unpalatable figures. In relation to this, in the second chapter, the theme of manipulation and misuse of accounting information that emerges from traditional financial reporting is developed. Information can be amended, subverted or omitted by those preparers who are desirous, often for their own nefarious purposes, of misleading users of this information. There is a great deal of literature that explores earnings management techniques and incidence. A related problem is the emergence of bias towards particular indicators which is created by the simplification of user needs into a few key figures or ratios. Proponents of new forms of reporting need to keep an eye on the potential that exists for the misuse of information.

In chapter 2, attention is focused on IC values which are recognised and measured on the balance sheet. The question is raised of whether accounting for intangibles might simply provide managers with another earnings management technique (permitting possible manipulation of financial statements) and, in consequence, the ethical implications that all this entails are discussed. It is, however, worth noting that accounting for IC via additional disclosures by management could also be used for similar nefarious purposes of misleading users of the information. This risk obviously exists given that some empirical evidence suggests that investors overreact to intangible information (Daniel and Titman 2001) and also, as looked at in more depth

in chapter 3, that intangible information is value relevant for investors and, therefore, for the market.

The subject of the third chapter is the relevance of Intellectual Capital. Hidden factors of production such as human, structural and social capital are of interest, although rendering them visible presents problems. Indeed, such factors cannot be ignored for practical, as well as research, purposes and, in this sense, reference is made to the theoretical and empirical contributions which have shown how these intangible factors are important for investors, and, therefore, the capital market, for strategy, while also being of value in the context of the relationships between mechanisms of corporate governance and corporate performance.

Authors, for example Liu *et al.* (2009) and Wang (2008), have empirically verified that accounting for IC via either incorporation of values within the financial statements or by additional disclosures by management provides information that is value relevant for investors. In other words, this information is valued by investors and, therefore, it is reflected by the market value of the firm.

Empirical proof that knowledge and intangible resources are associated with the growth of shareholder value provides further support for the resource–based view (RBV) of strategic management research. In strategy literature, IC has been identified as one of the key drivers of firm–level performance (Teece, 1998; Youndt, *et al.*, 2004).

Finally, ownership structure is usually considered to be one of the core internal mechanisms of corporate governance. The relationship between ownership structure and corporate performance has received considerable attention in governance literature. Evidence shows that ownership can indirectly affect corporate value through the mediating role of intellectual capital (Chen *et al.*, 2005; Yammeesri *et al.*, 2006). Liang *et al.* (2011) have also discovered that there are direct impacts of ownership structure on corporate value in more traditional industries; on the other hand, for high–tech firms, ownership can indirectly affect corporate value through the moderating role of intellectual capital.

Chapter 4 looks at the criticism which has developed around the use of a specific hard number metric, known as value added intellectual coefficient (VAIC). This method was developed by Ante Pulic (2000a; 2000b) and has had success as a measurement given that, in the course of the two last decade, it has been used in a lot of academic research,

including some which has been published in such important sector journals as the *Journal of intellectual capital* (Abhayawansa *et al.* 2018; Dabić *et al.* 2018; Dzenopoljac *et al.* 2017; Ge and Xu, 2020; Hussinki, *et al* 2017; Smriti and Das N., 2018; Xu and Li, 2020). In spite of this, in 2011, the Journal of intellectual capital published an article by Ståhle *et al.* (2011) who demonstrated that the VAIC calculation process only appears to operate with the main concepts of intellectual capital — such as structural capital, human capital and the efficiency of intellectual capital. According to these authors, VAIC measures a company's operating efficiency in a different way, but its connection to intellectual capital remains non–existent. The fact that these contributions in literature, which have, for some time, been based upon the efficacy of the VAIC method, have been followed by great criticism of the validity of VAIC, should not be a surprise since this is a natural consequence of the difficulty of evolving genuinely useful metrics in this area. After a description of the literature for and against VAIC, the theoretical hypotheses that are at the heart of the VAIC measurements are tested. In particular, the financial and market data is revealed for 77 listed firms from the Italian stock market. We gather the data for each firm at year's end for each of the six years covered by the period 2005–2010, therefore, our sample comprised a panel of 498 observations. Our findings do not support the Pulic theory previsions, but support previsions by critics of VAIC. The results of the empirical analysis are discussed in detail in chapter 4, together with conclusions drawn from them.

Como, 9th January 2022

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Chapter I

The intellectual capital of the firm

1.1. Historical notes and definitions

The Intellectual Capital concept has historically been accredited to John K. Galbraith, who formally launched such terminology in 1969 (Bouteiller, 2002, p.3). Another relevant milestone was the setting up of a department dedicated to the study of intellectual capital in the 1990s, which was headed by Leif Edvinsson in the Skandia AFS insurance company. Additionally, a guide for the Intellectual Capital Statement was produced based on research performed by the Denmark Ministry of Science, Technology and Innovation under the responsibility of the lecturing staff of the Copenhagen Business School (DMSTI, 2003, p. 2). The first guide, issued in 2000, was criticised and, then, enhanced and updated in a new issue in 2003. In the guide, there was an attempt to answer three fundamental questions: (i) with regard resources, what does a company's knowledge resource consist of?; (ii) with regard activities, what has the company been doing in order to strengthen its knowledge resources?; (iii) with regard effects, what effects does administrative work have on the company knowledge?

Although the concept of intellectual capital has been discussed for some decades, there is no consensus on its definition yet. One definition given by the Skandia team (Edvinsson and Malone, 1997, p. 44) was that intellectual capital represents the domain of knowledge, practical experience, organisational technology, customer relations and professional skills that provides the company with a relevant advantage in its market.

Edvinsson and Malone (1997) introduced the important notions of *Human Capital, Structural Capital* and *Intellectual Capital*.

Human capital is defined as the combined knowledge, skill, innovativeness and ability to meet the task at hand of the company's individual employees. It also includes the company's values, culture and philosophy. Human capital cannot be owned by the company.

Structural Capital is the hardware, software, databases, organisational structure, patents, trademarks and anything else regarding organisational capability that supports employees' productivity — in other words, everything that gets left behind in the office when employees go home. Structural capital also includes customer capital, i.e. the relationships that have been developed with key customers. Structural Capital gives the company more stability and a longer–life. So the leadership of the company plays the role of transforming Human Capital, that can only be rented, into Structural Capital, which can be owned or traded by the stock owners.

Intellectual Capital equals the sum of human and structural capital. According to Edvinsson and Malone (1997), IC encompass the applied experience, organisational technology, customer relationships and professional skills that provided Skandia with a competitive advantage in the market.

According to International Accounting Standard No 38, intangible assets are non–monetary, immaterial, identifiable assets which imply the need for an initial acquisition or internally generated costs. In contrast, Kaufmann and Schneider (2004) suggest that intellectual capital should include intangibles, intangible assets, intangible resources and intellectual property, but not be limited to them. Without getting into a detailed discussion on intangible assets, table 1.1 presents a brief tabulation and lists some relevant studies that highlight the diversity of intellectual capital definitions.

Table 1.1. Intellectual Capital Definitions.

«IC is intellectual material — knowledge, information, intellectual property and experience — that can be put to use to create wealth = collective brainpower», p. XI	Stewart (1997)
«the knowledge–based equity of a company», p. 1	Brennan and Connell (2000)
«… knowledge that can be converted into profit», p. 34	Harrison and Sullivan (2000)
«IC is knowledge that can be converted into profit», p. 228	Sullivan (2000)
IC «is not one thing, it is fragile construct, which has to be continuously supported and held together by a whole array of interrelated elements», p. 88	Bukh *et al.* (2001)
«IC is valuable, yet invisible», p. 60	Heisig *et al.* (2001)
«IC is not a conventional accounting or economic term. It may be an effect, it may be a departmental strategy, it may be a mathematical formula», pp. 10–11	Mouritsen *et al.* (2002)
IC is «an economical value of two categories of intangible assets of a company», p. 158.	Petty and Guthrie (2000)
«IC may properly be viewed as the holistic or meta–level capability of an enterprise to co–ordinate, orchestrate, and deploy its knowledge resources towards creating value in pursuit of its future vision», p. 230	Rastogi (2003)
«A broad definition of intellectual capital states that it is the difference between the company's market value and it is book value. Knowledge based resources that contribute to the sustained competitive advantage of the firm form intellectual capital», p. 63	Pablos (2003)
«no definition, states that IC is information in peoples' minds»	Wood (2003)

Source: Kaufmann and Schneider (2004, pp. 372–374).

With regard the components of intellectual capital, in the two last years of the twentieth century, it was found that there was a consistent convergence both in the process of sorting by categories and in the language of a single model (Pike and Roos, 2000, pp. 2–3): «Intellectual Capital = Human Capital + Organisational Capital + Relational Capital», capital that can be presented in the following way: (1) Human Capital corresponds to personnel attributes, such as intellectuality, skill, creativity and working patterns; (2) Organisational Capital corresponds to pertinent items such as computers and telecommunication systems, intellectual property, processes, data basis, and cultures; (3) Relational Capital corresponds to external relations with customers, suppliers, partners, networks, market governmental agencies, etc. Figure 1.1 shows the intellectual capital components according to Pike and Roos (2000). Edvinsson and Malone (1997) also believe that there are three basic properties of IC, which are as follows:

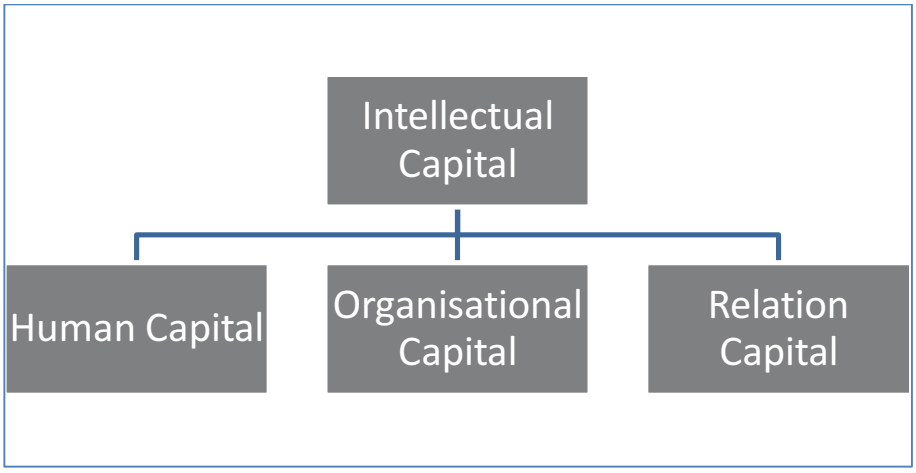
(1) IC is supplementary and not subordinate to the financial report.
(2) IC is non–financial capital which represents the gap between market and book values.
(3) IC is a debt item, not an asset item, which is regarded in the same way as equity. It is borrowed from stakeholders such as customers, employees, and the like.

Edvinsson and Malone (1997) have the merit of having been the first to study the firm's intellectual capital and having developed a classification framework of IC, which has been cited broadly in research, albeit successive authors have not always given the same importance to the three factors. For example, the third point is often overlooked. Edvinsson and Malone used Skandia in Sweden to publish the first public and the most representative IC annual report in the world (Edvinsson, 1997). For them, the measurement of market value includes five core aspects — financial, customer, process, innovation and human. Each aspect focuses on corresponding significant elements. Financial focus represents real value; customer focus represents real wealth; process focus, real work; innovation, real future and human focus, real life.

The model is presented in figure 1.2. Skandia's value scheme contains both financial and non–financial building blocks that combine to estimate the company's market value as shown. This conceptualisation

achieved a balance for Skandia in trying to represent both financial and non–financial reporting, uncovering and visualising of its intellectual capital, tying its strategic vision to the company's core competencies

Figure 1.1. Intellectual Capital Components.

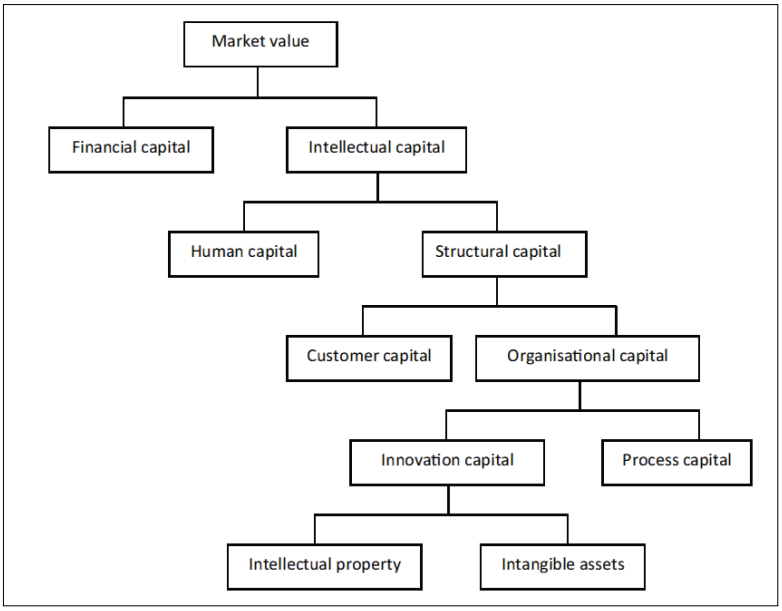


Source: Adapted from Pyke and Roos (2000, p. 3).

reflecting knowledge–sharing technology and knowledge assets beyond intellectual property, and reflecting its market value better (figure 1.2). Edvinsson and Malone (1997) argue that IC represents such a fundamentally new way of looking at organisational value that it will never be confined to playing an adjunct role to traditional accounting. They also assert that the presence and value of intangible assets are capable of accounting for the significant widening gap between companies' evaluation of enterprises stated in corporate balance sheets and investors' assessments of those values.

The Skandia IC report uses up to 91 new IC metrics plus 73 traditional metrics to measure the five areas of focus which make up the Navigator model. Edvinsson and Malone (1997) acknowledge that various indices may be redundant or of varying importance. Yet, in trying to use their experience to create a *universal IC report*, they still recommend 112 metrics.

Figure 1.2. Skandia's value scheme.



Source: Adapted from Bontis (2001).

1.2. Accounting perspectives: a short review

Although both researchers and managers have been talking extensively about intellectual capital for a decade or more, contributors such as Salinas (2007) or Marr (2007) conclude that people still do not fully understand what it encompasses.

There is no globally accepted definition or taxonomy of intellectual capital. Although it is fully appreciated that intellectual capital can provide substantial competitive advantage, managers do not fully understand what it is and how it works. This is particularly so in the context of how investments in human capital have an impact on the operation of a business (Holland, 2002; Holland and Johanson, 2003). Initially many managers thought that reporting on intellectual capital was pointless, not least because they could not understand it. Hannington (2006) asserts that companies should know the correlation that exists among different intangibles. Focusing on corporate reputation, he argues that it is important to understand the correlation among diverse intangibles