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***The rise of Intellectual Capital reporting. The relevance of IC disclosure  
in Italian Universities***

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# INTRODUCTION

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**SUMMARY:** 1. *The emerging of Intellectual Capital: framing of the phenomenon and definitions.* - 2. *Identifying the IC: the accounting problem.* - 3. *Measuring and classifying the IC: different approaches.* - 4. *The failure and resurgence of IC reporting. The relevance of IC disclosure.*

## 1. The emerging of Intellectual Capital: framing of the phenomenon and key definitions

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### 1.1 *The rise of Intellectual Capital*

In recent years the world economy has experienced a process of profound change mainly due to globalization, the emergence of new technologies and the change in consumer purchasing processes, in which the tangible assets related to standardized and large-scale production have gradually lost importance in favour of intangible assets mainly related to the knowledge (Guthrie and Petty, 2000; Lev *et al.*, 2005; Abeysekera, 2007, Anghel, 2008; Whiting and Miller, 2008; Dumay and Guthrie, 2017; Osinski *et al.*, 2017).

In particular, in the previous industrial economy, production facilities, physical location, and efficient manufacturing processes were the pivotal resources for a company and fundamental to gain a better position in the market place (Lev *et al.*, 2005). In this scenario traditional cost-focused reporting tools were able to provide an adequate picture of firm performance.

However, in last decades, global trade has gradually shifted from sellers' markets towards buyers' markets characterized by more informed customers, more aware of their purchases; a dematerialization of processes; an increasing in products innovation speed and technology and a decreasing in product life cycles (Marr *et al.*, 2004; Lev *et al.*, 2005). These changes have driven the transition to the new so-called knowledge-based economy era<sup>1</sup>, in which products differentiation grounded on distinctive and inimitable skills development became critical and, in which, knowledge capabilities<sup>2</sup> and assets such as research and

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<sup>1</sup> Stewart (1997, p. 5) described the Knowledge economy through three pillars: firstly, knowledge has become what we buy, sell and do. It is the most important factor of production. Secondly, knowledge assets – that is Intellectual Capital - have become more important for companies than financial and physical assets. Thirdly, to prosper in this new Economy and exploit these newly vital assets, we need new vocabularies, new management techniques, new technologies and new strategies. On these three pillars rest all the new economy's laws and its profits.

<sup>2</sup> On this point, Nahapiet and Ghoshal (1998, p.242) argue: "The particular capabilities of organizations for creating and sharing knowledge derive from a range of factors, including the special facility organizations have for the creation and transfer of tacit knowledge; the organizing principles by which individual and functional expertise are structured,

development (R&D), creativity, brand image, patents and copyrights became fundamental to achieve a competitive advantage (Marr et al., 2004; Lev et al., 2005).

Indeed, since the 1980s, mainstream management theory studies, traditionally focused on companies' external environment factors as basis for understanding competitive advantage, pushed by the "resource-based theory" perspective<sup>3</sup>, have shifted their attention on the analysis of the combination of the different internal inimitable organizational resources, in order to understand the real sources of firms' competitive advantage, by recognizing in knowledge assets<sup>4</sup> the main inimitable resources<sup>5</sup> which can drive the firms' performance<sup>6</sup> (Roos and Roos, 1997).

In this regard, Marr et al. (2004, p. 552) argued: "Today, many companies see themselves as learning organisations pursuing the objective of continuous improvement in their knowledge assets (...) This means that knowledge assets are fundamental strategic levers in order to manage business performance and the continuous innovations of a company. In order to execute a successful strategy, organisations need to know what their competitive advantage is and what capabilities they need to grow and maintain this advantage. Capabilities are underpinned by knowledge."

Moreover, as stated by Edvinsson (1997), today, differently from the Industrial era in which the majority of firms' investments were focused on plant, physical equipment and capital tools, the largest part of business investment regards knowledge upgrading and competence development coupled with the development of information technologies and global networks. So, firms' value cannot be measured exclusively on the basis of financial outcomes but it is fundamental to take into consideration the activity values which contribute to develop knowledge resources in order to understand how employees, customers and activities contribute to value creation (Guthrie et al. 2006).

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coordinated, and communicated, and through which individuals cooperate (; and the nature of organizations as social communities".

<sup>3</sup> *Resource based view* (RBV) theorists consider firm as a heterogeneous entity characterized by the endowment of unique and inimitable basic resources which ensure a sustainable competitive advantage over time. The RBV individuates in intangible assets those resources which can lead to gain this competitive advantage and to obtain superior corporate performance (Barney, 1996; Marr and Schiuma, 2003; Villalonga, 2004).

<sup>4</sup> On the concept of knowledge assets, Marr and Schiuma (2004, p.552) argue: "The management literature shows two main streams that discuss knowledge. One of them, taking an epistemological approach, interprets knowledge as an entity and discusses the differences between information and knowledge, and its implications for knowledge management, whereas the other stream of literature discusses knowledge as an organizational asset that has to be managed in order to improve organizational performance".

<sup>5</sup> "RBV's prediction about the role of intangibles in sustaining superior firm performance might be formalized by saying that the more intangible resources a firm has, the greater the sustainability of its competitive advantage" (Villalonga, 2004, p.207).

<sup>6</sup> Prusak (1996, p. 6) said: "The only thing that gives an organisation a competitive edge... is what it knows, how it uses what it knows, and how fast it can know something new." In other words, how it applies knowledge management".

Therefore, clearly emerges that, in this transition from an “industrial economy” to a “new Knowledge-based economy”<sup>7</sup>, it has become crucial for companies to identify and maximize the management of their own knowledge-related assets in order to create value and achieve a sustainable competitive advantage (Roos and Roos, 1997<sup>8</sup>; Stewart, 1997; Marr et al., 2004; Lal Bhasin, 2012).

In this scenario the importance of “Intellectual Capital” (IC) emerged as a knowledge-based capital basically composed of non-physical intangible assets mainly related to employee knowledge and expertise, customer relationships and confidence, brands, franchises, information systems, administrative procedures, patents, trademarks and the efficiency of company business processes (Brennan and Connell, 2000; Abdolmohammadi, 2005; Lev *et al.*, 2005; Sonnier *et al.*, 2008).

Within this new economic paradigm, the Intellectual Capital is considered a crucial factor for economic growth (Guthrie and Petty, 2000; Siboni *et al.*, 2013) and a non-replicable critical success factor for firms, fundamental for the value creation and the achievement of a sustainable competitive advantage (Chen *et al.*, 2005; Lev *et al.*, 2005; Li *et al.*, 2008; Sonnier *et al.*, 2008; Goebel, 2015).

## 1.2 *Intellectual Capital: the main definitions*

The growing importance of the IC phenomenon, has attracted the interest of several researchers who have undertaken many research by coining a plethora of definitions of IC<sup>9</sup> (Brennan and Connell, 2000; Guthrie and Petty, 2000; Marr et al., 2004; Schneider and Samkin, 2008). So there is no universally accepted definition of IC (Luthy, 1998; Petty and Guthrie, 2000; Lev et al. 2005; Meihami et al., 2014; Osinski et al., 2017).

The majority of IC definitions tends to include the firms’ knowledge and, according to the generally accepted definition of an asset, the assumption that intangibles can represent claims to future benefits. (Sveiby, 1997; Lev et al., 2005; Schneider and Samkin, 2008). Further, from the plethora of IC coined definitions emerges that, in many cases, the terms intangible assets, intellectual capital, knowledge capital and intangible are used

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<sup>7</sup> “The knowledge-based economy supports a business model that relies mainly on wealth creation through development, deployment, and utilization of companies’ intangible assets or IC. The cornerstones of IC that drive enterprise performance include knowledge, competence, intellectual property, brands, reputation, and customer Relationships” (Dženopoljac et al., 2016, p. 373).

<sup>8</sup> Very interesting are the words of Peter Drucker reported by Roos and Roos (1997, p. 413): “in the knowledge era the company needs to serve and nurture the ‘knowledge worker’. But at the same time knowledge workers need the value creating processes and infrastructure of the organization, as well as conversations with other knowledge workers to unleash and leverage their knowledge.”

<sup>9</sup> As this regard, Bontis (1998, p. 63) stated: “Intellectual capital has been considered by many, defined by some, understood by a select few, and formally valued by practically no one”.

interchangeably and as synonymous in literature as well as in business practice (Petty and Guthrie, 2000; Whiting and Miller, 2008; Castilla-Polo and Ruiz-Rodriguez, 2017; Osinski et al., 2017)

According to scholars (Anghel, 2008; Meihami et al., 2014; Khalique et al., 2015), the term “intellectual capital” was firstly introduced by the economist John Kenneth Galbraith in 1969, in the aim of explain the spread between *book value* and *market value* in organizations, describing it as a bundle of intellectual resources owned by individuals, strongly involved in the process of value creation.

Instead, the notoriety of the term and more in general of the phenomenon, dates back to 1994, when Stewart and Loose published an article, considered as a “milestone” about IC in “Fortune Magazine”, followed by the famous seminal book “the new wealth of organisations”. In the same years, in Sweden, Leif Edvinsson at Skandia (1994) developed and published the world’s first IC statement and continued to do so until 2000 (Kok, 2007; Dumay, 2014, p.1259; Dumay and Guthrie, 2017).

To better understand the evolution and scope of this phenomenon, some IC definitions, deserving special attention, coined over the years by those who may considered as the “founding fathers”, conclude this introductory section.

Itami, considered as one of the IC pioneers (Goh and Lim, 2005; Chan, 2009), defined intellectual capital as “intangible assets which includes particular technology, customer information, brand name, reputation and corporate culture that are invaluable to a firm’s competitive power” (Itami, 1987).

Edvinsson and Sullivan (1996, p. 358), defined IC as: the “knowledge that can be converted into value”, while, Brooking (1996, p. 12), by referring substantially to the pivotal role of intangible assets, offer a comprehensive definition of intellectual capital “Intellectual capital is the term given to the combined intangible assets which enable the company to function”.

Edvinsson and Malone (1997), the promoters of one of the first IC reporting framework models named “Skandia Navigator”<sup>10</sup>, defined IC as: “the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a company with a competitive edge in the market”.

Stewart (1997), in his “the new wealth of organisations”, referred to the IC as “the intellectual material - knowledge, information, intellectual property, experience that can be put to use to create wealth”. Prusak (1998) stated that “Intellectual capital can be defined as

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<sup>10</sup> The “Skandia Navigator” will be subject of specific discussion in paragraph 3 devoted to intellectual capital measurement models description.

intellectual resources that have been formalized, captured and leveraged to create assets of higher value”.

From a traditional accounting perspective, the Society of Management Accountants of Canada (SMAC, 1998, p.4) defines IC as “those knowledge based items that a company owns, which will produce a future stream of benefits for the company. They can include technology, management and consulting processes and patented intellectual capital”.

Roos et al. (1998), argued that: “IC includes all the processes and the assets which are not normally shown on the balance sheet and all the intangible assets (trademarks, patents and brands) which modern accounting methods consider. It includes the sum of the knowledge of its members and the practical translation of their knowledge”. Moreover, for Bontis (1998, p. 67) “Intellectual capital is therefore the pursuit of effective use of knowledge as opposed to information”. Further, Lev (2001) associates the IC to: “Sources of future benefits (value), which are generated by innovation, unique organizational designs, or human resource practices”.

Johanson and Skoog (2001, p. 4), stated: ‘Intellectual Capital could be said to be the way in which different intangibles and tangible resources interact to produce an organization’s output’.

A very comprehensive definition of IC is offered by the Chartered Institute of Management Accountants (CIMA, 2001) which defined IC as: “The possession of knowledge and experience, professional knowledge and skill, good relationships, and technological capacities, which when applied will give organizations competitive advantage”.

For Marr and Schiuma (2001) “IC is composed of all knowledge-based assets, distinguished between organizational actors (relationships) and infrastructure (virtual and physical)”.

European Commission (2006, p.4) defined IC as “the combination of intangible resources and activities that allows an organization to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value”.

More interesting are also the IC definition coined in more recent years. Kok (2007, p. 184), argues: “It may be said that intellectual capital deals with articular, reasonable, knowledgeable and substantial fruits of the mind. It claims intangible (tacit) and tangible (explicit) dimensions, which do not mutually exclude, but actually complement each other. The conversion of knowledge into a valuable asset has come to be known as an intellectual asset or intellectual capital”<sup>11</sup>. Striukova et al. (2008, p. 298) by replacing a previous

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<sup>11</sup> However, the author (Kok, 2007, p. 184) states that there is a small difference, from an accounting point of view, between the terms “intellectual asset” and “intellectual capital”. In particular, “In balance sheet terms, intellectual

definition of Ricceri (2008) defined IC as “the intellectual, or knowledge-based, resources of an organisation. It encompasses both resources that exist at a particular point in time (a stock of IC) and the more fluid way these resources are used and interact with other resources (both intellectual and physical) to further the organisation’s goals (a flow concept).

Khalique et al. (2015, p.225) argue that “intellectual capital represents a combination of intangible assets or resources, such as knowledge, know-how, professional skills and expertise, customer relationships, information, databases, organizational structures, innovations, social values, faith, and honesty. These can be used to create organizational value and provide a competitive edge to an organization”.

Finally, very appreciable is the is the re-proposition of Stewart’s definition (1997) made by Dumay (2016, p. 169). In his article “A critical reflection on the future of intellectual capital: from reporting to disclosure”, the author proposes a modification of the historical citation of Stewart (cited above) with the replacement of the word “wealth” with the word “value” for two reasons: firstly, because most of IC authors in their works have utilized the concept of “value creation” rather than “wealth creation” and secondly, because the concept of “value creation” differently from that of “wealth creation” which is basically money based, is broader and encompasses a set of aspects, even non-financial, that are more coherent with the nature of IC.

### 1.3 *Intellectual Capital: the main taxonomies*

Together with the main definitions, very interesting are also the main taxonomies used in order to distinguish the main IC components.

Edvinsson and Malone (1997) have identified two main IC components: *Human Capital* and *Structural Capital*.

The *Human Capital* is defined as the set of capabilities, knowledge, skills, competences and abilities held by firms’ employees and utilized to perform the tasks, develop innovations, intangible and tangible assets and solve the problems. This category also includes firm’s value, culture and philosophy. Human Capital<sup>12</sup> is considered pivotal for

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assets are those knowledge-based items that the organisation owns that will produce a future stream of benefits for the organisation. They are the "debits" or individual items that comprise intellectual assets on the balance sheet, whereas intellectual capital is the total stock of balancing "capital" or knowledge-based equity ("credits").

<sup>12</sup> Human Capital is the “life” of organizations and is the “heart, wisdom, and soul” of the firm because all fields in the organization are operated by humans (Edvinsson and Malone, 1997).

firm's value creation and *Structural Capital* development<sup>13</sup>. It cannot be owned but only rented. It leaves the firm when employees go away at the end of the working day.

The *Structural Capital* is the combination of hardware, software, databases, concessions, IT systems, patents, trademarks and any other organizational capability which support employees' efforts to produce IC performance and overall corporate performance. It is an infrastructure which depends and is influenced by *Human Capital* and which, at the same time, support it. Unlike *Human Capital*, it can be owned, reproduced, shared and represents the set of components that remain in the company even when employees go away at the end of the working day (Edvinsson, 1997; Edvinsson and Malone, 1997; Luthy, 1998; Brennan and Connell, 2000; Bontis, 2001; Holland, 2001; Chen et al., 2005; Jahanian and Salehi, 2013).

They also divide the *Structural Capital* in two additional capitals: *Customer Capital* and *Organizational Capital* representing respectively the external and the internal perspective of *Structural Capital*.

The *Customer Capital* regards the relationships with the customers, the actions and marketing policies that can be implemented to improve them. So, its measurement is focused on customer satisfaction, customer loyalty and customer retention indices.

The *Organizational Capital*, which fundamentally comprises the organization philosophy and systems for leveraging the organization's capability is further divided in *Process capital* and *Innovation Capital*. The former embeds the know-how, manuals, techniques, procedures, routines and programs involved in production and distribution of goods and services; the latter includes the intangible assets and intellectual properties covered by legal rights and which contribute to the firm's innovation (Edvinsson, 1997; Luthy, 1998; Brennan and Connell, 2000; Marr et al., 2004; Chen et al., 2005).

Sveiby (2001), has grouped IC components into three main categories: *External Structure*, *Internal Structure* and *Employee Competence*.

*The External Structure* consists of firms' relationship with the external environment such as customers and suppliers coupled with the firm's reputation and image. The development of some of these relationships may later lead to the creation of brands and trademarks.

*The Internal Structure* regards patents, concepts, software, systems, models and databases internally developed by employees or brought and thus owned by the company. This capital remains even though part of those employees who have created it leaves the

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<sup>13</sup> "So a key role of leadership is the transformation of human capital into structural capital. Furthermore, the human capital cannot be owned, it can only be rented. The structural capital can, from a shareholder's point of view, be owned and traded" (Edvinsson, 1997, p.369).

company. Organizational formal and informal culture and spirit are also considered part of the Internal Capital.

*The Employee Competence*<sup>14</sup> consist of the competences, skills, capabilities, training and experiences of firms' employees who, in turn, in Sveiby's vision grounded on Knowledge-based theory, are considered as pivotal actors for tangible and intangible assets development and firm's value creation<sup>15</sup> (Sveiby, 1997, 2001, 2004; Brennan and Connell, 2000; Guthrie and Petty, 2000; Bontis, 2001; Kannan and Aulbur, 2004; Marr et al., 2004; Anghel, 2008; Gogan, 2013).

Finally, the MERITUM project<sup>16</sup> divides the IC into three categories: *Human Capital*; *Structural Capital* and *Relational Capital*.

*Human capital* is defined as the knowledge that employees take with them when they leave the firm. It includes the knowledge, skills, experiences and abilities of people. Some of this knowledge is unique to the individual, some may be generic. Examples are innovation capacity, creativity, know-how and previous experience, teamwork capacity, employee flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty, formal training and education.

*Structural Capital* is defined as the knowledge that stays within the firm at the end of the working day. It comprises the organizational routines, procedures, systems, cultures, databases, etc. Examples are organizational flexibility, a documentation service, the existence of a knowledge centre, the general use of Information Technologies, organizational learning capacity, etc. Some of them may be legally protected and become Intellectual Property Rights, legally owned by the firm under separate title.

*Relational capital* is defined as all resources linked to the external relationships of the firm, with customers, suppliers or R&D partners. It comprises that part of *Human* and *Structural* Capital involved with the company's relations with stakeholders (investors, creditors, customers, suppliers, etc.), plus the perceptions that they hold about the company. Examples of this category are image, customers' loyalty, customer satisfaction, links with suppliers, commercial power, negotiating capacity with financial entities, environmental activities, etc. (MERITUM project, 2002, pp. 10-11).

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<sup>14</sup> "People are seen as the only true agents in business; all tangible physical products, assets as well as the intangible relations, are the results of human action and depend ultimately on people for their continued existence. People are seen to be constantly extending themselves into their world by tangible means such as craft, houses, gardens and cars and through intangible associations with corporations, ideas, and other people" (Sveiby, 2001, p. 345).

<sup>15</sup> "People can use their competences to create value in mainly two directions: externally and internally. If the managers of a car or soap company direct the efforts of their people internally, they may create tangible structures such as machinery and tools and intangibles structures such as better processes and new design for products. When they direct their attention outwards, they can create, in addition to tangible things, such as cars or soap, intangible structures, such as customer relationships and new experiences" (Sveiby, 2001, p.346).

<sup>16</sup> The Meritum Project will be described in detail in the fourth paragraph of this chapter.

## 2. IC Identification issues: the accounting problem

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### 2.1 *Intellectual Capital: the four stages*

IC research has been divided in four stages over the years (Petty and Guthrie, 2000; Guthrie et al., 2012; Dumay and Garanina, 2013; Dumay, 2016; Sangiorgi and Siboni, 2017). The *first stage* is characterized by several attempts to understand and at the same time acquire awareness about the importance of IC as a potential for value creation. During this stage the “grand theories” have been utilized to create awareness about IC concepts and the management and reporting IC relevance emerges. “The aim of stage one was to render the invisible visible by creating a discourse that all could engage in.” (Petty and Guthrie, 2000, p. 156).

*The second stage* is characterized by the establishment of research in this field as a legitimate operation. Within this stage, IC guidelines related to IC reporting and management were improved and a plethora of IC classification and taxonomies were developed.

*The third stage* which is currently on-going is based on the critical analysis of IC practices in organizations with a particular focus on the examination of the organisational implications of the application of IC in managing companies.

Finally, the *fourth stage* represents an extension of previous stages. In this stage the IC research open the boundaries to the wider external environment by considering the ethical, social and environmental impact of firms’ policies and strategies as well as the relationships with the wider range of stakeholders involved in firms’ activities. Thus, during this stage the IC analysis is integrated with the analysis of existing interconnections with all other sources of value creation such as governance, business models, external relationship, reputation and so on.

### 2.2 *Intellectual Capital: the difference between market value and book value*

As discussed above, in what Petty and Guthrie (2000) have defined as the *first stage* of IC research, many authors have devoted their efforts in raising awareness about the potential that IC can express from the perspective of the sustainable competitive advantage creation at an individual firm level as well as from the perspective of the more general value creation at global-systemic level.

So, in becoming gradually aware of IC potentialities, the main concern of scholars, analysts, policy makers, associations and institutions has become to try to correctly

individuate and account the IC components, in order to help managers to improve their strategies formulation and investors and lenders to enhance their firms' evaluation activities in preparation for their investment decisions to maximize the resources allocation (Edvinsson, 1997; Ross et al., 1997; Lev, 2001; Marr et al., 2003, 2004; Andriessen, 2004; Chen et al., 2005; Lev et al., 2005; Lal Bhasin, 2012; Ferchichi and Paturel, 2013).

However, as emerged from the plenty of IC definitions developed in literature, especially during the *first stage*, the IC has been often associated to intangible assets as well as to the knowledge capital, being these terms largely treated as synonyms<sup>17</sup> (Petty and Guthrie, 2000; Whiting and Miller, 2008; Castilla-Polo and Ruiz-Rodriguez, 2017). However, it seems that this equation can only be confirmed from a theoretical point of view, as, from a concrete, purely accounting point of view, there are substantial differences that make this association rather difficult, causing, in turn, considerable difficulties in identifying and accounting IC elements (Petty and Guthrie, 2000; Lev, 2001; Chen et al., 2005; Lev et al., 2005; Striukova et al., 2008; Lal Bhasin, 2012).

In particular, as many authors observed, current financial reporting systems, grounded on contemporary accounting principles, are inadequate in providing a correct representation of intangible assets on financial statements due to the overly-conservative standpoint of standard setters, so that, most of those intangible assets that are considered as part of the intellectual capital cannot be represented and recognized in the balance sheet while, other ones receive a representation that only partially meets their real value (Abeysekeera, 2008; Anghel, 2008; Maditinos et al., 2011; Vafaei et al., 2011; Ferchichi and Paturel, 2013; Meihami et al., 2014; De Silva et al., 2014).

Obviously, in an economy intangible assets-based era, the concrete risk is the loss of relevance of current accounting systems which if in an industrial era, tangible assets-based, were able to provide an adequate picture of firm performance, now are failing in properly capturing the economic value of the real sources of business value creation<sup>18</sup> (Brennan and Connell, 2000; Van der Meer-Koistra and Zijlstra, 2001; Lev et al., 2005; Oliveras et al., 2008; Lal Bhasin, 2012; Ferchichi and Paturel, 2013; Castilla-Polo and Ruiz-Rodriguez, 2017).

A clear signal of this phenomenon is the growing increase which has been observed in recent decades of the spread between *market value* and *book value* (Edvinsson, 1997;

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<sup>17</sup> On this point, Lal Bhasin (2012, p. 64) stated: "The term intangible assets can often be found in the accounting literature, whereas the term knowledge assets is used by economists and IC is used in the management and legal literature, but all refer essentially to the same thing: the intangible value contained in the heads and relationships of employees, management staff, customers and other stakeholders. IC encompasses not only the contents of employees' minds but also the complex intangible structure that surrounds them and makes the organization function".

<sup>18</sup> Particularly interesting is the quote of (Edvinsson and Malone, 1997) on this matter: "the traditional model of accounting which so beautifully described the operations of companies for a half-millennium, is now failing to keep up with the revolution taking place in business".

Ordonex De Pablos, 2003; Chen et al., 2005; Lev et al., 2005; Oliveras et al., 2008; Ousama et al., 2011; Husin et al., 2012; Lal Bhasin, 2012).

In particular, as reported by Lev (2001), the relationship between *market value* and *book value* of shares in 1970 was 1:1 and in mid-1990 has increased to an average of three times (Lal Bhasin, 2012). Moreover, also Ross et al. (1997) have studied this phenomenon by reporting that: “The market value in March 1997 of GM, which has considerable traditional assets, is approximately \$49 billion. Microsoft, which has few such assets apart from its headquarters buildings in Seattle, has a market value of some \$119 billion! The ratio between a company’s market value and the cost of replacing its assets (Tobin’s  $q$ <sup>19</sup>) is getting larger in most industries, not only in service industries, but in all businesses where companies integrate smart technologies, software, electronics and total solutions into their existing products”.

Furthermore, Bontis (1998), by employing the *Tobin’s q ratio* noted that, generally, the firms belonging to the software industry, where IC is plentiful, tend to have a market value about 7 times higher than the book value, whereas firms belonging to the steel industry, known for their abundant capital assets, have a market value almost equal to the book value.

Thus, by observing, *per se*, this phenomenon, it may not sound like a sign of the loss of relevance of current accounting systems, being the increase in the above spread attributable to the contemporary firms’ earnings growth rates (Lev et al., 2005).

However, by considering that this spread has been particularly observed in the high-tech-knowledge-based sectors and that, the majority of the firms across the world have dramatically increased their investments in intangible assets<sup>20</sup>, the suspicion that current cost-based accounting systems are losing their value-relevance<sup>21</sup> by failing in providing an adequate picture of business performances, arises vigorously<sup>22</sup>.

Substantially, the spread between *market value* and *book value* continues to increase due fundamentally to two vectors pushing in opposite directions.

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<sup>19</sup> Tobin’s  $q$  ratio was developed by the Nobel Prize-winning economist James Tobin and nowadays is considered one of the most suitable IC measurement methods. This ratio measures the relationship between a company’s market value and its replacement value (i.e., the cost of replacing its assets). We will return in more detail on this point in the section dedicated to the IC measurement methods.

<sup>20</sup> As reported by Lev et al. (2005, p. 2) “R&D investments in the US economy doubled for the period of 1953-1997, while investment in tangible assets remained steady. Even with this increase in investments in IC as future sources of value and profit, most of them have to be immediately expensed, thus decreasing current earnings and book value of equity (...) Research and Development expenditures as a proportion of non-financial corporate Gross Domestic Product increased from 1.3 for the period 1953-1959 to 2.9 from 1990 to 1997. Conversely, tangible investment remained the same 12.6% over the total nonfinancial corporate Gross Domestic Product”.

<sup>21</sup> The concept of value relevance is linked to the usefulness of the information embedded in the financial statement. Generally, in literature, the value relevance is defined as the ability of accounting values to influence market values so that an information is defined as value relevant if it is possible to find a statistical relationship between it and the market value while it is defined as non-value relevant if any causal link between them is missing (Ball and Brown, 1968; Francis e Schipper, 1999).

<sup>22</sup> On the decline in the value relevance of current accounting information please see also Lev et al. (2005).

On the one hand, as explained in detail below, in European accounting practice (IAS/IFRS), many IC investments intangible-based are not recognized on the balance sheets or undervalued as well as other ones are generally accounted as costs and not as assets and therefore immediately expensed to the income statement with the effect of reducing the current profits and hence the book value of the companies.

On the other hand, it seems that the market and thus the majority of investors have started to pay close attention on firms' intangible-based investments considered as potential future profitability sources and on their holistic value inside the organizations, so that a considerable value relevance is attributed to these assets<sup>23</sup> (Roos and Roos, 1997; Lev, 2001; Canibano et al., 2000; Chen et al., 2005; Lev et al., 2005; Petty and Cuganesan, 2005; Husin et al., 2012; Lal Bhasin, 2012; Berzkalne and Zelgalve, 2014; Sharma and Kaur, 2016).

Thus, it seems that the market is able to overcome the limitations of current accounting systems by proposing an intangible asset valuation more consistent with their real value, taking into account the ability of these assets to generate future earnings<sup>24</sup>. This evaluation is therefore reflected in a fairly large *market value* as compared with the book value precisely because it includes the valuation of these assets which are out of the accounting estimates and thus can be defined as "hidden assets" (Edvinsson, 1997; Roos and Roos, 1997; Brennan, 2001; Ordonex De Pablos, 2003; Kamath, 2008; Oliveras et al., 2008; Sonnier et al., 2008; Sharma and Kaur, 2016). Indeed, Lal Bhasin (2012, p. 66) argues: "the market to be invariably accurate in its valuations, and that any excess valuation of a company over its book value will be the correct valuation of the company's intangible assets".

So, many authors converge on the assumption that a possible IC measurement, albeit generic, arises from the same market as the difference between firm's *market value* and *book value*, a difference attributable to the valuation of those hidden assets that are not recognized or are underestimated in the balance sheet (Roos and Roos, 1997; Lev, 2001; Ordonex De Pablos, 2003; Lev et al., 2005; Whiting and Miller, 2008; Lal Bhasin, 2012; Sharma and Kaur, 2016). This assumption, although criticised<sup>25</sup>, however, shed light on the

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<sup>23</sup> Canibano et al. (2000) have conducted an extensive research on the value relevance of intangibles by reporting some studies in which significant statistical relationships between were found between the investments in R&D and advertising and the subsequent earnings and the firm's market value.

<sup>24</sup> On this concept, Roos and Roos (1997, p. 413) reports an interesting example: "concepts like hidden assets, intangible resources, or most recently 'intellectual capital' often say more about the future earning capabilities of a company than any of the conventional performance measures we currently use. If the top fifty programmers suddenly left Microsoft, the share price of the company would likely drop dramatically. The absurdity is that while a company may just have gone into 'intellectual bankruptcy', the short-term profits may very well rise since costs have been lowered".

<sup>25</sup> As will be seen in detail in the following discussion, this approach, although accepted by a part of the paperwork, has also been criticized as market value is influenced by external contingent dynamics and as it does not lead to an analytical evaluation of individual components of Intellectual Capital (Brennan and Connell, 2000; Petty and Guthrie, 2000; Goebel, 2015).

inadequacy of current accounting systems in identifying correctly IC elements and on the fact that the intellectual capital is still a hidden capital which needs special tools for its proper identification, representation and management<sup>2627</sup> (Petty and Cuganesan, 2005).

### 2.3 *Intellectual Capital: the accounting problem*

The American Institute of Certified Public Accountants (AICPA) and the Association for Investment Management and Research (AIMR) were among the first professional associations to express their concerns about the inadequacy of current financial statement models in representing such intangible assets.

In 1991, the board of directors of the AICPA formed a special committee on Financial Reporting which after two years has published a summary report (AICPA, 1994) by evidencing that the existing accounting system were not able to satisfy the information needs of investors and creditors and at the same time, claiming for the inclusion of relevant non-financial information in such accounting systems. In the same vein, The FASB (Financial Accounting Standards Board) have undertaken a research project focused on enhancing financial statements information utility in 1998. As a result, the FASB published several reports underlining the relevance of voluntary disclosure of information about intangible assets (Lev et al., 2005).

Across the Europe, the Canadian Institute of Chartered Accountants (CICA), the Danish Agency for Development of Trade and Industry, the Netherlands Ministry of Economic Affairs, the Organization for Economic Cooperation and Development (OECD), the Institute of Chartered Accountants in England and Wales (ICAEW), and the Chartered Institute of Management Accountants (CIMA) have all undertaken studies in order to identify, measure and report information on intangibles (Lev et al., 2005).

Nevertheless, the accounting and the identification of IC elements continues to represent a current issue (Van der Meer-Koistra and Zijlstra, 2001; Fincham and Roslender, 2003; Marr et al., 2004; Petty and Cuganesan, 2005; Ferchichi and Paturel, 2013; Berzkalne and Zelgalve, 2014; Goebel, 2015; Sharma and Kaur, 2016; Castilla-Polo and Ruiz-Rodriguez, 2017). So, in order to better understand this problem it is necessary to start from the definition of asset and intangible assets offered by IASB (International accounting standard board)<sup>28</sup>.

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<sup>26</sup> This kind of thinking led Skandia management to recognize that there was a need to bring these hidden values to the surface by developing a specific IC reporting framework. (see paragraph 3).

<sup>27</sup> " Intellectual Capital is something that you cannot touch, but still makes you rich" (Stewart, 1994, p. 28).

<sup>28</sup> The International Accounting Standards Board (IASB), is the body responsible for issuing international accounting standards. Founded in London in 1973 as a private body, it is the result of an agreement between the major professional associations operating in Australia, the United States, Canada, Mexico, Japan, France, Germany and the

IASB conceptual framework (IASB CP) (2010, par.4.4) offers the following definition of assets: “An asset is a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity”.

According to the International Accounting Standard - IAS 38 (par.8) an intangible asset is: “an identifiable<sup>29</sup> non-monetary asset without physical substance” which is identifiable, controlled<sup>30</sup> and for which it is probable that future benefits specifically attributable to the asset will flow to the enterprise. Furthermore, IAS 38 (par.10) specifies that for those elements which do not meet the definition of intangible assets, namely the identity, control of the asset in question and the existence of future economic benefits, the cost to acquire or generate the asset internally is expensed to the income statement when it is sustained<sup>31</sup>.

IAS 38 (par. 21) also lists the recognition criteria for intangible assets establishing that an entity can recognize an intangible asset (purchased or self-created (at cost)) if, and only if: it is probable that the future economic benefits that are attributable to the asset will flow to the entity; and the cost of the asset can be measured reliably. If any intangible asset does not meet the above criteria, IAS 38 requires the expensing of this item<sup>32</sup>.

So, by matching the assets definition with the intangible assets definition and its recognition criteria it is quite evident that the main issues in recognition of such assets, related to IC, arise from the consideration of what the probable future economic benefits are and to what extent they are controlled by the firm as well as from the perplexity of finding a reliable measure of the value of internally generated intangible assets (Canibano et al., 2000; Lev et al., 2005). On this regard, IAS 38 (par. 22) states that the probability of future economic benefits must be based on reasonable and supportable assumptions about conditions that will exist over the life of the asset, adding that the probability recognition

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United Kingdom. IASB members are responsible for the development and publication of IFRS Standards, including the IFRS for SMEs Standard. The Board is also responsible for approving Interpretations of IFRS Standards as developed by the IFRS Interpretations Committee (formerly IFRIC). [www.ifrs.org](http://www.ifrs.org).

<sup>29</sup> IAS 38 (par.12) specifies that an intangible asset is identifiable when it: is separable (capable of being separated and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract) or arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

<sup>30</sup> IAS 38 (par. 13) states that an entity has the control of an asset if it has the power to benefit from the future economic benefits deriving from the asset itself and may restrict third party access to such benefits. The ability of the entity to control the future economic benefits deriving from an intangible asset originates, in general, from legal rights that are eligible for legal protection. In the absence of legal rights, it is more difficult to prove that there is control. However, the legal protection of a right is not a necessary condition for control as the entity may be able to control future economic benefits in some other way.

<sup>31</sup> For a detailed discussion on the representative and valuation issues of intangible assets, please refer to Tartaglia Polcini (2003).

<sup>32</sup> IAS 38 requires that intangible assets should be classified in terms of expending resources or incurring liabilities or the acquisition, development or enhancement of intangible assets such as: scientific or technical knowledge, design and implementation of new processes or systems, licenses, intellectual property, market knowledge and trademarks (Brennan and Connell, 2000, p. 207).

criterion is always considered to be satisfied for intangible assets that are acquired separately or in a business combination (IAS 38, par. 33).

As a result, many IC investments such as human recruiting and training, advertising and research cannot be capitalized in balance sheet since the absence of an objective certainty of the control over the future economic benefits due, in the case of human recruiting and training, to the lack of certainty regarding the length of the contractual relationship between the company and its human resources. This leads to the immediate expensing of these costs to the income statement (Canibano et al., 2000; Lev et al., 2000). In particular IAS 38 (par. 69) requires the immediate expensing to the income statement of: start-up, pre-opening, and pre-operating costs; training cost; advertising and promotional cost, including mail order catalogues and relocation costs.

Particular problems arise from the R&D treatment. As discussed above, R&D are widely recognized as part of IC and several studies have found empirical evidences about the value relevance of R&D investments by founding positive associations between them and the value of companies and thus underlying the necessity of capitalize and amortize these investments coherently with their economic value and life (Canibano et al., 2000; Villalonga, 2004).

However, IAS 38 (par.54 and 57) considers R&D as a category of internally generated intangible items and requires the full expensing of research costs while allows the capitalization of developments costs only after technical and commercial feasibility of the asset for sale or use have been established. This means that the entity must intend and be able to complete the intangible asset and either use it or sell it and be able to demonstrate how the asset will generate future economic benefits. If an entity cannot distinguish the research phase of an internal project to create an intangible asset from the development phase, the entity treats the expenditure for that project as if it were incurred in the research phase only.

In addition to R&D investments, the problem of internally generated intangibles treatment involves another wide range of assets which also are considered as part of IC. In particular: brands, mastheads, publishing titles, customer lists and items similar in substance that are internally generated should not be recognized as assets but treated as expenditure and charged to the income statement. (IAS 38, par. 63).

Moreover, the goodwill accounting represents a further problem. Many authors converge on the assumption that a significant part of the goodwill contains a set of company's intangible assets and as a consequence contains IC elements (Petty and Guthrie, 2000; Husin et al., 2012). Nevertheless, the goodwill which is associated to any excess of the costs of the

acquisition over the acquirer's interests in the fair value of the identifiable assets and liabilities, can be recognized only in the case of business combinations and not when it is internally generated (IAS 38, par. 48). Furthermore, the goodwill being treated as intangible assets with indefinite useful lives should not be amortized (IAS 38, par. 107) but it must be submitted annually to impairment test<sup>33</sup>. As a consequence, only after a business combination, the IC elements of the acquired firm can emerge in the acquirer's financial statements as separate intangible assets recognized at their fair value<sup>34</sup> if they meet both the definition and recognition criteria for an intangible asset or as part of the amount attributed to the goodwill recognized at the acquisition date if they don't meet those criteria.

The last issue about the IC accounting identification is related to the revaluation model which is allowed under IASB both for tangible and intangible assets (IAS 16, IAS 38). In particular, IAS 38 (par. 75) states that intangible assets may be carried at a revalued amount (based on fair value) less any subsequent amortization and impairment losses only if fair value can be determined by reference to an active market<sup>35</sup>. At the same time, (IAS 38, par. 75) the standard specifies that such active markets are expected to be uncommon for intangible assets. In the latter definition seems to be implicit that identifying a market value for intangible assets that do not have a reference active market, being firms' specific, represents a very difficult change. This problem which is most likely to be felt in knowledge-based companies, leads to a shrinking of this model which, in the first instance seemed to be a way of bringing the book value of intangible assets closer to their real economic value, so, reducing the problem of the loss of the value relevance of current accounting systems.

Thus, summarizing, in the light of IAS 38 requirements, current accounting systems which are fundamentally designed to measuring and reporting tangible assets, are inadequate in identifying correctly IC elements which represent the fundamental firm's value drivers (Van der Meer-Koistra and Zijlstra, 2001; Oliveras et al., 2008; Striukova et al., 2008; Bruggen et al., 2009; Husin et al., 2012; Beattie and Smith, 2013; Berzkalne and Zelgalve, 2014; Low et al., 2015; Abhayawansa and Guthrie, 2016; Sharma and Kaur, 2016).

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<sup>33</sup> Current goodwill accounting treatment is part of a convergence project between the regulatory bodies FASB and IASB. Before the launch of this project amortization of goodwill and intangible assets were required under IAS/IFRS accounting standards. Then, after the FASB-IASB Norwalk Agreement on convergence between both regulatory bodies, the IASB has issued Exposure Draft 3 'business combinations' that aligned with SFAS 141 and 142 requirements of goodwill and other intangible assets and has made changes to IAS 36 and IAS 38. The main changes introduced were: the use of the fair value method to measure intangible assets and the abolition of amortization of goodwill and intangible assets with indefinite useful life with the provision of annual impairment test. (Lev et al., 2005, p. 7).

<sup>34</sup> There is a presumption that the fair value (and therefore the cost) of an intangible asset acquired in a business combination can be measured reliably. (IAS 38, par. 35).

<sup>35</sup> As regards the accounting treatment, IAS 38 (par. 85) states that under the revaluation model, revaluation increases are recognised in other comprehensive income and accumulated in the "revaluation surplus" within equity except to the extent that it reverses a revaluation decrease previously recognised in profit and loss. If the revalued intangible has a finite life and is, therefore, being amortised (see below) the revalued amount is amortised.

The narrow definition and restrictive recognition criteria allow the recognition of a small group of intangible assets fundamentally identifiable in those covered by specific legal rights (e.g. patents and trademarks) which however may be recognized, prevalently, only when they are purchased. (Ferchichi and Paturel, 2013).

A broad spectrum of assets, which are intangibles in nature, referred to Intellectual Capital such as human resources skills, customer loyalty, company reputation, knowledge and so on continue to be excluded and fuel the spread between market value and book value<sup>36</sup> (Brennan and Connell, 2000; Chen et al., 2005; Lev et al., 2005; Petty and Cuganesan, 2005; Bruggen et al., 2009; Husin et al., 2012; Sharma and Kaur, 2016).

These accounting limitations analysed by taking as a reference the IAS 38 can be logically extended also to the public sector context<sup>37</sup> in which the intangible assets accounting treatment is regulated under the International Public Sector Accounting Standards - IPSAS 31<sup>38</sup>. Indeed, the IPSAS 31 is fundamentally drawn from the IAS 38 and substantially repeats the same contents. It presents just some novelty elements related to the accounting treatment of intangible heritage assets (par. 11-15) and web site costs (an appendix of IPSAS 31 containing an operating guide for the accounting treatment of those costs related to the websites creation and management).

As a consequence, the phenomenon of the “invisible balance sheet” arises as imaginary balance composed by these assets (invisible capital) which escape from the accounting balance sheet evaluations but that, being individuated by the market through other information sources and recognized as firm’s value creation drivers, contribute to the increase in the market value of the companies investing in them together with the tangible assets (visible assets) (Lal Bhasin, 2012, p.66).

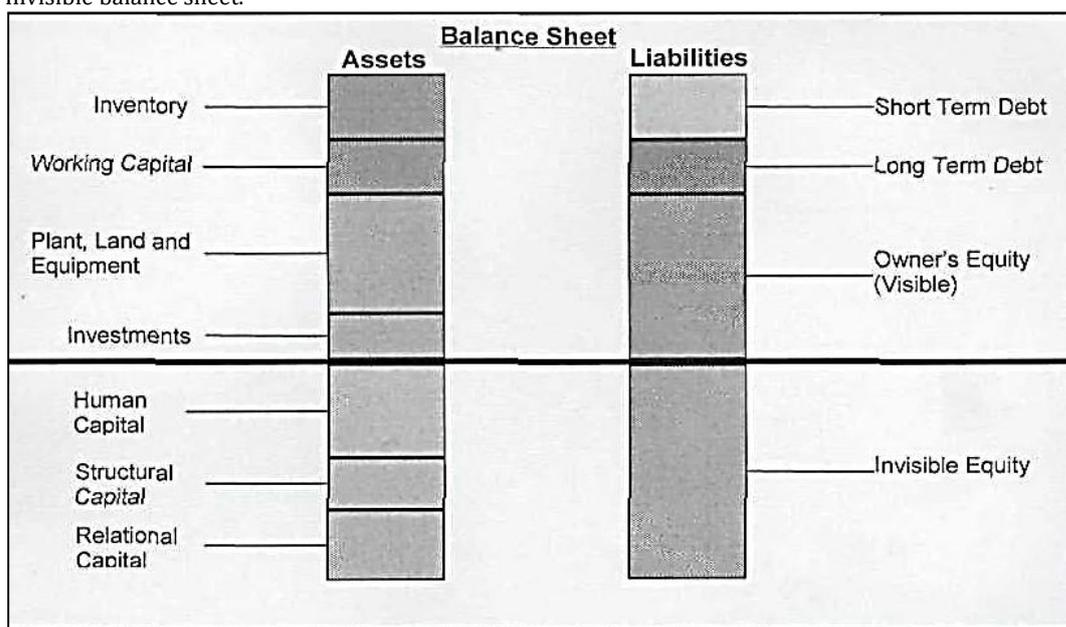
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<sup>36</sup> Andriessen (2004b, p. 9) criticizes the belief that necessarily the book value should tend to market by affirming: “Not only is there no need to make book value equal market value, it is also impossible. Contributing the gap between market value and book value of companies to Intellectual Capital is like contributing the difference between an apple and an orange to a banana. The book value represents the historic value of the assets of a company not yet amortized. The market value is equal to the perceived present value of the future cash flow of the company. Using the concept of book value implicates taking an internal perspective on the company and listing its resources: tangible, intangible and financial. Using the concept of market value implicates taking an external perspective on the company.”

<sup>37</sup> The Intellectual Capital in the public sector context and in particular in University sector will be object of specific discussion in the next chapters.

<sup>38</sup> The International Public Sector Accounting Standards - IPSAS - are a set of specific International Accounting Standards drafted for Public sector entities. They are issued by the International Public Sector Accounting Standards Board - IPSASB created in 1986 as Public Sector Committee - PSC and transformed in IPSASB in 2004. Today the IPSASB is an independent standard-setting board, supported by the International Federation of Accountants (IFAC), the worldwide organization for the accountancy profession. The IPSASB consists of 18 volunteer members—15 members from IFAC member bodies and three public members—with experience and expertise in public sector financial reporting. Members include representatives from ministries of finance, government audit institutions, public practice, and academia. All members of the IPSASB, including the chair and deputy chair, are appointed by the IFAC Board upon recommendations from the IFAC Nominating Committee. [www.IFAC.org](http://www.IFAC.org).

**Figure 1.**  
Invisible balance sheet.



Source: Lal Bhasin (2012, p. 66).

### 3. Measuring and classifying the IC: different approaches

#### 3.1 Intellectual Capital measurement. The different approaches

Several scholars and practitioners, especially during the *first* and the *second stage* of IC research, have developed a plethora of IC identification and measurement approaches<sup>39</sup>, in the aim of measuring this “unaccounted capital”<sup>40</sup> and therefore of reporting it correctly (Petty and Guthrie, 2000; Massingham and Tam, 2015; Benevene et al., 2017).

Each developed model has its own strengths and weaknesses, so no commonly accepted model for IC measurement has emerged to date (Guthrie and Petty, 2000; Anghel, 2008; Khaliq et al., 2015; Osinski et al., 2017), thereby creating a lack of synthesis in the academic literature.

The IC literature identifies several benefits related to the IC measurement (Edvinsson, 1997; Roos and Roos, 1997; Andriessen, 2004a; Marr et al., 2003, 2004; Lal Bhasin, 2012;

<sup>39</sup> On the proliferation of IC measurement models, Andriessen (2004a, p. 2) states: “The enormous amount of methods is probably the result of the fact that “...Intellectual Capital research has primarily evolved from the desires of practitioners”. Great progress has been made in creating sophisticated measurement tools and methods. Great confusion has been created about the underlying concepts and motives.”

<sup>40</sup> As a result of the accounting problem, Abeysekeera (2007, p. 3) stated that: “The IC held by a firm can be thought of as a form of ‘unaccounted capital’, to borrow a term used in the traditional accounting system. This ‘unaccounted capital’ can be described as the knowledge-based equity that supports the knowledge-based assets of a firm.” Later, the author, in his article of 2010 (p. 3) refer to the intellectual capital as “the “unaccounted economic capital” of future earnings not captured in financial statements.

Pazdior and Pazdior, 2012; Cronje and Moolman, 2013; Gigante, 2013; Jahanian and Salehi, 2013; Morariu, 2014; Kamath, 2015; Massingham and Tam, 2015; Svanadze and Kowalewska, 2015; Schaper, 2016; Osinski et al., 2017; Sardo and Serrasqueiro, 2017):

- to help organizational management in business strategy formulation by improving the identification, management and development of those key factors<sup>41</sup> which gain a competitive advantage;

- to help organizational management in strategy execution assessment;
- to accelerate the learning patterns within the organizations;
- to create a performance oriented culture;
- to increase the learning and innovation<sup>42</sup>;
- to ameliorate employee compensation by using IC measurement results for rewards and additional fees or as a basis for compensation;
- to improve collaborative activities and knowledge sharing culture;
- to assist managers, investors and financial analysts in mergers and acquisition operations, in particular in firms evaluation, by offering a better evaluation of such “hidden assets”<sup>43</sup>;
- to improve benchmarking between companies;
- to enhance the communication with external stakeholders by providing more useful and reliable data, based on quantitative measure, of those assets which are not adequately represented or not recognized on balance sheet.

So, after identified the reasons driving the IC measurement and identification models development, the purpose of this section is to describe the main models by taking as reference the most utilized classification approach in IC literature.

This classification, which identifies four main IC measurement approaches, was utilized for the first time by Sveiby (2004) as an extension of the previous classifications suggested

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<sup>41</sup> Very interesting, on this aspect, is the critique of Sveiby (2004, p. 1) “The most common reason for measuring and reporting is to improve internal performance, i.e. management control. It is so common that the purpose is generally not even stated explicitly. The idea is founded on one of the most quoted management slogans; “you can only manage what you measure”. It is a simple slogan and unfortunately completely erroneous. The trouble is that people don’t like being measured upon. I don’t. Do you? Or are the measuring systems only for measuring the others? We find all kinds of ways to evade and obstruct the systems. Then add an individual reward system tied to the measurement system and we have an explosive concoction. The temptations to manipulate the system become overwhelming!”

<sup>42</sup> “The learning motive promises the highest long-term benefits. First; the learning motive offers the best way around the manipulation issue. If the purpose is learning, not control or reward, the employees and managers can relax. Second, a learning purpose allows more creativity in the design of metrics, a more process-oriented bottom-up approach and less of top-down commands (Sveiby, 2004, p.2).

<sup>43</sup> “Corporate acquisitions represent an exchange of both tangible assets and intellectual assets requiring these assets to be measured and valued (...) Without correct assessment, measurement and valuation of IC, the acquirers may overvalue it thus causing value destruction for the acquiring firm’s shareholders and other stakeholders” (Marr et al. 2003, p. 447).

by Luthy (1998) and Williams (2000) and was replaced, also with slight adjustments, by several IC authors over the years (Pike and Roos, 2005; Kok, 2007; Jurczak, 2008; Chan, 2009; Sveiby, 2010; Gigante, 2013; Pucci et al., 2013; Ramanauskaitė and Rudžionienė, 2013; Meihami et al., 2014; Svanadze and Kowalewska, 2015).

The four main IC measurement approaches are: Market Capitalisation Methods (MCM); Return on Assets methods (ROA); Direct Intellectual Capital methods (DIC); Scorecard Methods (SC)<sup>44</sup>.

### 3.2 *Market Capitalisation methods*

Market Capitalisation Methods (MCM) are based on the historical assumption that the value of IC can be obtained as the comparison between the company's market capitalization and its book value (Edvinsson, 1997; Stewart, 1997; Kok, 2007; Maditinos et al., 2011). This approach is based on the accounting paradigm of historical cost and balance sheet evaluation (Chen, 2009). It essentially refers to the market's ability to capture the hidden values of intangible assets not adequately reflected in financial statements estimations by valorising the holistic effects of interactions between those IC components which typically generate an overall value greater than the aggregate value of the individual estimates (Andriessen, 2004a; Lal Bhasin, 2012; Goebel, 2015).

MCM methods, being based on quantitative data deriving from accounting and market estimations, are useful in calculating and reporting the financial value of IC and for firms' benchmarking within the same industry. Moreover, they entail better estimations in merger & acquisition situations (Sveiby, 2004; Kok, 2007). On the other hand, these methods do not provide an evaluation of individual components of IC, providing only a partial perspective, mainly financial based, which is unhelpful to assist corporate organization in IC management (Sveiby, 2004; Kok, 2007; Chan, 2009; Sydler et al., 2014; Goebel, 2015).

Among the most commonly used and popular methods in this category, there are: the *Market to Book ratio (MtB)* and the *Tobin's q ratio*.

The *Market to Book ratio* is the most investigated method in this category and represents the immediate derivation of what was said before, by estimating the IC value as the ratio or the difference between firm's *market value* and its *book value*. In other words, a positive IC value occurs where the *Market-to-book ratio* is above the unity. This method is easy to apply being based on readily obtainable and publicly available data (accounting data and market

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<sup>44</sup> IC authors have identified more than 30 IC measurement methods (Sveiby, 2004; Chan, 2009; Dumay, 2009; Ramanauskaitė and Rudžionienė, 2013; Svanadze and Kowalewska, 2015), however, since this is not the main objective of this discussion, only the most used and debated in the literature will be discussed in this chapter.

data) which ensure an element of rigor in the calculation (Jurczak, 2008) and allows easy comparisons and benchmarking.

However, two main issues arise from the application of the MtB ratio: (i) the distortion of data generated by historical cost accounting; and (ii) the influence, especially in short-term analysis, of “unpredictable” market fluctuations (Luthy, 1998; Brennan and Connell, 2000; Chan, 2009; Dumay, 2009; Dumay 2012; Paździor and Paździor, 2012; Goebel, 2015).

The *Tobin's q ratio* takes its name from the Nobel Prize winner Tobin in 1981 and it measures the relationship between a company's market value and its assets replacement value (Anghel, 2008; Ferchichi and Paturel, 2013; Goebel, 2015). As well as MtB ratio, also *Tobin's q* reflects expected future earnings and captures the lag between IC investment and realized benefits by correcting the above mentioned MtB accounting distortion by employing the replacement values of assets (Goebel, 2015), however not resolving the problem of market fluctuations caused by accidental factors (Pazdior and Pazdior, 2012). *Tobin's q ratio* was not initially designed as a measure of IC, but many authors have attributed a high *q* ratio to the value of investments in technology and human capital (Stewart, 1997; Anghel, 2008). So, despite a change in *Tobin's q ratio* basically indicate that the cost to replace a firm's assets is greater (*Tobin's q* lower between 0 and 1) or lower (*Tobin's q* greater than 1) than the value of its stock with the immediate implication that the stock is undervalued or overvalued, *Tobin's q* is widely recognized as a proxy for IC measurement where positive values of this ratio are attributed to IC investment values which are not recognized in balance sheet<sup>45</sup> (Villalonga, 2004; Jurczak, 2008; Ferchichi and Paturel, 2013; Goebel, 2015).

### 3.3 ROA methods

Return on Assets methods (ROA) identify a company's IC as the excess return on its tangible assets (Gigante, 2013). In particular, they are based on the calculation of the average pre-tax earnings of a company divided by the average tangible assets of the company. The result, that is the company ROA, is then compared with its industry average: if the resulting spread is zero or negative, it means that the firm did not produce IC surplus respect to the average of the industry and that the IC value is zero. On the contrary, if the

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<sup>45</sup> Very interesting is the research conducted by Villalonga (2004) who, in the light resource-based view, find that intangibles measured as *Tobin's q* ratio play an effective role in sustaining a firm's competitive advantage although the empirical evidences differ among the sectors analysed. On the use of *Tobin's q* as intangibles values proxy, the author states: “I use *Tobin's q* to measure resource intangibility. From an empirical point of view, it is well known that *Tobin's q* proxies for the intangible assets of firms as a result of the accounting treatment of intangibles. Tangible assets are capitalized, i.e. recognized as assets and reported on firms' balance sheets. In contrast, intangibles are expensed, i.e. written off in the income statement along with regular expenses such as wages, rents, and interests. As a result, the book value of assets does not reflect the stock of intangibles that results from cumulative investment, but market value does”. (Villalonga, 2004, p. 210)

resulting difference is positive, it implies that the company has IC surplus to the average of industry and it is positive. Then, this difference is multiplied by the company's average tangible assets to calculate an average annual earnings from intangibles. Finally, the IC value is obtained by dividing the above-average earnings by the company's weighted average cost of capital or an interest rate (Sveiby, 2004; Kok, 2007; Jurczak, 2008; Ramanauskaitė and Rudžionienė, 2013; Meihami et al., 2014; Svanadze and Kowalewska, 2015).

ROA methods advantages are mainly identifiable in those discussed above with regard to MCM methods. Indeed, also these methods allow easy comparisons between firms belonging to the same industry sector and are suitable in illustrating the financial value of intangible assets. Moreover, being grounded on established accounting rules they allow easier communication to external stakeholders (Sveiby, 2004; Jurczak, 2008; Sydler et al., 2014). However, they offer only a superficial perspective of firms' IC value which doesn't meet management needs for improving strategy formulation and assessment (Sveiby, 2001, 2004; Jurczak, 2008; Sydler et al., 2014). Furthermore, differently from MCM methods, they are particularly sensitive to interest rate and discounting rate assumptions (Sveiby, 2004).

The Valued Added Intellectual Coefficient (VAIC) is undoubtedly the best known and popular, among academics, IC measurement method in ROA category (Saleh et al., 2013; Kamath, 2015; Noradiva et al., 2016). This method was developed by Alen Pulic, a professor at the University of Zagreb and Graz and the Austrian founder of the Intellectual Capital Research Centre. Pulic was one of the first scholars in the IC research field to concentrate explicitly on the relationship between IC and firms' economic performance and the first to use only balance sheet figures to develop an IC measurement tool (Pulic 1998, 2000; 2004; Stahle et al., 2011; Iazzolino and Laise, 2013).

VAIC does not intend to measure the firm' IC directly. It aims to provide objective and reliable information about the efficiency of both tangible and intangible assets in the creation of "value added" (VA)<sup>46</sup> by referring mainly to the values contained in the income statement of the companies (Pulic, 2000; Chan, 2009; Puntillo, 2009; Maditions et al., 2011; Berzkalne and Zelgalve, 2013; Gigante, 2013; Iazzolino and Laise, 2013; Saleh et al., 2013; Morariu, 2014; Suhermin, 2014; Osinski et al., 2017; Sardo and Serrasqueiro, 2017).

VAIC model is based on some key concepts: the creation of a company's added value is based on the use of physical, financial and intellectual capital and this added value created by a company is directly related to its efficiency and may, in turn, influence the company's performance and market value (Stahle et al., 2011; Gigante, 2013; Iazzolino and Laise,

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<sup>46</sup> Pulic (1998, p.3) considers this methodology as "universal indicator showing the intellectual abilities of business unit's value creation ability and represents a measure of business efficiency in the knowledge based economy".

2013). Therefore, the VAIC's perspective is grounded on the assumption that a company cannot create added value basing only on the contribute of IC components, but, in this aim, has to combine and manage efficiently the IC with financial and physical capital (Pulic, 2004; El-Bannany, 2008; Chan, 2009; Zéghal and Maaloul, 2010). So, VAIC measures the new value created per invested monetary unit of resources. A high coefficient indicates a higher value generated by managing firms' intellectual, financial and physical resources<sup>47</sup> (Chan, 2009; Berzkalne and Zelgalve, 2013; Saleh et al., 2013).

In the VAIC model, both intellectual capital and physical capital are considered as investments: the intellectual capital consists of Human and Structural capital, while the physical capital composition is ambiguous because Pulic (1998) defined "physical capital" as "all necessary funds" such as equity, after tax profits, open reserves, and so on, but it is not clear if it includes intangible assets as reported in financial statements or it is restricted solely to tangible (physical) assets (Stahle et al., 2011; Gigante, 2013; Iazzolino and Laise, 2013; Forte et al., 2017).

The key components in VAIC calculation, which represent the main sources of firm's efficiency, are the following (Firer and Williams, 2003; Chen et al., 2005; Chan, 2009; Zéghal and Maaloul, 2010; Stahle et al., 2011; Berzkalne and Zelgalve, 2013; Saleh et al., 2013; Morariu, 2014; Kamath, 2015):

- Human capital (HC). HC is associated to employee expenses;
- Structural capital (SC). SC is the difference between produced added value (VA) and Human Capital (HC);
- Capital employed (CE). CE is recognized in book value of the net assets (or equity)<sup>48</sup>.

The first step in calculating VAIC is to determine the company's value added. Value added (VA) is fundamentally the output (the overall income, all the products and services sold on the market) less input which represents the value created by the company during the selected financial period (all the expenses, everything that came into the company excluding salaries cost) (Pulic, 1998)

VA is usually calculated with the following expression<sup>49</sup> (Pulic, 2004; Puntillo, 2009; Stahle et al., 2011; Dženopoljac et al., 2017; Sardo and Serrasqueiro, 2017)

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<sup>47</sup> "Value added grows out of physical capital and intellectual potential. It does make a difference whether a given value added could be achieved by 10 or 100 employees, as well as it matters, if 10 or 100 millions of funds (CA) have been used. Thus the goal is clear: create as much value added as possible with a given amount of physical capital and intellectual potential. Therefore, we have to know how successfully these resources were managed" (Pulic, 1998, p. 9).

<sup>48</sup> As discussed above, many authors calculate CE as book value of total assets minus intangible assets.

<sup>49</sup> Another formula used by IC scholars (Firer and Williams, 2003; Saleh et al., 2013; Kamath, 2015) to calculate added value is:  $VA = I + DP + D + T + M + R$ ; VA for firm computed as the sum of interest expenses; depreciation expenses

$$VA=OP+EC+D+A$$

Where OP is operational profits; EC is employee costs (salaries plus social expenses) and D and A are the depreciation and amortization of assets, respectively). It is important to note that in Pulic's model, salaries and wages are not considered as costs, but as investments in Human Capital (HC)<sup>50</sup>.

The second step regards the calculation of Intellectual Capital efficiency which comprises the calculation of Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)<sup>51</sup> (Pulic, 2004; Dženopoljac et al., 2016; Sardo and Serrasqueiro, 2017).

HCE indicator is obtained by dividing VA by HC (total employee salaries and wages paid annually and considered as investments):

$$HCE^{52}=VA/HC$$

The HCE coefficient expresses the value added created in the company for each unit of money invested in human capital in the current year.

SCE indicator is obtained by the ratio between SC and VA. (Pulic, 2004; Zéghal and Maaloul, 2010; Dženopoljac et al., 2016; Sardo and Serrasqueiro, 2017).

$$SCE= SC/VA$$

The SCE coefficient expresses how much capital a company can create through its structural capital besides the human resources. As showed in the above equation, SC is not and independent indicator. Its value derives from the VA created and is inversely proportional to HC. The immediate consequence is that any increase in wage and salaries expenses have the effect to reduce the SC and SCE (Pulic, 2004; Stahle et al., 2011; Dženopoljac et al., 2016).

So, by summing the human capital and structural capital efficiency indicator, the Intellectual Capital efficiency (ICE) indicator is obtained:

$$ICE = HCE + SCE$$

The ICE coefficient represents the value created through the use of IC elements and therefore measures the efficiency of the company's IC (Firer and Williams, 2003; Pulic, 2004; Stahle et al., 2011).

(DP); dividends (D); corporate taxes (T); equity of minority shareholders in net income of subsidiaries (M); profits retained for the year (R).

<sup>50</sup> On this point, Pulic (1998, p. 9), states: "It is important to point out that labour expenses were not calculated into input. Because of the active role in the value creating process, intellectual potential (represented by labour expenses) cannot be counted as costs any more. This is the key point of my method. To put it shortly: input is costs except labour expenses. The result is value added (VA) expressing the new created wealth of a period".

<sup>51</sup> "Intellectual capital has two components, human capital and structural capital. All the expenditures for employees are embraced in human capital. What is new about this concept is that salaries are no longer part of the INPUT (Pulic, 2004, p. 64).

<sup>52</sup> HCE ratio is also recognized in the IC literature with the acronym of VAHU (value added efficiency of human capital) but the calculation and the significance of the coefficients is the same (Chen et al., 2005; Zéghal and Maaloul, 2010; Maditinos et al., 2011; Suhermin, 2013; Morariu, 2014).

The last component of VAIC to be calculated is the Capital Employed Efficiency (CEE). CEE can be calculated in the following manner:

$$CEE = VA/CE$$

Finally, the VAIC can be calculated as the sum of the different capitals above calculated:

$$VAIC = ICE + CEE$$

So, in this final aggregated form, VAIC highlights company's total efficiency deriving from the use of Intellectual Capital, Physical Capital and Financial Capital by underlining the individual contribute of each capital. A higher value of VAIC indicates the efficient use and management of each capital with the result of a greater value created (Pulic, 2004; Chen et al., 2005; Pazdior and Pazdior, 2012; Dženopoljac et al., 2016).

Several authors (Firer and Williams; 2003; Jurczak, 2008; Chan, 2009; Puntillo, 2009; Zéghal and Maaloul, 2010; Maditinos et al., 2011; Paździor and Paździor, 2012; Berzkalne and Zelgalve, 2013; Saleh et al., 2013; Sardo and Serrasqueiro; 2017) have underlined the benefits linked to this IC measurement: (i) the model requires few simple calculations and the result can be easily interpreted; (ii) VAIC and its components may be obtained from financial statement data which are derived entirely from the firm's operations and are verified by the firm's auditors; (iii) as it based on accessible, objective, standardized, verified and reliable data, VAIC allows easier comparison between different firms as well as statistical analysis; (iv) VAIC is based on Value Added, a widely accepted measure of value creation in business activities; (v) it provides indicators which are relevant and useful to all stakeholders and with which they may conduct comparisons among the key components of IC in the aim of analysing the company performance.

On the other hand, some scholars have discussed the limitations of VAIC<sup>53</sup> (Stahle et al., 2011; Iazzolino and Laise, 2013; Goebel et al., 2015; Dzenopoljac et al., 2016). Firstly, it focuses mainly on financial reports values which rely on past strategies and decision making and cannot allow to consider VAIC as an alternative to other more traditional methodologies. Secondly, since human capital is considered as an investment, it should be added to capital employed. Thirdly, VAIC assumes that all salary expenditures are related to IC, by ignoring that part of these expenses might reasonably be attributed to other operating expenses incurred in the period. Moreover, by considering only annual salaries as human capital it may be argued that the VAIC method does not concern IC at all, as it only measures the operational efficiency of a firm without considering, firm's investment in training employees, skills, motivation and knowledge, which are considered as core component of IC.

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<sup>53</sup> For a more complete and detailed discussion of the issues arising from the use of this indicator please refer to the valuable works of Stahle et al. (2011) and Iazzolino and Laise (2013).

Fourthly, the model does not take in account the synergies which can occur among the different components of VAIC by ignoring the “holistic” aspects of IC. Finally, VAIC does not take into consideration adequately the innovation capacity and the “relational capital” of a firm.

Other methods belonging to the ROA family which have not received the same attention and diffusion of the VAIC are: The Economic Value Added (EVA); the Knowledge Capital Earnings (KCE) and the Calculated Intangible Value (CIV).

The EVA was introduced by Stern Stewart & Co., a New York-based consulting firm, in the late 1980s as comprehensive financial management measurement system to support firms’ managers in strategy formulation and performance measurement in the final aim of maximize the shareholder value.

EVA<sup>54</sup> is not specifically focused on the IC<sup>54</sup> measurement but is based on the assessment of the economic value that is added in a company, by considering the equity cost needed to create that value. It is calculated by adjusting the firm’s disclosed profit with charges related to intangibles. Changes in EVA give an indication of whether the firm’s IC is productive or not<sup>55</sup> (Bontis et al., 1999, 2001; Andriessen, 2004b; Sveiby, 2004; Chen et al., 2005; Jurczac, 2008).

The KCE was born with the basic concept that the IC does not have a concrete value as such and therefore does not produce value alone. Instead, its implementation and management within the company leads to the increase in the productivity of the materials and financial resources held.

So, in the aim of measuring this capital, benefits obtained by the firm have to be divided between three basic resources (material, financial and knowledge) by also forecasting the results related to the strategy implemented. In particular, KCE are calculated as the portion of normalized earnings above expected earnings attributable to book asset (Lev, 1999; Jurczac, 2008; Pazdior and Pazdior, 2012).

Finally, the CIV derives from the attempt of breweries and distilleries to measure the value of goodwill and other intangible assets lost as the consequence of law on prohibition. Then, Stewart (1995) have discussed about the possibilities of adapting this model for measuring the IC of companies through a seven step process which generally aims to

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<sup>54</sup> ROA basically is calculated with the following formula: Net sales - Operating expenses - taxes - capital charges = EVA (Bontis et al., 1999).

<sup>55</sup> “Even though EVA does not explicitly relate to the management of intangible resources, the implicit argument here is that the effective management of knowledge assets will increase EVA. All the same, this origin implies that no specific measures are developed for the assessment of the potential contribution of investments in intangibles. Indeed, some strategy researchers support the idea of using EVA measures as a surrogate measure for the stock of intellectual capital and that EVA can be viewed as a measure for return on intellectual capital” (Bontis et al., 1999, p.7).

calculate the average (from three years) rate of return from tangible assets of the company and the industry-average ROA in order to obtain the proportion of return of the single company attributable to intangible assets. In particular, the industry-average ROA is multiplied by the selected company's average tangible assets and the result is subtracted from the firm's pre-tax earnings in order to calculate the excess return. Then, the three-year-average income tax rate is calculated and multiplied by the excess return. Finally, by subtracting the result obtained from the excess return, the premium attributable to intangible assets is obtained. This premium appropriately discounted at a given discount rate represents the present value of intangible assets which is not reflected on balance sheet (Luthy, 1998; Jurczak, 1998; Sveiby, 2004; Pazdior and Pazdior, 2012).

### 3.4 *Direct Intellectual Capital methods*

This category includes the approaches which tend to measure the monetary value of individual components of IC by following a bottom-up perspective. In this type of measurement process, firstly, the individual IC components are identified (for example through a series of audit questionnaires or specific analyses) and secondly, after the identification process, they are directly estimated, either individually or as an aggregated coefficient. (Pike and Roos, 2005; Kok, 2007; Jurczak, 2008; Chan, 2009; Sveiby, 2010; Gigante, 2013; Pucci et al., 2013; Ramanauskaitė and Rudžionienė, 2013; Meihami et al., 2014; Svanadze and Kowalewska, 2015).

DIC methods unlike previous IC measurement categories, offer a much more analytical and less financially-based perspective by favouring the internal managerial aspect (Pike and Roos, 2005; Kok, 2007).

DIC methods propose a more comprehensive and detailed analysis of IC than financial metrics and can be easily applied and utilized at any level of an organization (Sveiby, 2004; Pike and Roos, 2005; Kok, 2007; Jurczak, 2008). Furthermore, the measurement approach proposed in these methods is event-based and is more accurate compared to the one proposed by the IC measurement financial-based categories (MCM and ROA approaches).

These methods are very useful for non-profit organisations, internal departments and public sector organisations and for environmental and social purposes (Sveiby, 2004; Kok, 2007; Jurczak, 2008). On the other hand, despite these advantages mainly linked to the improvement of the internal management activities, DIC methods present some related issues. In particular, they are strictly contextual-based and therefore need to be tailored to each selected organization and internal purpose, by making comparisons and benchmarking between different companies very complicated, to the point that these methods have had a

lesser diffusion in academia than those based on more objective quantitative estimates such as MCM and ROA methods (Sveiby, 2004; Kok, 2007; Jurczac, 2008; Chan, 2009).

Among DIC methods, one of the most well-known and discussed in literature is the Technology broker methodology (Brooking, 1996) which is an audit methodology which has the purpose to identify and measure IC components of an organization which do not are adequately represented on traditional financial statements (Brooking, 1996; Luthy, 1998; Bontis, 2001; Marr et al., 2004; Sveiby, 2004; Anghel, 2008; Jurcazc, 2008). These components are identified in: market assets (brands, distribution channel, customers relationship, collaborations, agreements, etc); intellectual property (copyrights, patents, trade secrets, etc.); human-centered assets: education and work related knowledge and competences); infrastructure assets (management processes, networking, information system)<sup>56</sup> (Brooking, 1996; Luthy, 1998; Bontis, 2001; Marr et al., 2004; Anghel, 2008).

In particular, the IC value measurement process, under the assumption that the market value of a company is the result of the sum of tangible assets and the IC, consists of a diagnostic analysis of a firm's response to twenty questions regarding the four major components of intellectual capital listed above in order to assess whether the organization needs to develop new or strengthen existing areas of IC<sup>57</sup> (Marr et al., 2004; Sveiby, 2004; Jurczac, 2008). Then, once an organisation has finished its IC audit questionnaire, it can use three approaches to calculate a monetary value for its IC: 1) the cost-based approach (whose purpose is to determine the value of an asset by ascertaining its replacement costs); the market-based approach (aiming at determine the value of an asset by referring to market values) and the income-based approach (having the purpose to calculate the value of an asset by referring to the revenue-producing capability of the asset) (Bontis, 2001; Marr et al., 2004).

Another method, among the most debated DIC methods in literature, is The Citation-Weighted Patents (Bontis, 1996).

The Citation-Weighted Patents approach was developed by Dow Chemical at a time of reorganization and delayering in order to improve critical communication links. This approach attributes a pivotal role to firm's patents as proxies for IC measurement and drivers for firms' value creation (Bontis, 2001; Pastor et al., 2017). Its main objective is to

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<sup>56</sup> The complete list of IC sub-components is reported by Brooking (1996): Market assets - Service brands - Product brands - Corporate brands - Champions - Customers - Evangelists - Customer loyalty - Repeat business - Company name - Backlog - Distribution channels - Business collaborations - Franchise agreements - Licensing agreements - Favorable contracts; Intellectual property assets - Patent - Copyright - Design rights - Trade secrets - Know-how - Trademarks - Service marks; Human-centered assets - Education - Vocational qualifications - Work-related knowledge - Occupational assessments and psychometrics - Work-related competencies; Infrastructure assets - Management philosophy - Corporate culture - Management processes - Information technology systems - Networking systems - Financial relations.

<sup>57</sup> See Brooking et al. (1997); Luthy (1998) and Bontis (2001) for an extensive description of this method.

determine the real and comprehensive value of firm's patents through the estimation of a "technology factor" which includes a series of indicators which, besides the cost of acquisition of the patent, take into account a range of other factors linked to the R&D efforts to create the intellectual property (e.g. R&D expense per sales dollar; income per R&D expense; number of patents; cost of patent maintenance per sales dollar and project life-cycle cost per dollar) (Bontis, 2001; Sveiby, 2004; Jurczac, 2008). Thus, a company, by implementing this patents evaluation process, in which a team of members with different specializations (e.g. R&D, market, production) is involved, can make visible part of IC by attributing a more significant value to its intellectual properties (Bontis, 2001).

### 3.5 *Scorecard methods*

This family of methods is very similar to the previous analysed family of DIC methods, however, in this case, unlike DIC methods, SC methods do not have the purpose to assign a financial value to the IC components (Sveiby, 2004; Jurczac, 2008; Chan, 2009; Ramanauskaitė and Rudžionienė, 2013; Meihami et al., 2014). These methods are fundamentally based on the identification of the different IC components and on the formulation of indicators and indices to measure them, at an individual or aggregate level, which, in a subsequent step, are reported on scorecards or graphs (Sveiby, 2004; Kok, 2007; Jurczac, 2008; Chan, 2009; Gigante, 2013; Pucci et al., 2013; Ramanauskaitė and Rudžionienė, 2013; Meihami et al., 2014; Svanadze and Kowalewska, 2015).

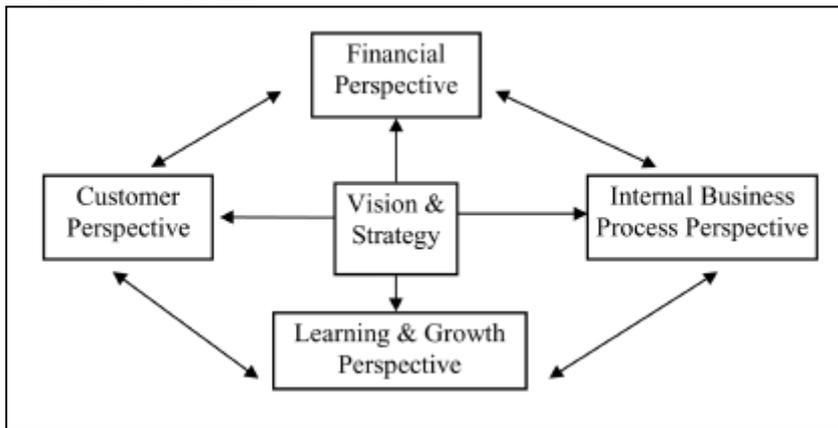
As well as DIC methods, SC methods have the advantage to offer more comprehensive picture of an organization's health than financial metrics, resulting very useful in formulating strategies and in management control processes to the point that they are among the most widely used models in knowledge management (Kok, 2007; Jurczac, 2008). Moreover, they can be easily implemented at any level of an organization and since they measure closer to an event, the reporting can be precise and reliable (Sveiby, 2004; Kok, 2007). Further, as DIC methods they are not financial metrics-based, so they are particularly suitable in non-profit organisations, government agencies, public sector organizations and for environmental and social purposes (Sveiby, 2004; Kok, 2007; Jurczac, 2008). On the other hand, these family of IC measurement methods suffers of the same limitations individuated for the DIC methods: their implementation is closely linked to the company's specific features, so they need to be adapted to each organisation and each purpose, by making, obviously, comparisons and benchmarking very hard (Brennan and Connell, 2000; Petty and Guthrie, 2000; Sveiby, 2004; Kok, 2007; Jurczac, 2008; Chan, 2009; Ramanauskaitė and Rudžionienė, 2013).

The most relevant and debated SC methods are: The Balanced Scorecard (BSC) (Kaplan and Norton, 1996); the Intangible Asset Monitor (Sveiby, 1997); and the Skandia Navigator (Edvinsson, 1997).

The Balanced Scorecard (BSC) was developed by Robert Kaplan and David Norton in an article of 1992 in which the authors proposed a holistic approach in order to measure business performance by overcoming the limits of traditional economic-financial accounting. It is born as a tool to support the company's strategic management through the translation of the company's mission and strategy into a coherent set of performance measures, facilitating its measurability (Bontis et al., 1999; Anghel, 2008; Kong, 2008; Jurczac, 2008; Osinski et al., 2017). It represents a multidimensional performance measurement approach which combines financial and non-financial perspectives in the aim of supporting the managers in their decisions through the development of leading and lagging indicators and measurements focusing on the input and the output of the company (Bontis et al., 1999; Gogan, 2013).

In particular, the organizational measurement system is developed along four perspectives which complement financial and non-financial measures: *financial perspective* including traditional accounting measures by considering the viewpoints and expectations of shareholders, by considering traditional financial indicators; *customer perspective* including the selection of firm's customer target groups and linked marketing measures by considering some indicators as loyalty rate, customer satisfaction rate, new customer acquisition rate, customer profitability, market share; *internal business process perspective* including the analysis of those core processes regarding the production of products and services which aims to satisfy the customers' needs by considering indicators that measure the efficiency and effectiveness of these processes; finally, the *learning and growth perspective* considering the attitude of the organization and individual employees to the general improvement through continuous learning by considering some metrics such as the degree of satisfaction and employee loyalty rate, the level of training and professionalism of staff, the ability to transfer knowledge and the level of excellence of information systems (Bontis et al., 1999; Brennan and Connell, 2000; Sveiby, 2004; Anghel, 2008; Jurczac, 2008; Gogan, 2013; Morariu, 2014).

**Figure 2.**  
The Balanced Scorecard.



Source: Kaplan and Norton (1992)

The Balanced Scorecard allows managers to visualize the implemented strategies, strategic goals, performance drivers, and results achieved in a comprehensive picture under a cause-and-effect relationships perspective, by taking corrective actions where necessary (Bontis et al., 1999; Gogan, 2013).

One of its cornerstones is the consideration that investing and managing intangible assets is pivotal and more fruitful than investing and managing physical and tangible assets (Jurczac, 2008).

However, despite the innovations and the advantages introduced by the BSC model prevalently related to the improvement in formulating, planning and assessing corporate strategies, it presents some limitations: it is a relatively rigid system especially in the choice of critical success factors and perspectives to be analysed; the employees are all considered of equal importance and embedded in the learning and growth perspective without a focus on their specific skills and their contribution to the innovation; it is strictly an internal document based on firm's specific characteristics, so it does not allow comparisons between firms (Bontis et al., 1999; Petty and Guthrie, 2000; Kong, 2008; Jurczac, 2008; Gogan, 2013).

The Intangible Assets Monitor (IAM) (Sveiby, 1997), arises from the awareness of the limitations of traditional accounting systems in the correct identification and representation of intangible assets and hence from the need to devise a system that could help managers in identifying and managing these "invisible knowledge-based" assets in order to enhance the management control process (Sveiby, 1997; Bontis, 2001; Ordonez de Pablos, 2003; Marr et al., 2004; Anghel, 2008).

Indeed, Sveiby argues that the existing spread between *market value* and *book value* can be attributed to that class of intangible/invisible assets<sup>58</sup> not adequately represented in the balance sheet but recognized by the market as a source of competitive advantage (Sveiby, 1997; Bontis, 2001; Gogan, 2013). This special class of unaccounted intangibles is identifiable in: *External Structure; Internal Structure* and *Employee (Human) Competence* already described in the first paragraph.

Then, operatively, in this model, Sveiby identifies three main measurement indicators groups<sup>59</sup>: *growth and renewal; efficiency; stability* for each class of intangible assets identified, by recommending to select only one or two indicators for each intangible classes under each of the main measurement indicators groups, according to firm's strategy and specific characteristics (Bontis, 2001; Marr et al., 2004; Jurcazc, 2008; Morariu, 2014) (see figure 3).

**Figure 3.**

Example of basic structure of the Intangible Asset Monitor with some examples of indicators belonging to the main groups (growth and renewal; efficiency; stability) selected for each of the intangibles classes

	Human competence	Internal structure	External structure
Indicators of growth/renewal	Years in profession; Education level Training costs; Turnover	Investments in internal structure; Customers contributing to systems/process building	Profitability per customer; Organic growth
Indicators of efficiency	Proportion of professionals in the company; Leverage effect; Value-added per professional	Proportion of support staff; Sales per support person; Corporate culture poll	Satisfied customers index; Win/loss index; Sales per customer
Indicators of stability	Average age; Seniority; Relative pay position; Professional turnover rate	Age of organisation; Support staff turnover rate; Rookie ratio	Proportion of big customers; Age structure; Devoted customers ratio; Frequency of repeat orders

Source: Marr et al. (2004, p. 561)

Moreover, Sveiby, as regards the operational development of the model, requires paying particular attention to two important steps: the identification of stakeholders interested in the intellectual capital measurement and the distinction of employees in *professional* and *support staff* (Sveiby, 1997). Regarding the former step, Sveiby distinguishes between the *external presentation*, in which the company offers a picture of its economic and financial situation with particular reference to the valuation of intangibles as accurately and reliable as possible to its stakeholders and the *internal measurement*, in which management is interested in obtaining as much information as possible regarding the company and the

<sup>58</sup> "Invisible assets are matched on the financing side of the balance sheet by equally invisible finance, most of which are in the form of invisible equity" (Brennan and Connell, 2000; Morariu, 2014).

<sup>59</sup> As reported by Sveiby (1997, p. 197), the Intangible Asset Monitor is "a presentation format that displays a number of relevant indicators in a simple fashion".

intangibles development in order to monitor progress and be able to take corrective actions (Sveiby, 1997; Bontis, 2001; Marr et al., 2004). Regarding the latter step, the distinction between *professional* and *support staff* is relevant because the pivotal role played by these two different types of employees in strategy formulation and intangibles development (Sveiby, 2001). The category of *professional* is composed by those workers who plan, produce and present products and solutions and who are the only included in the third intangibles category (individual competence or Human Capital) and considered as revenue-generators. The category of *support staff* is composed by those workers who are involved in accounting, administration, reception, etc. tasks and who contribute to the development of the second class of intangibles (internal structure) but are not included in the first class of intangibles and are not considered as revenue-generators (Sveiby, 1997, 2001; Guthrie and Petty, 2000; Bontis, 2001; Marr et al., 2004).

So, IAM model represents an important instrument for the measurement, monitoring and communication of intangible assets from different perspectives<sup>60</sup> which can be more useful for internal management purpose than for external reporting purpose. It emphasizes the internal perspective and does not represent properly a valuation approach since does not provide quantitative measures of IC value addition or ROI and does not clarify how to develop a comprehensive performance measurement system in which the intangible performance drivers are linked to the performance outcomes, assuming that IC and financial outcomes are innately related (Bontis, 2001; Kannan and Aulbur, 2004; Marr et al., 2004).

Finally, the Skandia Navigator's experience (Edvinsson and Malone, 1997) can be considered as pioneering in the measurement of intangible/knowledge assets, being the first company which have attempted to develop an IC report in 1985 and a supplement to traditional financial statement IC based in 1994 (Bontis, 2001; Pazdior and Pazdior, 2012). The Skandia navigator arises from the awareness that knowledge-based assets are the main sources of sustainable long-term competitive advantage for companies<sup>61</sup> and that therefore investment in these assets, unlike those in tangible assets, have increased dramatically in

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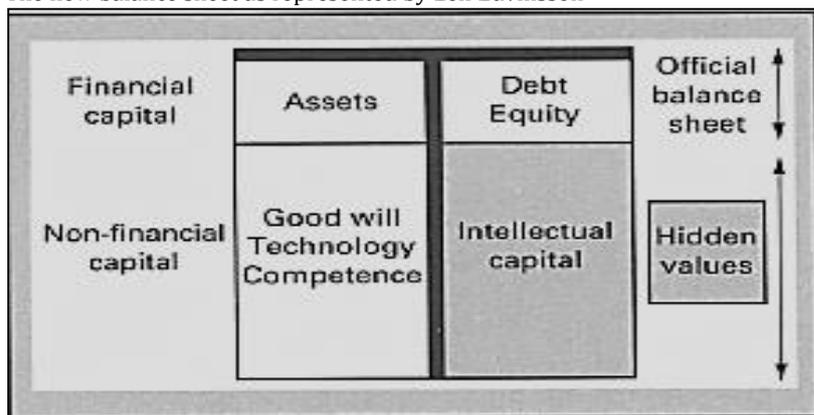
<sup>60</sup> Celemi, a Swedish business solutions and marketing company has utilized the Intangible Asset Monitor for several years in order to measure and monitoring their intangible assets, also placing on the market the TANGO business game, developed by Sveiby, which support corporate managers in managing and monitoring intangible assets by involving teams of different companies which fiercely compete to create short-term profit and long-term value. (Bontis, 2001; Marr et al., 2004; [www.Celemi.com](http://www.Celemi.com)). "We found that we could identify and manage the highly critical success factors in a knowledge company and actually quantify the results of our decisions. Celemi Tango is a great learning laboratory that had a very positive impact on our business management." (Worldwide General Manager, Hewlett Packard). [www.Celemi.com](http://www.Celemi.com).

<sup>61</sup> In order to clarify the pivotal importance of knowledge assets for firms' value creation, Leif Edvinsson (1997, p. 366) utilized a metaphor of a tree with fruit as well as roots: "For the long-term sustainability of an organization it is much more important to focus on nurturing the roots than harvesting the fruit. The long-term idea might even be to get a new balance with a leadership focus on how the tree is flourishing".

recent years without receiving, however, an adequate representation in the financial statement (Edvinsson, 1997; Edvinsson and Malone, 1997).

Leif Edvinsson, the chief architect of Skandia Navigator was one of the first to investigate the phenomenon of increasing the spread between market value and book value by hypothesizing the existence of a new balance composed by a *visible section* (the financial capital and the goodwill<sup>62</sup> on the assets side and the debt equity on the debts side) and an *invisible section* (the intellectual capital on the debts side) (see figure 4).

**Figure 4**  
The new balance sheet as represented by Leif Edvinsson



Source: Edvinsson (1997, p. 368)

Thus, the Skandia Navigator arises from the need to bring out these invisible assets on the surface by creating a comprehensive measurement tool<sup>63</sup> capable to improve the visibility of intangible and soft assets. Skandia Navigator combine both financial and non-financial firms' perspective in the aim to have a clear visualization of all the elements which contribute to the organizational value and thus to the market value<sup>64</sup> (Edvinsson, 1997; Bontis, 2001; Anghel, 2008). The result was the identification of a long list of hidden intangible assets or IC elements that although valuable were not recognized in balance sheet and the development of a sort of Balanced Scorecard for measuring and reporting these assets through metrics and indicators. This list of IC items initially too long was reduced to

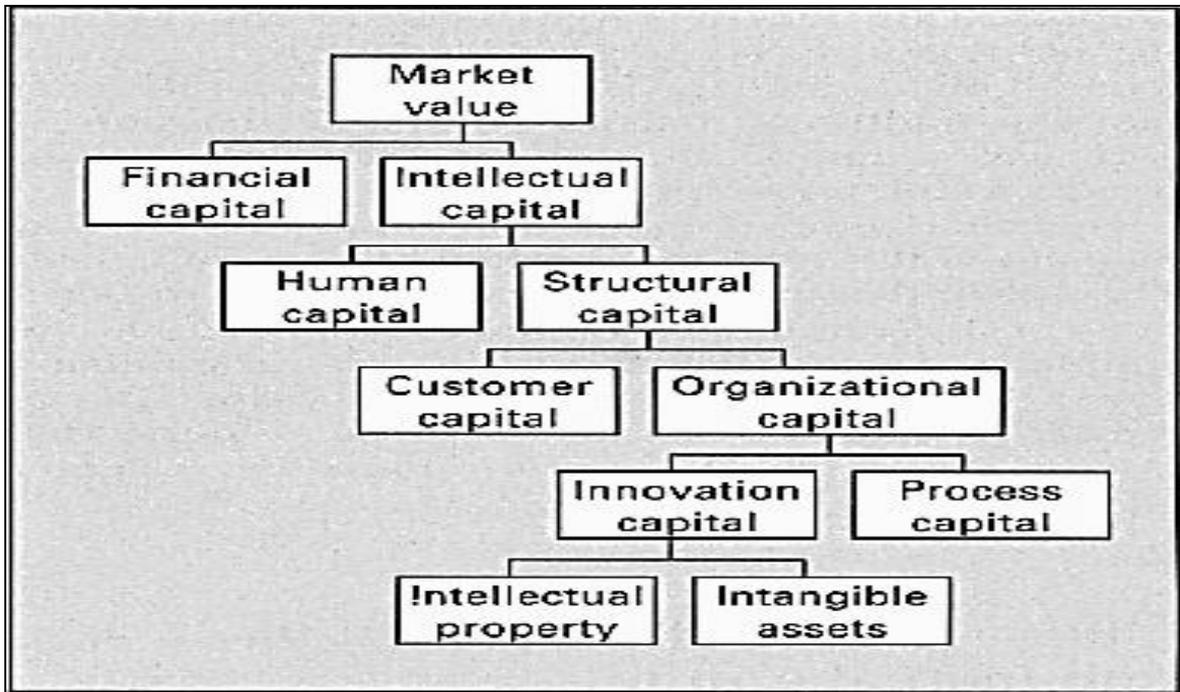
<sup>62</sup> "As an intangible item, goodwill should be deducted as quickly as possible, thereby actually reducing the value of the balance sheet. From a knowledge value viewpoint however, it could be considered to reflect the intellectual value which grows over time (Edvinsson, 1997, p. 368).

<sup>63</sup> The intellectual capital mission at Skandia AFS was defined as follows: 1) To identify and to enhance the visibility and measurability of intangible and soft assets; 2) To capture and support packaging and accessibility by knowledge transparency and knowledge technologies; 3) To cultivate and channel intellectual capital through professional development, training and IT networking; 4) To capitalize and leverage by adding value through faster recycling of knowledge and increased commercialized transfer of skills and applied experience (Edvinsson, 1997, p. 368).

<sup>64</sup> As reported by Edvinsson (1997, p. 369): "The ambition was to have a simple overview of financial as well as non-financial data. Such a one-page report was presented to the board of Skandia AFS in 1993. The reception was enthusiastic and encouraging. The completion of this very first blueprint report was a part-time effort by the Director of Intellectual Capital and Deputy Controller, Mr Ake Freij. To be able to develop this type of reporting further it was evident that a supplementary function had to be created. This led to the recruitment of the first IC Controller, Mrs Elisabeth Gemzell-Mikkelsen, in 1993".

two main IC components: *Human Capital* and *Structural Capital*<sup>65</sup> which together with the Financial Capital contribute to the firm's market value (see figure 5) (Edvinsson, 1997; Edvinsson and Malone, 1997; Marr et al., 2004; Gogan, 2013).

**Figure 5.**  
Skandia Value scheme



Source: Edvinsson (1997, p. 369)

Thus, once the IC elements are identified and the value creation pattern that led to market value has been built, the Skandia Navigator, by following the Balanced Scorecard approach, envisages the development of numerical indicators which allow the measurement of corporate performance through five main, financial and non-financial outlooks perspectives<sup>66</sup>: the financial perspective; the customer perspective; the process perspective; the human perspective and the renewal and development perspective which, finally, are resumed in a single, balanced report: the Skandia Navigator (Edvinsson and Malone, 1997; Edvinsson, 1997; Bontis, 2001; Marr et al., 2004). In particular, Edvinsson and Malone (1997), list about 112 recommended metrics grouped in IC metrics and traditional metrics by encouraging the use of an ideal number of indicators of 3-4 metrics for each of the five identified focus area in order to avoid redundancy issues (Edvinsson, 1997; Gogan, 2013).

<sup>65</sup> In order to facilitate a better understanding of the IC phenomenon, the description of these capitals has been brought forward to the first paragraph

<sup>66</sup> Edvinsson (1997, p. 371) utilizes another interesting metaphor to describe the development of Skandia value scheme: "This model could also be viewed as a house. The financial focus is the roof. The customer focus and process focus are the walls. The human focus is the soul of the house. The renewal and development focus is the platform. With such a metaphor, renewal and development becomes the critical bottom line for sustainability".

They also recommend the use of direct counts in order to facilitate benchmarking and the formulation of monetary-based ratios (Bontis, 2001).

Thus, substantially, the Skandia Navigator represents a management tool aiming at measuring the company's intangible assets value and presents some structural similarities with the Balanced Scorecard developed by Kaplan and Norton (1992). Unlike the BSC, the Skandia Navigator places much more emphasis on the relevance of *Human Capital* in the value creation process as well as on *Customer Capital* (this latter aspect also differs greatly from the approach followed in the Intangible Asset monitor development) (Bontis, 2001; Chen et al., 2005).

However, the Skandia Navigator does not offer a clear explanation of how the five perspectives are related and also the equation which sums IC and financial capital to obtain the market value of a company is questionable since the variables are not separable because they interact with each other and represent two different sides of the same equation (Marr et al., 2004). Moreover, other criticisms of this model arise from the excessive focus placed on numeric indicators that might be inadequate to measure the contribution of knowledge assets to the creation of value as well as from the balance sheet-perspective followed in measuring the intangible assets which lead to an underestimation of some contents of IC which play important roles in creating value, such as a company's culture, organizational learning and an employee's creativity and to a lack of representation of the dynamic flows of an organization (Roos et al., 1997; Bontis, 2001; Chen et al., 2005; Gogan, 2013).

## 4. The failure and resurgence of IC reporting. The relevance of IC disclosure

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### 4.1 *IC measurement approaches. A critical background*

As above highlighted, during the so called first and second stages of IC research, a plethora of IC measurement and reporting models has been proposed, but none of these has reached the right consensus among practitioners and researchers (Dumay, 2009; Chiucchi, 2013).

In this regard, a first aspect to point out concerns the taxonomy used. The terminology of IC as well as of its main categories differs among the different models, this in turn has caused confusion and, difficulties in implementing such models in the operational reality of companies, leading to debate about the actual usefulness of these contemporary

frameworks (Dumay, 2009; Lonqvist et al., 2009; Paazdior and Pazdior, 2012; Chiucchi, 2013).

Andriessen (2004a, p.2;), by discussing about the problems raising from the IC measurement, have underlined two important issues: firstly, IC research, at first, has been developed fundamentally from the desires of practitioners which have also developed most of the seminal IC frameworks (e.g. Skandia), as consequence the utility and the validity of these models has been widely debated. Secondly, most of the models developed represent a sort of “solutions in search of a cause” because they “are based on a variety of problem definitions that are sometimes made explicit but often remain implicit”. In these models it is not clear what is the problem to be solved and there is not enough attention to organizational diagnosis.

According to Van der Meer-Kooistra and Zijlstra (2001), it seems that the plethora of models proposed in literature are tailored on the specific case of the company or the industry analysed, or in the case of the models developed directly by the companies, they turn out to be strongly adapted to the organizational reality in which the model has been developed. This enforces the idea that the IC is “highly case specific and volatile”, where “IC resources are linked to a company’s strategy and ways of doing things” (Lonqvist et al., 2009, p. 562). As a result, it is difficult to identify a measurement and identification IC tool that could be universally acceptable without taking into account that, the same IC is composed of unique and not replicable resources strictly related to the type of activity, business environment, history and culture of a company, requiring specific reporting and measurement methods (Pazdior and Pazdior, 2012).

According to Lonqvist et al. (2009, p. 562), “the type of competencies or stakeholder relationships, for example, which are important for a given company, cannot be valued without a thorough understanding of the company. What is important in one company may be irrelevant for another”.

Moreover, the majority of IC measurement approaches, especially those considered as pioneering (e.g. Skandia, Intangible Asset Monitor), assume an internal, scorecard based, managerial perspective (Van der Meer-Kooistra and Zijlstra, 2001). Therefore, they are strongly measurement oriented rather reporting oriented. So, prevailing the internal managerial perspective, little attention is given to the external one that concerns the communication with stakeholders (Van der Meer-Kooistra and Zijlstra, 2001). Furthermore, none of these models has been developed in accordance with accounting principles as well as none of them tries to include the information on IC in the traditional financial statement framework (Van der Meer-Kooistra and Zijlstra, 2001; Marr et al., 2003).

Another problem is related to the widespread use of non-financial indicators and metrics which can quickly become obsolete in the new knowledge-economy era in which there are rapid changes in environments, markets and technologies (Chiucci, 2013).

Moreover, what emerges from the proliferation of all these models is that, the potentialities as well as the relevance of IC as driver of firms' economic performance and sustainable competitive advantage, have remained largely theoretical concepts of academic inspiration. After a first flow of framework developed by practitioners in companies (e.g. Skandia), IC framework measurement models have been mostly developed by academics, creating confusion and uncertainty about their practical application and their utility. According to Dumay (2012, p.5) the "grand theories"<sup>67</sup> (IC as market to book value and IC as vehicle for a greater profitability) developed by academics at the theoretical level to explain and understand the potential of IC, have hindered the development of IC measurement models in practice. These theories though widespread, have also been widely criticized by IC scholars, and not being derived from empirical research, they needed to be tried and tested in practice, but in the current state, they represent only barriers to IC implementation in practice<sup>68</sup>.

The limitations showed by these models, have led to a shortage of practical applications in companies and even so-called pioneering companies in the measurement of intellectual capital (e.g. Skandia) have abandoned the measurement and subsequent reporting activities after few years (Dumay, 2009, 2012, 2016; Chiucci, 2013; Schaper, 2016). So, IC measurement research has stopped its development at a rhetorical and theoretical step by remaining unexplored from a practical point of view, bringing the intellectual capital to be considered as a "fashionable concept" and an "optimistic agenda"<sup>69</sup> (Marr et al., 2003; Mouritsen, 2006, p. 823; Schaper, 2016, p. 54).

Therefore, with the emergence of the IC as a prevalently theoretical concept, many managers, in the business operating reality, did not understand the real importance of IC and its measurement, believing that the IC measurement was of little use to both internal

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<sup>67</sup> As argued by Llewelyn (2003, p.676), grand theories are "formulated at a high level of generality and reflect ideas that have been arrived at by thinking through the ideas and relationships in an abstract way – rather than being derived from empirical research"

<sup>68</sup> "Thus, as grand theories, they represent "grand narratives" that explain the value of IC, making it is easy for people to understand the theories while at the same time avoiding the need to offer conclusive proof of their espoused outcomes. However, I argue that relying on these grand theories misrepresents the cause and effect relationships implied by the theories. Therefore, I also argue the theories represent barriers to the use of IC practices by many mainstream organizations" (Dumay, 2012, p.6).

<sup>69</sup> "Generally, IC is an optimistic agenda. IC is related to the generation of value as a resource in knowledge based firms and societies. This is clear from the outset since the initial concern with market-to-book ratios proposes that value in knowledge-based firms is developed less from physical assets and more from intangible or intellectual assets related to cleverness, imagination, knowledge, insight and wisdom. IC develops a story of progress through human, organisational and customer/relationship capital" (Mouritsen, 2006, p.823).

and external ends, by considering it also as a real threat to their personal assessment and to the company in general<sup>70</sup> (Schaper, 2016).

The managers who, on the other hand, have become aware of IC potential, have preferred to develop IC measurement and management models for internal purposes, avoiding the dissemination of sensitive quantitative information that could cause a loss of competitive advantage to the external environment (Dumay, 2016). Instead, as claimed by several IC scholars, in order to overcome resistance and viscosity to change, the theories and the various tools of IC measurement should have been practically tested and gradually introduced as routine in companies under the full awareness of its usefulness by linking it to firms' strategies and objectives in an organic perspective<sup>71</sup> (Johanson et al., 2001; Chiucchi, 2013; Schaper, 2016).

#### 4.2 *The failure of IC measurement-based reporting and the need for a new type of IC disclosure*

With the awareness of IC measurement models limitations, in recent years, the attention has shifted from the IC quantitative measurement, to the disclosure, prevalently narrative<sup>72</sup> and external oriented, of IC, not necessarily communicated through a single, specific IC reporting model (Dumay, 2008; Dumay and Rooney, 2011; Dumay and Roslender, 2013; Dumay, 2016; Dumay and Guthrie, 2017).

As mentioned before, the experience of the most famous IC frameworks developed as Skandia and Intangible Asset Monitor has shown how complicated and restrictive is the attempt to create a model that intends to measure IC by relying basically on numbers and indicators. These first IC framework aiming at creating specific IC reports devoted prevalently to the IC quantitative measurement, paid little attention to the external communication perspective, so the information contained therein were perceived as unclear or unhelpful by external stakeholders.

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<sup>70</sup> "The trouble is that most of the reporting based IC wealth-creation believers are not managers. Rather, most of the believers are management gurus, accountants, consultants and academics with their own self-interest in promoting IC reporting" (Dumay, 2016, p. 172).

<sup>71</sup> In this regard, Lonnqvist et al. (2009) have conducted an empirical study in which they have examined the role of Intellectual Capital management in an organizational change process on a sample of three companies which have implemented the Danish framework for IC management in the context of organizational change. They found that the IC framework provided means to model and individuate the IC-related components in the change process. IC framework provided a sort of IC-related strategy map suitable to the change management program. The main benefit of the IC model seemed to be in the improvement of managerial understanding related to the links of various issues within the change process.

<sup>72</sup> The narrative presents something close to the identity of the firm, and therefore presents some kind of *raison d'être* of its activities. Therefore, when understanding knowledge as a narrative it is part of a wider justification of its role in helping the firm to develop and produce something "good", and it also suggests where it is different from things, which in the situation is considered "bad" (Mouritsen et al., 2002, p. 14).

The IC and therefore the intangible elements which make up its base, have a highly qualitative connotation that can hardly be enclosed only in financial and accounting figures. Each company has its IC that is linked to its own business model, strategies, objectives, etc. The understanding and the communication of the contribution that the IC itself, through its management, give to the comprehensive firm's value creation, requires a reporting effort that necessarily goes out of the boundaries of accounting and quantitative measurement. It has to embrace, in a narrative disclosure way, the whole process of value creation together with the actors involved and the external environment in which the company operates (Mouritsen et al., 2002; Dumay, 2008; Dumay and Roslender, 2013).

Dumay and Roslender (2013, p. 265) by discussing how narrative IC disclosure can overcome the limitations of numerical metrics or accounting framework schemes in representing the overall process of creating a company's value, stated: "This attempt at reifying intangibles through the development of hard IC measures has resulted in a failure of IC to penetrate to the lower echelons of the organisation. Although employees hear about IC, communication is one-way. The lesson for organisations is not to blindly implement "frameworks" or "guidelines" that seek to measure and control IC as if it were any other asset (or liability). Organisations wishing to develop IC may benefit from considering how the development IC fits with the strategic intent of the organization".

Moreover, as widely discussed in literature, reducing the IC reporting to a mere measurement operation, necessarily entails the exclusion from its management and its mobilization of a number of corporate members, limiting the involvement only to those actors such as accountants, managers and IC experts who, by virtue of their specific competences, understand the meaning of management accounting and IC (Dumay, 2008; Dumay and Rooney, 2011; Dumay and Roslender, 2013).

As argued by Dumay and Roslender (2013, p. 252) "Because of the continuing accountingisation of IC those not educated in IC and its measurement are marginalised and organizational actors without accounting knowledge, are unable to understand the numbers and ontology of IC". Instead, the narrative IC disclosure rather than IC quantitative measurement, allows greater involvement of all members at different levels of the organization in the IC mobilization process and allows a better communication to external stakeholders of how IC elements contribute to the firm's value creation and how they are managed. Further, in organizational change processes, the narrative IC disclosure, can result very useful in order to understand the IC relevance and the reasons behind the IC use and management, by favouring further IC management action and organizational changes IC

based as well as the communication to the external environment of their implementation (Dumay, 2008; Dumay and Rooney, 2011).

So, a key point to underline is that, if from an internal management point of view, as mentioned before, the IC quantitative-based reporting frameworks (e.g. Skandia; IAM) could have a potential usefulness, from the point of view of external communication to investors and stakeholders involved in firms' value creation process, they are found to be of little use since the complexity and the difficulties occurred in interpreting some indicators. The inability in providing useful, timely and understandable information to investors and stakeholders about IC and the interactions between intangible assets and the value creation process has been another of the main causes of failure of contemporary IC reporting framework. (Dumay, 2009, 2016).

#### 4.3 *The Second wave of IC reporting frameworks*

At this point, it is interesting to mention two projects of European relevance that represented "a second wave in IC reporting frameworks" (Nielsen et al., 2017, p. 42).

These projects, were developed between 1998 and 2002, in an attempt to overcome the above mentioned limitations of the IC reporting and measurement frameworks developed up to that point (e.g. Skandia Navigator and Intangible Asset Monitor) and which represent the first wave of IC frameworks, they are: the MERITUM (measuring intangibles to understand and improve innovation management) project and the Danish project for guidelines for Intellectual Capital statements. Both the projects, representing a bridge between academics and professionals, were born as a response to the proliferation of IC measurement frameworks and models that, due to the many limitations, have been poorly accepted and implemented among companies. They have been developed with the main aim to create guidelines to manage and disclose the intangibles in order to reduce the information asymmetries and improve the decision making of investors and stakeholders, by proposing a more narrative-based disclosure approach to make sense of the indicators and numbers related to IC (Brennan and Connell, 2000; Petty and Guthrie, 2000; MERITUM project, 2002; Bukh and Johanson, 2003; Schaper, 2016).

The MERITUM project, started in November 1998, have involved six European countries (Finland, France, Denmark, Norway, Spain and Sweden) and at least 40 researchers from nine different universities<sup>73</sup> and research organisations which have participated in this research. The project has continued for 30 months. By following the main intention to

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<sup>73</sup> Copenhagen Business School; The Research Institute of the Finnish Economy, The Swedish School of Economics and Business Administration; Groupe HEC, Paris; Norwegian School of Management; Autonomous University of Madrid, and Stockholm University.

produce useful guidelines for the disclosure of intangible assets, it has been articulated into four main areas of activity: 1) the establishment of a classification scheme for intangibles in which they are classified into *human, structural* and *relational* capital<sup>74</sup>; 2) the analysis of the different management and information-disclosure practices for intangibles developed among European firms in order to find the best practices which can serve as a guide for newcomers becoming increasingly aware of the relevance of intangible assets, and realizing that their disclosure might considerably influence their market performance; 3) the analysis of the relationship between the intangibles and the financial markets, through econometric models, which has demonstrated how R&D and qualitative human resources were related to the value of the companies; 4) the proposal of guidelines for managing<sup>75</sup> and reporting on intangibles which were subject to several Delphi steps including representatives from European firms, policy-makers, standard setting bodies, accounting and auditing firms, labour organisations, etc. which felt the guidelines to be complete, useful and feasible even if still needed to be further developed. Finally, the project proposes a model of IC report as logical conclusion of the Intellectual Capital Management process, in which the firm communicates to stakeholders how has developed and managed its intangible resources and how they have contributed to the value creation. The IC report model proposed has to contain three sections: a) *a vision of the firm* (which describes in a narrative form the firm's main objectives and strategy and the key drivers to reach those objectives; b) *a summary of intangible resources and activities* (which describes the intangible resources controlled by the firm and the different activities undertaken to improve the value of those resources; c) *a system of indicators* financial and non-financial for the intangible resources and activities, referred to the three categories of Intellectual capital (human, structural and relational capital), having the purpose to allow to stakeholders to assess how well the company is fulfilling its objectives as well as to evaluate correctly the firm's future expected earnings

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<sup>74</sup> Very interesting is also the second proposed classification of intangibles which embraces a static and a dynamic view of the intangibles within the company, distinguishing between: *Intangible resources* (static notion) which are the stock or current value of a given intangible at a certain moment in time. They may or may not be expressed in financial terms and *Intangible activities* (dynamic notion) which imply an allocation of resources aimed at: a) developing internally or acquiring new intangible resources, b) increasing the value of existing ones, or c) evaluating and monitoring the results of the former two activities (MERITUM project "guidelines for managing and reporting on intangibles (intellectual capital report)", 2002, p. 12).

<sup>75</sup> Regarding the development of the Intellectual Capital Management systems, the MERITUM project proposes three non-linear and related phases: 1. *Identification of intangibles* (which requires the identification of firm's strategic objectives together with the identification of the related intangible resources and the definition of the activities which are likely to affect those resources and that allow an adequate monitoring and follow-up of all the intangible activities and their impact on crucial intangibles resources; 2. *Measurement* (which requires the definition of specific indicators that serve as a proxy measure for each intangible and which have certain characteristics: comparability, reliability, objectivity, truthfulness, verifiability and feasibility; 3. *Action* (which is based on the consolidation of the intangibles management system and its integration within the firm's management routines. It can be considered as the recognition of a learning process that acts parallel with the previous phases (MERITUM project "guidelines for managing and reporting on intangibles (intellectual capital report)", 2002, pp. 14-22).

and risk (Brennan and Connell, 2000; Petty and Guthrie, 2000; MERITUM project, 2002; Bukh and Johanson, 2003).

The Danish project for guidelines for Intellectual Capital statements is a project which was launched in Denmark and that was articulated in two separate phases during the years 1997-2002. It had the main aim of providing guidelines for the IC disclosure and therefore for the drafting of an IC statement more narrative disclosure-based and more focused on the external communication than on internal management (DATI, 2000; Mouritsen et al., 2001, 2003; Bukh et al., 2001; Schaper, 2016). It represents one of the government's initiatives to support the transition of Danish firms from the industrial society to the knowledge society (Bukh and Johanson, 2003). The first project was initiated by the Danish Agency for Trade and Industry (DATI) in collaboration with researchers (under the guidance of Professors Jan Mouritsen and Per Nikolaj Bukh) and consultants as well as 17 companies (all but two of the firms participating in the project are service companies, and half of them operate in the IT business). The involved companies were selected to develop two sets of ICS each over a two-year period. This first project resulted in the first publication: *A Guideline for Intellectual Capital Statements – A Key to Knowledge Management* (DATI, 2000; Bukh et al., 2001) proposing a first version of Danish guidelines (Bukh and Johanson, 2003; Schaper, 2016; Nielsen et al., 2017). The second project was organized by the Danish Ministry for Science, Technology, and Innovation (DMSTI) and have involved a team of 13 researchers, again guided by Mouritsen and Bukh, assisted by a number of student workers. In this second step, the guidelines developed during the first project (DATI, 2000) have been tested by around 100 Danish companies including both public and private sector organization of all sizes, with the resulting publication of a revised guideline, based on this experience, which was published in Danish in December 2002 and later translated into English (DMSTI, 2003) (Bukh and Johanson, 2003; Nielsen et al., 2017). The framework offered by Danish Guidelines is focused on knowledge resources<sup>76</sup> and on their management. The particular taxonomy envisaged in the framework distinguishes between 4 types of knowledge resources on which a company's knowledge management is focused: *employees*; *customers*; *processes* and *technologies*<sup>77</sup>. According to the Danish guideline for IC statements (DMSTI,

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<sup>76</sup> "Knowledge is, however, an 'intangible' which is a major challenge when it comes to accounting for it. You cannot see knowledge and it cannot be described, changed, developed or evaluated. It first must be 'translated' into knowledge resources, which it is possible to point to and say 'that is knowledge'. Knowledge resources can be described, developed, evaluated and combined in new ways. In short, they can be managed, which means they can be described in an intellectual capital statement" (DMSTI, 2003, p.11).

<sup>77</sup> "*Employees* include employees' skills and personal competencies, experience, the combination of different types of employees and educations, employees' motivation, commitment, willingness to adapt etc.; *Customers* include customer mix, relations to customers and users, their satisfaction and loyalty, their referral of the company, insight into users' and customers' needs and the degree of co-operation with customers and users in product and process development etc.; *Processes* relate to the knowledge content embedded in the company's stable procedures and

2003, p. 12), the intellectual capital statement is composed of four elements which together represent the firm's knowledge management. The four elements allow to relate users of the company's goods or services with the company's need for knowledge resources. They comprise the consolidation of the need for knowledge management, several initiatives to enhance knowledge management and a battery of indicators to define, measure and following up initiatives. These elements are interrelated and must be read and interpreted together, in their context of pertinence. They do not represent formal constraints but the dimensions along which the report should be developed (Mouritsen et al., 2001; Nielsen et al., 2017).

The first element is: a *knowledge narrative* which represents the dimension in which the company portrays his identity and describes how it utilizes its knowledge resources to increase the value created for its customers (value in use). Substantially, the *knowledge narrative* shows which types of knowledge resources are needed to create the use value the firm wants to supply<sup>78</sup>. The second element are the (knowledge) *management challenges* which represent a set of challenges, that the company has to face to develop the existing knowledge resources or to acquire new knowledge resources from external sources. These management challenges are closely linked to the *knowledge narrative* and therefore to the individual knowledge resources identified within the company to improve the value in use<sup>79</sup>. The third element are a set of *initiatives* which could be implemented to face the *management challenges*. They are activities related to how to compose, develop and procure the necessary knowledge resources and how to monitor their extent and effects<sup>80</sup>. The fourth element are a set of *indicators* that allow to check the status of implementation of the *initiatives* and the state of development of the *management challenges*. This set of *Indicators* allow to make initiatives visible by making them measurable<sup>81</sup> (Mouritsen et al., 2001; DMSTI, 2003; Nielsen et al., 2017).

So, in summary, the Danish project for guidelines for Intellectual Capital statements, represents an evolution compared to the previous IC reporting framework models (e.g.

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routines. These can be the company's innovation processes and quality procedures, management and control processes and mechanisms for handling information; *Technologies* refer to the technological support of the other three knowledge resources. Focus is usually on the company's IT systems (software and hardware) such as the intranet, IT intensity, IT competencies and IT usage" (DMSTI, 2003, p.11).

<sup>78</sup> The questions that must be answered in the *knowledge narrative* dimension are: "What product or service does the company provide? What makes a difference for the consumer? What knowledge resources are necessary to be able to supply the product or service? What is the relationship between value and knowledge resources?" (DMSTI, 2003, p.12).

<sup>79</sup> The questions that must be answered in the *management challenges* dimension are: "Which existing knowledge resources should be strengthened? What new knowledge resources are needed? (DMSTI, 2003, p.12).

<sup>80</sup> The questions that must be answered in the *initiatives* dimension are: "What initiatives can be launched? What initiatives should be prioritised? (DMSTI, 2003, p.12).

<sup>81</sup> The questions that must be answered in the *indicators* dimension are: "Which indicators can each initiative have? Indicators can measure: effect; activities and resource mix (DMSTI, 2003, p.13).

Skandia Navigator, Intangible Asset Monitor, Balanced Scorecard), because it is a more narrative-based report which describes how knowledge resources contribute to the value creation process. In Danish guidelines, the external perspective prevails over the internal one. Indeed, the importance of numbers and indicators is subordinated to the narrative description, in an attempt to foster understanding of the firm's activities and processes by a wide range of stakeholders (Schaper, 2016; Nielsen et al., 2017).

Notwithstanding the different premises and the different approaches followed by MERITUM project and the Danish guidelines project, also these IC reporting frameworks which were not compulsory, after the trial period, were abandoned because of the resistance of managers who perceived these reports as unhelpful, complex to implement and detrimental in terms of loss of competitive advantage and because of internal changes to implement into the organization unwelcome to employees (Dumay, 2009, 2016; Schaper, 2016; Nielsen et al., 2017; Schaper et al., 2017).

Thus, the problem of the IC reporting has remained and has continued to attract the interest of many scholars who, in last decades, have carried out numerous empirical researches by highlighting, the relevance and the necessity of IC disclosure as fundamental vehicle to improve transparency and accountability towards stakeholders.

#### 4.4 *The relevance of IC disclosure*

Several scholars (Brennan and Connell, 2000; Petty and Guthrie, 2000; Holland, 2001; Williams, 2001; Bontis, 2003; Bozzolan et al., 2003, 2006; Abeysekera and Guthrie, 2005; Abdolmohammadi, 2005; Bukh et al., 2005; Petty and Cuganesan, 2005; Guthrie et al., 2006; Oliveira et al., 2006; Abeysekera; 2007, 2008, 2010; Cerbioni and Parbonetti, 2007; Dumay and Tull, 2007; White et al., 2007; Kamath, 2008; Li et al., 2008; Sonnier et al., 2008; Striukova et al., 2008; Whiting and Miller, 2008; Bruggen et al., 2009; Cormier et al., 2009; Yi and Davey, 2010; Taliyang et al., 2011; Hidalgo et al., 2011; Nurunnabi et al., 2011; Lal Bhasin, 2012; Nazli and Ghazali, 2013; Abhayawansa and Guthrie, 2016; Dumay, 2016; Garanina and Dumay, 2017; Dumay and Guthrie, 2017), by taking, mainly, an external perspective of communication with stakeholders and using some theories as support<sup>82</sup>, have, in their studies, underlined several benefits related to the IC disclosure: the *information asymmetry* reduction between internal managers and shareholders and stakeholders as well as between large shareholders and small shareholders as a result of a

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<sup>82</sup> The theoretical framework most utilized to explain the reasons behind voluntary IC disclosure includes mainly four theories: agency theory, stakeholder theory, signalling theory, and legitimacy theory (see An et al., 2011). This point, with particular regard to the public sector and the university context, will be discussed in depth in the chapter on empirical research.

better access to relevant information, IC-based; the firm' managers *opportunistic behaviour* and *insider trading* problem mitigation as a consequence of the publication of those IC information which usually remain private, held by internal managers; the *equity cost* reduction and *stock market* liquidity enhancement as a result of the investors' uncertainty reduction about firm' risks and future prospects IC based; the *market evaluation* improvement and *shares price volatility* reduction as a direct consequence of the facilitation of firms assessment and valuation process which can benefit of non-financial disclosure on firms critical success factors<sup>83</sup> (IC elements).

So, by starting from the awareness of the failure of several projects concerning the draft of specific companies report for the IC disclosure, whose causes have been widely above analysed, these authors, by focusing in particular on the *voluntary* IC disclosure, have conducted empirical research in different geographical contexts, by analysing, several potential information sources: annual reports, IPO prospectuses, management commentaries, analysts' reports, websites etc. In order to find the best information source or sources for IC disclosure and in some cases its determinants.

Among IC scholars, Dumay (2016, p. 178), aware of the need to provide useful and reliable information on intellectual capital to investors and stakeholders, has made a very important distinction, subsequently proposed by other authors (Dumay and Guthrie, 2017; Lardo et al., 2017; Pisano et al., 2017; Schaper et al., 2017), between the reporting and disclosure. Disclosure is: "the revelation of information that was previously secret or unknown", while reporting is a "detailed periodic account of a company's activities, financial condition, and prospects that is made available to shareholders and investors". Consequently, Dumay claimed that: "investors are always looking for more timely and relevant information, especially if "previously secret or unknown". In the same vein, Schaper et al. (2017, p. 83) by replacing the definitions coined by Dumay (2016), have defined the disclosure as "the act of releasing or revealing all relevant information, new or secret, pertaining to a company that may influence an investment decision" and the reporting as "the process of producing statements that communicate an organisation's financial status to management, investors, and the government for a certain period". Therefore, the above cited authors by proclaiming somehow the failure of IC reporting, considered excessively restrictive, static, complex and less useful to investors and markets, at the same time emphasized the usefulness and the relevance of the voluntary IC disclosure provided through different communication means through which it is also possible to extend the

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<sup>83</sup> On this subject are worth mentioning the interesting empirical studies conducted by Villalonga, 2003; Abdolmohammadi, 2005; Dumay and Tull, 2007; Garanina and Dumay, 2017.

boundaries of IC disclosure by creating useful links with other firm's dimension: internal, such as internal strategies, objectives and ethical issues and external, such as environmental and sustainability issues.

Thus, according to several scholars (Zéghal and Maaloul, 2011; Dumay, 2016; Dumay and Guthrie, 2017; Garanina and Dumay, 2017; Lardo et al., 2017; Pisano et al., 2017; Schaper et al., 2017), the emerging solution for companies is to exploit and combine the different communication means available (emerging new communication channels such as web, as well as periodic and institutionalized documents such as annual report) in order to provide timely, reliable and useful IC information to investors, stakeholders and markets, by making appropriate connections with the whole process of value creation.

According to Schaper et al. (2017, p. 95) "Focussing on disclosure rather than reporting would arguably result in more relevant, higher-quality information that, through the several existing communication channels, could further be directly targeted to an audience. Additionally, this would reduce the information overload that analysts and investors regularly claim to be facing".

In this sense it is worth to cite the World Intellectual Capital/Assets Initiative (WICI) launched by a global network formed in October 2007 and composed by organizations representing companies, analysts, investors, practitioners and academics who collaborate to promote a better corporate reporting by attributing to the intangibles<sup>84</sup>/IC elements a key role in the sustainability of an organization's value generation (WICI, 2016). In September 2016, after a period of consultation of the draft submitted in December 2015 and the resulting changes, the first framework was published to support companies in preparing their report. The general purpose of the WICI framework is to "establish guiding principles and content elements for the reporting of intangible resources which are material for an organization's value creation process and its communication to stakeholders, from the perspective of showing the sustainability of the business over time" (WICI, 2016, p. 1). The relevant aspects which represent a point of break with the initiatives developed in the past (e.g. Skandia Navigator, Intangible Asset monitor, Danish Guidelines, etc.), of which in this chapter have been extensively highlighted the criticalities and the limits that did not allow a satisfactory dissemination among enterprises, are several: firstly, the WICI framework assume an external communication perspective rather than an internal management,

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<sup>84</sup> WICI defines intangibles as: "Non-physical resources that generate value to the organization in the short, medium and long term". WICI also distinguishes between: Intangible Assets and Intangible Liabilities. The Intangible asset: "are the drivers of long-term competitive differentiation and advantage. They derive from strategic utilization (including combination) of intangible that is conducive to an organization's sustainable business value and/or sustainable future stream of cash flows". The intangible liabilities are "Intangibles that may have substantive negative impact on the organizational business and/or financial value. Intangible liabilities are often linked to specific risks of the organizations" (WICI, 2016, pp. 11-12).

“reporting and communication on intangibles are intended to provide useful information for decision making, and in particular resource allocation decision, to investors, creditors, analysts, as well as the organization’s management. These are expected to be the primary information users” (WICI, 2016, p.1). Secondly, unlike previous failed IC framework initiatives, WICI framework does not require the draft of a new specific IC report in addition to existing reports, but provide a guidance to improve the disclosure of intangibles which can be provided through different tools. Thirdly, WICI framework expands the boundaries of IC disclosure by requiring a multi-dimensional disclosure encompassing four aspects: 1) the value creation mechanism which is unique to the organization and sustainable into the future, 2) the specific strategic assets, including the intangible assets that are key factors of the value creation mechanism, 3) the organization’s own perspective concerning risks and opportunities for the future, and 4) the strategy for the future business, including how it will utilize those strategic assets based on its perspective (WICI, 2016, p. 5). Finally, WICI frameworks does not focus on a completely narrative-based approach or on a completely quantitative-based approach. It proposes the use of different types of information (qualitative (narrative), quantitative, financially and non-financial) about the past, present and future value creation process of an organization with appropriate references to the strategy, the resources (especially of intangible nature), the governance and the organizational model (WICI, 2016, p. 5). In particular, it requires, as far as possible, the integration between narrative information and quantitative information represented by lagging and leading indicators (KPIs)<sup>85</sup>.

Closely related to the WICI<sup>86</sup>, is the Integrated Reporting initiative<sup>87</sup> (King III, 2009; IIRC, 2013; King IV, 2016) which emphasizes the concept of multi-dimensional disclosure embracing all aspects influencing the overall firm’s value creation process. As reported in the framework developed by the International Integrated Reporting Council (IIRC)<sup>88</sup> in 2013, the Integrated Reporting (IR) is a synthetic communication that illustrates how

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<sup>85</sup> KPIs are “numerical figures (metrics) related to critical/material factors of value creation and which should provide objective evidence of performance trends by tracking them over time” (WICI, 2016, p.20).

<sup>86</sup> The WICI framework (2016) was developed later than that of the Integrated Reporting (2013). However, between the two there are several common elements that are witnessed by the graph and the appendix present in the WICI framework which highlight the elements of commonality and differentiation between the two frameworks (Manes Rossi et al., 2017, in publication). Furthermore, WICI has signed a formal agreement with the International Integrated Reporting Council (IIRC) in which both parties agree to work together to develop and promote the Integrated Reporting Framework and other business reporting frameworks, guidelines and standards that can be aligned to strengthen corporate reporting with a focus on value creation (WICI, 2016).

<sup>87</sup> For a detailed and comprehensive discussion on the integrated reporting, please refer to Eccles and Kruz (2010); de Villiers et al. (2014); Katsikas et al. (2016).

<sup>88</sup> The International Integrated Reporting Council (IIRC) is a global entity, consisting of regulatory bodies, investors, companies, regulatory bodies, professionals working in the field of accounting and NGOs. All members of the body agree on the conviction that the communication about value creation has to be the next step in the evolution of company reporting (IIRC, 2013).

strategy, governance, the performance and the perspectives of an organization allow to create value in the short, medium, and long period in the context in which it operates (IIRC, 2013). The IR is voluntary and not mandatory document (with the exception of South Africa where Companies listed on the Johannesburg Stock Exchange are required to adopt IR, using the South African IR framework for its preparation) issued by the IIRC in an effort to promote, on an international scale, a more coherent and efficient approach to business reporting (de Villiers et al., 2014). The main objective of the IR is to improve the quality of information transmitted to capital providers by improving efficiency and productivity in capital allocation (IIRC, 2013 p. 4). Therefore, IR has to demonstrate to financial capital providers how an organization can create value over time. It also provides feedback to all stakeholders interested in the ability of an organization in creating value over time, such as employees, customers, suppliers, business partners, local communities, legislators, regulators and responsible for political decisions (IIRC, 2013, p. 8).

Unlike the WICI, the IR is not just focused only on the disclosure of intangible assets but it proposes a holistic view of the company based on the disclosure of six key elements, defined as capital, which could affect the firm's value creation (Manes Rossi et al., 2017, *in publication*). In the IR framework view, these capitals (Financial, Manufactured, Intellectual, Human, Social & Relationship and Natural) are related to the internal dimension as well as to the external dimension of the company and are at the centre of the general value creation process, where they represent, at the same time, the inputs and outputs and whose consistency changes as a result of the organization's activities, the chosen business models, the risks and opportunities faced, the chosen strategies, and the performance achieved (IIRC, 2013; Haller and van Staden, 2014).

Many IC authors (Beattie and Smith, 2013; Dumay, 2016; Dumay and Guthrie, 2017; Garanina and Dumay, 2017; Nielsen et al., 2017) have emphasized the integrated reporting relevance in an intellectual capital key by highlighting how the IR can represent a useful vehicle in order to disclose IC information to a wide range of stakeholders. In particular, Beattie and Smith (2013) have underlined how the IR can overcome the limitations of the previous IC reporting framework models, not widely adopted in practice, by offering a more comprehensive IC disclosure, integrated with the disclosure of the key elements of value creation such as business model, strategies, resources capabilities, business environment and so on. Moreover, Dumay (2016, p. 175) has pointed out that "IC wealth-creation myth believers are heartened because the IRW framework includes six capitals. When you take away the physical capitals of financial, manufactured and natural capital, the remaining

three intangible capitals broadly align with IC’s three capitals: human capital with human capital; social and relational capital with relational capital; and IC with structural capital”.

Thus, at the end of this chapter, it is possible to affirm that, in recent decades, there has been a growing awareness among academics and practitioners about the potential and the relevance of Intellectual Capital, as a set of intangible resources which represent key drivers for the value creation in all types of organization. At the same time, there has emerged a growing need to develop appropriate intellectual capital management and reporting tools as a response to the inadequacy of traditional accounting systems in recognizing and representing such resources. Indeed, in the same years, among investors and stakeholders, has dramatically increased the need to gather useful and reliable information about IC resources, in order to carry out more accurate and significant estimates about firms’ value, thus improving the decision making process and the resource allocation decisions.

However, the first attempts to develop IC measurement and reporting models have progressively failed and these models, due to the various limitations above discussed, have not been sufficiently disseminated. Indeed, it seems that a singular and specific corporate IC reporting model has been perceived as useless both by external investors and by internal managers.

Thus, progressively, the focus is shifted towards the voluntary disclosure of intellectual capital, provided through different communication means, as a response to the general absence of IC compulsory reports caused by the diffusion and acceptance difficulties encountered by previous IC reporting frameworks models.

So, many authors, through theoretical and empirical research, have highlighted the benefits of IC voluntary disclosure for both companies that provide it and investors or external stakeholders who use it to obtain useful information. In particular, in addition to annual reports, new communication tools such as the websites seem to be very useful vehicles in order to disseminate IC information, due to the possibility to provide timely and reliable information to stakeholders. In addition, strong impetus has arisen from the development of new reporting frameworks such as WICI and integrated reporting. In particular, the latter, seems to have opened the doors to a transition into a new and integrated disclosure type including IC contents.

Table 1 and Table 2 offer a schematic summary of the main definitions coined for IC and the main frameworks developed and used to identify the IC components.

**Table 1.**  
Summary of the main definitions coined for the Intellectual Capital

Year	Author	IC Definition
1996	Edvinsson and Sullivan	The knowledge that can be converted into value.

1996	Brooking	Intellectual capital is the term given to the combined intangible assets which enable the company to function.
1997	Edvinsson and Malone	The possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a company with a competitive edge in the market.
1997	Stewart	The intellectual material – knowledge, information, intellectual property, experience that can be put to use to create wealth.
1998	Prusak	The intellectual resources that have been formalized, captured and leveraged to create assets of higher value.
1998	Society of Management Accountants of Canada	Those knowledge based items that a company owns, which will produce a future stream of benefits for the company. They can include technology, management and consulting processes and patented intellectual capital.
1998	Roos et al.	IC includes all the processes and the assets which are not normally shown on the balance sheet and all the intangible assets (trademarks, patents and brands) which modern accounting methods consider. It includes the sum of the knowledge of its members and the practical translation of their knowledge.
1998	Bontis	Intellectual capital is therefore the pursuit of effective use of knowledge as opposed to information.
2001	Lev	Sources of future benefits (value), which are generated by innovation, unique organizational designs, or human resource practices.
2001	Johanson and Skoog	Intellectual Capital could be said to be the way in which different intangibles and tangible resources interact to produce an organization's output.
2001	Chartered Institute of Management Accountants	The possession of knowledge and experience, professional knowledge and skill, good relationships, and technological capacities, which when applied will give organizations competitive advantage.
2001	Marr and Schiuma	IC is composed of all knowledge-based assets, distinguished between organizational actors (relationships) and infrastructure (virtual and physical).
2006	European Commission	The combination of intangible resources and activities that allows an organization to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value.
2007	Kok	It may be said that intellectual capital deals with articular, reasonable, knowledgeable and substantial fruits of the mind. It claims intangible (tacit) and tangible (explicit) dimensions, which do not mutually exclude, but actually complement each other. The conversion of knowledge into a valuable asset has come to be known as an intellectual asset or intellectual capital.
2008	Striukova et al.	The intellectual, or knowledge-based, resources of an organisation. It encompasses both resources that exist at a particular point in time (a stock of IC) and the more fluid way these resources are used and interact with other resources (both intellectual and physical) to further the organisation's goals (a flow concept).
2015	Khalique et al.	A combination of intangible assets or resources, such as knowledge, know-how, professional skills and expertise, customer relationships, information, databases, organizational structures, innovations, social values, faith, and honesty. These can be used to create organizational value and provide a competitive edge to an organization
2016	Dumay	[IC] is the sum of everything 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 [value].
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**Table 2.**

Evolution of the main frameworks developed for IC reporting

Year	Developers	Framework	Classification
1992	Kaplan and Norton	<i>The balanced scorecard</i>	Financial perspective; Customer perspective; Internal business process perspective; Learning and Growth perspective.
1997	Edvinsson and Malone	<i>The Skandia Navigator</i>	Human Capital; Structural Capital.
1997	Sveiby	<i>The Intangible Assets Monitor</i>	Internal Structure; External Structure; Employee Competence.
2001	MERITUM	<i>The MERITUM project</i>	Human Capital; Structural Capital; Relational Capital.
1997 – 2002	Danish Agency for Trade and Industry; Danish Ministry for Science, Technology, and Innovation; researchers; consultants	<i>The Danish project for guidelines for Intellectual Capital statements</i>	Employees; Customers; Processes; Technology.
2011 – 2013	International Integrated Reporting Council	<i>International Integrated Reporting framework - IIRF</i>	Financial Capital; Manufactured Capital; Intellectual Capital: Human Capital; Social & Relationship Capital; Natural Capital.
2016	Various organizations, analysts, investors, practitioners and academics	<i>World Intellectual Capital/Assets Initiative framework - WICI</i>	Human Capital; Organisational Capital; Relational Capital.

# THE INTELLECTUAL CAPITAL IN PUBLIC SECTOR: THE CENTRAL ROLE OF UNIVERSITIES

**SUMMARY: 1. The IC phenomenon in the public sector: main features and theoretical background - 2. The Intellectual Capital in Universities: the evolution of Higher Education systems and the relevance of IC disclosure. - 3. Intellectual Reporting in Universities: European experiences and studies.**

## 1. The IC phenomenon in the public sector: main features and theoretical background

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### 1.1 *The IC phenomenon in public sector*

The IC phenomenon, initially penetrated only in the private sector, has become over the years very relevant also in the public sector (Wall, 2005; Sanchez and Elena, 2006; Kong and Prior, 2008; Bezhani, 2010; Massingham and Tam, 2015). According to Serrano-Cinca et al. (2003, p. 250) “intangibility is even more present in the public sector than in private enterprises”. As a result, as well as for private sector companies, also for public sector organisations “knowledge and intangible values become the main source of competitive advantage” (Ramirez, 2010, p. 248).

Indeed, public sector entities are characterized by a high degree of intangibility which permeates goals, production processes and input. Unlike private sector companies whose main objectives are earnings and market value, public organisations tend to have several objectives of a non-financial nature fundamentally linked to the value creation for citizens community through the intangible services provision<sup>89</sup>. According to Bronzetti and Sicoli (2011, p. 89), public organisations create value by pursuing the production of both wealth and public welfare. These entities create value when they are able to reach the public objectives (effectiveness) by utilizing a limited number of resource available, avoiding any environmental damage.

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<sup>89</sup> In the IC context Bossi et al. (2005) have identified specific characteristics that define the public sector in relation to the private sector: *a)* less incentive to implement new management tools, due to a non-competitive environment; *b)* intangibles objectives are less related with the market value and earnings; *c)* more importance given to social and environmental responsibility; *d)* basically public sector entities provide services intangible based; *e)* the most relevant resources used by public sector organizations are intangibles – knowledge and human resources; *f)* inflexible management procedures and rigid structures – the bureaucratic model does not foster new approaches; *g)* less need to make quantitative estimations; *h)* increase in external demand for greater accountability and transparency in the use of public funds.

In order to achieve these objectives, public sector entities make an intensive use of intangible assets such as human resources, skills, competences and knowledge and so on to the point that they are considered as “an ideal framework” for the application of the ideas related to IC theory (Serrano-Cinca et al., 2003; Wall, 2005; Sanchez and Elena, 2006; Bezhani, 2010; Ramirez, 2010; Cohen and Vlismas, 2013; Manes Rossi et al., 2016; Secundo et al., 2016).

Therefore, according to Del Bello (2006, p. 441) “public organisations are not only largely built on intangibles, such as skills, competences, procedures and information systems, but they also tend to generate intangibles of a “collective” nature with their actions (e.g. public welfare, quality of life, protection of the environment, reputation of a territory). In this sense, public sector entities can be seen as catalysts, generators and managers not only of resources explicitly classified as intangible (human, relational and organisational capital), but also of social and environmental capital, even though the management literature does not explicitly classify in general social and environmental capital as intangible resources”.

## 1.2 *The New Public Management wave*

The IC phenomenon in the public sector must be framed in a wider and more complex scenario characterized by reforms and developments which have dramatically altered the public sector morphology since the early 1980s, involving in particular the internal managerial aspects and those external of reporting and accounting.

This intensive reform trend which, in many OECD countries, with different degrees of penetration, has changed the public sector managerial styles and reporting systems at all levels (from central to local governments, from the healthcare to the university sector) is known under the umbrella term of New Public Management (NPM)<sup>90</sup> and represents, basically, a concrete attempt to modernize the public sector in searching of greater efficiency and effectiveness through the import of private sector management principles and models as well as accounting systems (Mouritsen et al., 2005; Almqvist and Skoog, 2007; Ramirez, 2010).

The NPM is defined as “an influential set of management techniques drawing on private sector performance criteria and practices. It has been widely deployed by governments seeking to modernize and transform their public sectors, and has achieved global significance” (Lapsley, 2009, p. 1). According to Hood (1995, p. 94) “The term NPM was

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<sup>90</sup> “The term “new” does not imply that NPM doctrines appeared for the first time in the 1980s (any more than the “New Learning” of the fifteenth and sixteenth centuries involved the first discovery of Latin and Greek). Many NPM doctrines repackaged ideas which have been in public administration since its earliest beginnings. Nor must NPM be confused with the “New Public Administration” movement in the U.S.A. in the late 1960s and early 1970s. which achieved no real mainstream influence” (Hood, 1995, p.94).

coined because some generic label seemed to be needed for a general, though certainly not universal, shift in public management styles”.

More specifically, NPM wave represents a response to the two old fundamental accountability paradigms of the so called “progressive public administration - PPA”<sup>91</sup> identifiable in two basic management doctrines: (a) the clear distinction of the public sector from the private sector in terms of methods of doing business, organizational design, rewards, career structures, and so on; and (b) the use of strict rules and procedures to limit the discretionary power of politicians and managers by reducing the risk of corruption and favouritism (Dunleavy and Hood, 1994; Hood, 1995; Lapsley and Pallott, 2000; Almqvist and Skoog, 2007).

Indeed, as a response, NPM introduces a new concept of public accountability<sup>92</sup> and a new approach to trust and distrust relationships in social and economic transactions.

In particular, by overcoming the paradigms of the old-style public administration, NPM proposes a different style of “accountingization”<sup>93</sup>, reducing the differences between the public and private sector and shifting the focus from process accountability<sup>94</sup> (in the form of rules and procedures) towards results and outcomes accountability (Hood, 1995; Lapsley and Pallott, 2000; Almqvist and Skoog, 2007).

In this new NPM scenario, the accounting becomes the pivotal element of accountability<sup>95</sup> by reflecting high trust in the market and private business methods, and low trust in public servants and the traditional professionals whose activities now have to be strictly assessed through specific accounting and management techniques (Almqvist and Skoog, 2007).

The need for this change in public sector has deep economic and political roots which can be tracked in: the progressive globalization of markets and consumption, which has also hit the public sector; the global financial crisis; the loss of trust in politicians; the emergence of new economic policies enacted by Reagan and Thatcher; the fiscal stress; the transition towards the knowledge economy; the poor macroeconomic performance and finally the

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<sup>91</sup> “The style of public administration that emerged in the “progressive era” of the late nineteenth and early twentieth centuries” (Hood, 1995, p. 93).

<sup>92</sup> On the concept of public accountability see also Perks (1993); Coy et al. (2001) and Coy and Dixon (2004). Generally, the accountability is defined as the duty, the responsibility or the obligation for a party to account for another party through reporting or other tools about a wide range of information which can comprise condition, performance, activities and progress of the public sector entity.

<sup>93</sup> A term coined by Power and Laughlin, 1992 which means the introduction of more explicit cost categorization into areas where costs were previously aggregated or undefined (Almqvist and Skoog, 2007, p. 104).

<sup>94</sup> Part of the literature argues that the NPM represents only a transitional stage in the evolution from traditional Public Administration (PA) to the so called the New Public Governance (NPG) which is considered as a new paradigm which unlike NPM place much more attention on inter-organizational relationships and the governance of processes, and which emphasises service effectiveness and outcomes rather than service inputs and outputs (Kickert, 1996; Rhodes, 1997; Osborne, 2006).

<sup>95</sup> “An increasingly notable element of the New Public Management movement is the seemingly endless list of accounting-based techniques that are being drawn on in the pursuit of reform” (Olson, 1998, p.18).

government overload (Hood, 1995; Ferlie, 1996; Lapsley, 2009; Pollitt and Bouckaert, 2011). Moreover, also theoretical roots deserve particular attention: *public choice theory*; *transactions cost theory* and *agency theory*. The *public choice theory* presupposes that actors in the political sphere do not aspire to promote the common good, but are guided by the goal of maximizing individual utility. So, this theory has been applied in an attempt to mitigate the role of government, decouple policy advice and regulation from policy implementation, improve transparency of state transfers and political interventions, and make all services as questionable as possible (Boston et al., 1996; Lapsley and Pallott, 2000; Christensen and Laegreid, 2001; Osborne, 2006). The *transactions cost theory* considers transaction costs as those costs, quantifiable or not, that arise when the "hypothesis" of an exchange is born and indicates both the costs which emerge from the efforts of the contractors to reach an agreement, and - once the agreement has been reached - the costs that arise in order to comply with what has been established. These costs arise fundamentally from the information asymmetry and opportunism between contracting parties. In this regard, this theory proposes as a solution the selection of those public governance structures which minimize their aggregate production and transaction costs (Williamson, 1985; Lapsley and Pallott, 2000). Finally, the *agency theory* concerns the problem of the conflict of interests between the principal and the agent tied by a contractual relationship of subordination for which the principal commits a series of tasks to the agent. The risk depicted in this theory arises from the moral hazard behaviour of the agent who, exploiting the asymmetric information deriving from its better contractual position, tends to maximize its own interests at the expense of the principal. Typically developed in private sector companies, where the main clash of interests involves shareholders and managers, this theory has found broad affirmation in the public sector and in particular in local governments where a double conflict of interests arises. In particular, the first conflict emerges between the voters (principal) and politicians (agents) who are elected agents of the voters and tend to maximize their self-interests. Secondly, a further conflict emerges between the politicians (principal) and the managers (agent) who are selected by the politicians in order to carry out specific institutional tasks. Therefore, *agency theory* recognizes the need to develop monitoring tools as contractual relationships and improved accounting instruments in order to overcome these problems. In particular, the performance specification, reporting and monitoring activities, and the application of incentives and sanctions represent the typical *agency theory* application in the NPM movement (Jensen and Meckling, 1976; Zimmerman, 1977; Lapsley and Pallott, 2000; Christensen and Laegreid, 2001).

Although the NPM had great diffusion in some geographical areas as UK, New Zealand<sup>96</sup>, Australia, USA than in others as continental Europe, with related differences in its development, it presents seven common general “doctrinal components” (Hood, 1991, 1995; Ferlie, 1996; Lapsley and Pallott, 2000; Christensen and Laegreid, 2001; Osborne, 2006; Almqvist and Skoog, 2007; Lapsley, 2009):

1) A progressive disaggregation of public sector entities into individually managed and decentralized units for each public sector product, each identified as a separate cost centre with its identity, structure and interests, together with a more deepen delegation of resource decisions and tasks.

2) A gradual development of a competitive mechanism, grounded on more contract-based competitive provision, at different levels of the public sector and also between public sector and private sector entities as a driver to reduce costs and reach better standard contracts.

3) A strong stress on the implementation of management practices, techniques and tools imported from the private sector.

4) A decisive orientation to efficiency and rationalization in the use of resources also through the searching for alternative resources and less expensive ways to provide public services.

5) A more emphasis placed on visible and professional hands-on top management, resulting in a more active control on public entities organizations exerted by visible top managers and in a lesser involvement of the political actors in managerial activities.

6) The implementation of more explicit, formal and measurable standards and indicators of public sector entities performance and success (preferably expressed in quantitative terms).

7) A greater emphasis on output controls rather than on input controls by stressing results rather than procedures.

By summarizing, although the NPM has been also criticized and has been defined as a rather contradictory paradigm in many of its operational aspects<sup>97</sup>, it is undeniable how it has influenced the operating, managerial and accounting structure of the public sector in many states around the world. Its diffusion has different characters and dimensions depending on the cultural, political and economic background of the various geographic

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<sup>96</sup> As reported by Ferlie (1996, p. 16): “New Zealand can be seen as an extreme case and as a rapid mover, yet here new public management-style ideas were embraced by a Labour government. Between 1984 and 1990 dramatic changes were brought into the organization and management of the public sector. The stated aims behind the restructuring have been to increase the efficiency of the public sector and to improve the accountability of public services to the Executive and to Parliament, although much concern has also been expressed about the social costs”.

<sup>97</sup> See Dunleavy and Hood (1994); Pollitt et al. (2007).

areas in the world<sup>98</sup>. Indeed, in some areas it has found strong opposition and resistance, while in others it has found fertile ground, inspiring many reforms based on its principles (Dunleavy and Hood, 1994; Christensen and Lægreid, 2001; Osborne, 2006; Pollitt et al., 2007).

### 1.3 *The NPM as a rationale for IC development in Public Sector*

Understanding the NPM paradigm and principles is crucial to framing the phenomenon of intellectual capital in the public sector, as NPM represents the theoretical basis for IC development and dissemination in this sector (Mouritsen et al., 2004, 2005; Wall, 2005; Almqvist and Skoog, 2007; Kong and Prior, 2008; Ramirez, 2010; Cohen and Vlismas, 2013; Secundo et al., 2015; Manes Rossi et al., 2016).

According to Cohen and Vlismas (2013, p. 235) “New public management (NPM) provides a theoretical rationalisation for IC, as a private sector oriented metaphor, to be viewed as a new conceptual framework for public strategic management”.

In particular, the NPM has introduced new logics and principles that have increased the emphasis on competitiveness among public sector companies. In this scenario, the IC can represent a critical factor since it represents the collective knowledge that is embedded in the personnel, organizational routines and network relationships of an organization which led to gain sustained competitive advantages, in particular in non-profit sector (Kong, 2008; Kong and Prior, 2008; Schiuma and Lerro, 2008 Ramirez, 2010). Moreover, the highly competitive NPO context has obliged non-profit organization to modify their management and operational models in the aim of utilising the organisational resources more effectively. In this sense, “IC is a valid strategic management conceptual framework for NPOs. IC allows NPOs to pursue their social objectives and utilise their resources effectively, and simultaneously to sustain their cherished qualities” (Kong, 2007, p. 728).

Furthermore, NPM paradigms have emphasised the need to modernize the public sector by improving the effectiveness and efficiency of services provided and rationalizing the use of strategic resources through new management tools. In this sense, the Intellectual Capital management assumes a pivotal importance as a new management approach which, in an NPM framework, allows to improve the effectiveness and efficiency of public services (Wall, 2005; Bezhani, 2010; Ramirez, 2010). Indeed, according to Cohen and Vlismas (2013) IC management is considered as a fundamental vehicle in order to enhance effectiveness and efficiency, representing a driver for economic efficiency. Moreover, as argued by Bezhani

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<sup>98</sup> “NPM is like a chameleon: it constantly changes its appearance to blend in with the local context. Such adaptability is possible, because NPM is not a coherent set of ideas and tools. The labels may be the same, but the underlying story differs all the time” (Pollitt et al., 2007, p. 4).

(2010, p. 182) "IC plays an important role in the operation of any Non-Profit Organization and is a key driver in the strategic alignment of organisational resources". Further, in this regard, Kong (2008, p. 292), by referring to social service non-profit organizations (SSNPO), has stated: "Intellectual capital helps to shift SSNPOs' strategic focus to intellectual resources, including knowledge, skills and experience. This is important to SSNPOs, because strategic activities and changes that are brought to the organizations will be mainly driven by internal initiatives by paid employees and volunteers rather than external forces such as government agencies".

Another important aspect of conjunction is the NPM stress on performance standard and performance measurement in public sector organisations. In this case, the Intellectual Capital management and reporting become pivotal because public sector entities have multiple objectives of non-financial nature whose achievement depends on the appropriate use and development of a combination of intangible strategic resources attributable to IC elements (Serrano-Cinca et al., 2003; Wall 2005). According to Bronzetti and Sicoli (2011, p. 90) "The set of intangible resources related to the knowledge of public administrations are often considered as public intellectual wealth. In order to be properly managed, the intangible value created by public administrations requires innovative measurement models that can supplement the traditional economic-financial information with qualitative elements to capture the organisation's characteristic aspects, such as its ability to relate to the outside, to spread skills and knowledge and to promote and support technological development". Moreover, according to Del Bello (2006, p. 441) "differently from companies, whose main objective is to create monetary value (shareholder value), the essence of the activity of public sector bodies is far from being quantifiable in monetary terms, as its most important inputs and outputs are intangible in character".

In this regard, Almqvist and Skoog (2007) have argued that the IC framework can represent an evolution compared to the logics introduced by the NPM paradigm, by allowing to overcome the limitations encountered by the latter in identifying and valorising the output of public sector companies which result particularly complex and difficult to define (Ramirez, 2010). In particular, Almqvist and Skoog (2007) have observed how, unlike NPM framework, the IC framework considers much more indicators, especially of non-financial nature belonging to a larger number of public sector dimensions. Moreover, the IC framework introduces a more holistic and comprehensive view of value creation process in public sector by placing strong emphasis on the contribution provided by all the actors and elements involved. IC framework also focuses on the connections and the relationships between the actors and shifts the attention towards non-financial indicators concerning

relational, human and structural resources which seems more appropriate in a public sector context. Differently, NPM places much more attention on outputs and quantitative and financial outcomes measurement and assumes a different view of value creation process by considering the different phases of the process in isolation from each other without analysing the connectivity between inputs, processes, outputs and outcomes<sup>99</sup>.

Finally, it is necessary to consider how NPM principles have attributed more autonomy to public sector organizations in defining strategies, management and budget allocation (Leitner, 2004; Bezhani, 2010). This increased autonomy, in turn, has led to an increasing demand from the wide range of public sector entities stakeholders for greater transparency and accountability about the use of public funds and performance achieved (Schneider and Samkin, 2008; Bezhani, 2010; Ramirez, 2010; Esposito et al., 2013; Ramirez and Gordillo, 2014; Sangiorgi and Siboni, 2017). Obviously, by considering the intangible essence of public sector organisations' processes and outcomes, reporting tools IC based have become strategic vehicles in order to discharge accountability and transparency towards stakeholders (Bezhani, 2010). According to Schneider and Samkin (2008, p. 463) "the discharge of accountability to stakeholders is facilitated through the inclusion of intellectual capital information in the annual reports of local government (...). In the public sector, the relationship between accountant and accountee is much broader than the conventional shareholder-manager relationship. It extends to complex web of interrelationships with government and non-government groups". Mouritsen et al. (2005, p. 280) argue "The public institution had to be accountable to a budget, to productivity and to customer satisfaction. This 'triple bottom-line' defined the public entity as these three kinds of performance. Even if it did do strategy, the public institution was more presented as a set of performance metrics than as the provider of something useful: the public institution developed into a space of performance. Intellectual capital has partly been an attempt to respond to this".

#### *1.4 The Intellectual Capital reporting in public sector. Framework and Classifications*

Due to the growing importance recognised to IC management and disclosure, many scholars have emphasised the need to develop adequate tools in public sector in order to improve the decision-making process, support the strategic and operative decisions, and enhance the accountability and transparency towards stakeholders (Serrano-Cinca et al.,

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<sup>99</sup> Almqvist and Skoog (2007, pp. 117-118) also make an interesting reflection on the different stakeholder considerations between NPM and IC. They argue that in NPM paradigm, stakeholders are generally treated in isolation from each other following the concept of contract relations (for example the "politicians" and "administrators" or the "purchasers" and "providers"). NPM assumes that purchasers, providers and receivers of public services maximize their own interests based on the formal contracts. On the contrary, within the IC framework stakeholders are considered as co-producers that work in connection to each other within a value-creation network.

2003; Mouritsen et al. 2004, 2005; Del Bello, 2006; Kong, 2007; Bezhani, 2010; Ramirez, 2010; Bronzetti and Sicoli, 2011; Manes Rossi et al., 2016).

However, unlike the private sector, where, as seen in the first chapter, there has been a large and perhaps excessive proliferation of frameworks and models for the identification, measurement and reporting of intellectual capital components, in public sector research is still in a development phase. So only a few number of framework, adapted to some extent from those introduced in the private sector, have been developed (Bossi et al., 2005; Sanchez and Elena, 2006; Ramirez, 2010; Bronzetti and Sicoli, 2011).

Serrano-Cinca et al. (2003, pp. 256-259) have made an attempt to develop a first list of intangible assets of relevance for public sector management by classifying IC elements into four categories: *Internal organization*; *External structural capital*; *Human capital*; and *Social and environmental commitment*, each of which contain further specific IC elements (see table 3).

**Table 3.**  
Classification of intangible assets

<b>Internal Organization</b>	<b>External Structural Capital</b>	<b>Human Capital</b>	<b>Social and Environmental commitment</b>
<ul style="list-style-type: none"> <li>• Ability to innovate</li> <li>• Know-how</li> <li>• Structural organization</li> <li>• Corporate culture</li> <li>• Links and contacts</li> </ul>	<ul style="list-style-type: none"> <li>• Service</li> <li>• Image</li> <li>• Transparency</li> </ul>	<ul style="list-style-type: none"> <li>• Aptitudes of civil servants</li> <li>• Permanent training</li> <li>• Conditions of service</li> </ul>	<ul style="list-style-type: none"> <li>• Social commitment</li> <li>• Environmental commitment</li> </ul>

Source: Serrano-Cinca et al. (2003)

*Internal organization* category includes those intangible assets which are related to processes, work procedures, and skills that allow the organization to function and achieve its objectives.

The “ability to innovate” allows the organization to adapt itself to environmental changes. The “know-how” embeds accumulated knowledge, working procedures, and ways of solving problems. The “structural organization capital” can be seen as an efficient intangible asset tool, which stimulates internal information flows. “Corporate culture” is the bundle of values shared by the institution. “Links and contacts” also represent relevant intangible assets. In particular, as well as private sector firms relying on strategic alliances and good

relationships in order to increase their market share and achieve their objectives, also public sector organizations develop relationships with other institutions such as social agents and media in order to attain specific objectives.

*External structural capital* category firstly includes the “service” which are pivotal since public organizations have to satisfy citizens’ needs through the services provision. The “image” conveyed by the public sector organizations is the equivalent of the concept of trade name listed on the financial reporting of private firms as an intangible asset. “Image could” be of fundamental relevance for a public organization, since it may contribute to the achievement of several objectives and opportunities. The “transparency” assumes particular relevance in public administration where politicians, have to face the voters regularly and need to demonstrate that there has been no corruption in the management and use of public money.

In *human capital* group, there is “aptitudes of civil servants” which regards the skills, knowledge, competences, capabilities and attitudes of human resources which are fundamental intangible assets in order to achieve the objectives of public organizations. The “permanent training” concerns the growth, development and learning of managers and employees involved in public organisations activities and management. Finally, the “conditions of service” include a series of elements such as working atmosphere, promotion opportunities, incentives, work security, and safety which influence staff performance.

The *social and environmental commitment* group includes the social identity of the public institutions together with the reporting activity on the impact of the actions and processes on the environment and society. The intangible “social commitment” embeds the relationships of the organization with the community and the external environment with their reflections from a social and ethics perspective. Finally, the intangible “environmental commitment” includes the plans and measures undertaken by public administrations to forward the objective of safeguarding the environment.

Further, another classification of IC, also adapted from private sector (MERITUM project, 2002), groups IC public sector components in three categories: *Human Capital*; *Relational Capital* and *Structural (Organisational) Capital* (Del Bello, 2006; Sanchez et al., 2006; Kong and Prior, 2008; Bronzetti and Sicoli, 2011; Cohen and Vlismas, 2013; Manes Rossi et al., 2016).

*Human Capital* consists of all the aptitudes, skill, knowledge, competences, innovativeness and talents of civil servants belonging to the human system of the institution. It is the capital that can be owned by the people possessing it.

*Relational capital* concerns all the relationships developed between a public sector organisation and the general community of stakeholders (taxpayers, citizens, associations, institutions, universities economic operators and every stakeholder which has interest in collaborating with the organization) in order to improve the value creation.

*Structural (Organisational) capital* regards the public organisation's structured knowledge that can be shared (databases, ethic codes, management philosophy, information systems, procedures, routines, research projects, software, manuals, etc.), from which derive the corporate culture and which creates value for organisations.

So, in conclusion, after describing the theoretical roots, the main characters and the main components of intellectual capital in the public sector, the following discussion focuses on the context of the university that, due to its peculiarities, is certainly deeply involved in intellectual capital management and reporting issues.

## 2. The Intellectual Capital in Universities: the evolution of Higher Education systems and the relevance of IC disclosure

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### 2.1 *Intellectual capital in Universities: background and the need for IC disclosure*

In the IC context, among the different types of public sector organisations, universities deserve special attention being those characterized by the highest degree of intangibility (Secundo et al., 2016).

Indeed, "IC plays a crucial role in universities, which are proper knowledge-based Institutions (...) In these organisations, IC is both the result of the research and development activities and the driver that enables the creation of greater value from those activities" (Sangiorgi and Siboni, 2017, p. 355).

In particular, according to Sanchez and Elena (2006, p. 529) "Universities' main goals are the production and the diffusion of knowledge and their more important investments are in research and human resources".

More specifically, universities fundamentally create knowledge through their three missions: *teaching* (students trained and productive relationships with their stakeholders); *scientific and technical research* (the results of investigation, publications, patents, trademarks, scientific discoveries) and *entrepreneurial activities* (technology transfer, licensing, spin-off). Therefore, Universities' inputs and outputs are largely intangible assets

(Ramirez et al., 2011; Ramirez and Gordillo, 2014; Ramirez et al., 2016; Secundo et al., 2016).

Moreover, Universities' most valuable resources are represented by their teachers, researchers, administration and service staff, university governors and students, with all their consolidated routines, know-how and relationship with the external environment (Leitner, 2004; Ramirez and Gordillo, 2014).

All these resources are relevant components of Intellectual Capital and make Universities an ideal framework for the application of the ideas related to IC theory (Ramirez and Gordillo, 2014, p. 2014).

According to several scholars (Ramirez et al., 2011; Ramirez, 2013; Ramirez and Gordillo, 2014; Ramirez and Lizano, 2015; Ramirez et al., 2016) "The term IC, when referred to a university, is a term used to cover all the institution's non-tangible or non-physical assets, including processes, capacity for innovation, patents, the tacit knowledge of its members and their abilities, talents and skills, the recognition of society, its network of collaborators and contacts, etc". In this vein, the IC can be defined as "the collection of intangibles which allows an organization to transfer a collection of material, financial and human resources into a system capable of creating value for the stakeholders" European Commission (2006, p. 4).

The IC Universities' components are usually grouped by scholars in three main categories (Leitner, 2004; Ramirez et al., 2011; Silvestri and Veltri, 2011; Ramirez, 2013; Ramirez and Gordillo, 2014; Low et al., 2015; Ramirez and Lizano, 2015; Secundo et al., 2015; Ramirez et al., 2016; Secundo et al., 2016):

- *Human capital* is composed by both the explicit and tacit knowledge of the university staff (teachers, researchers, PhD students, managers, administration and service staff), developed through formal and non-formal education and learning processes embedded in their activities. It is also identifiable in the knowledge contained in the people individual competencies which they take with them when they leave the institution, such as the expertise, knowledge and experiences of researchers, professors, technical and administrative staff, PhD and students' competencies.

- *Structural capital* is referred to the explicit knowledge related to the internal processes of diffusion, production, communication and management of knowledge and research at the university. It embeds the databases, procedures, research projects, research infrastructures, research and education processes and routines, university culture, image, reputation and governance principles. It is also recognizable in the knowledge that remains within the institution at the end of the working day.

• *Relational Capital* is represented by the complex bundle of economic, political and institutional relations developed and consolidated to create value between the university and its wide range of partners: companies, non-profit organisations, local and regional government, research centers, citizens' community and society in general. It also includes the perception that others have of the university: its image, appeal, reliability, and so on.

In the last few decades, universities have been affected by several economic, political and social changes that have contributed to change their role, structure, mission and organizational models by revolutionizing the whole higher education system.

These changes, which will be discussed in detail in this paragraph, aiming fundamentally at increasing the autonomy, comparability, competitiveness, efficiency and effectiveness of Universities, have overwhelmingly contributed to emphasise not only the overall relevance of IC in this sector, but, above all, the need for new management and reporting systems including IC components which, as argued above, represent the core essence of this type of public organisations, in order to enhance institutional accountability<sup>100</sup> and transparency and improve the decision-making process (Leitner, 2002, 2004; Sanchez and Elena, 2006; Canibano and Sanchez, 2008; Bezhani, 2010; Loureiro et al., 2011; Parker, 2011; Esposito et al., 2013; Ramirez and Gordillo, 2014; Ramirez et al., 2016; Secundo et al., 2016; Sangiorgi and Siboni, 2017; Secundo et al., 2017)

Consequently, according to the Observatory of European University, the disclosure of IC information should become compulsory for universities (OEU, 2006). In the same vein, Ramirez and Gordillo (2014, p. 176) state "The obligation to present an IC report in the higher education system would be a crucial step towards new university management, thereby achieving a double objective: to identify and measure intangibles for management purposes, and to provide useful information to stakeholders".

Moreover, consistent with Sanchez et al. (2009, p. 310) "An IC report can help to identify structural and personal strengths and weaknesses, reveal the current state of the different university missions and be used as a controlling and monitoring instrument". In the same vein, Loureiro and Teixeira (2011) state that an IC framework in Universities "can help to reveal the current state of the university's mission, because IC reports on the value added by the organisation's intangible assets and how they are aligned with its goals".

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<sup>100</sup> According to Capano (2010, p. 53) "Institutional accountability is not an intrinsic, objective characteristic of universities, but is of a relative, contextual nature. Institutional accountability means that universities are required to show the outside world (generally speaking, society) how they perform, and how they spend public (governmental) and private (tuition fees) money. This means that accountability requires a change in the manner of internal decision-making (which is currently structured in order to favour academic interests, and is thus characterized by a distributive logic)"

## 2.2 *The evolving context of Universities: towards the third mission*

Firstly, the changes affecting universities' context may be investigated from the perspective of new theories in evolutionary economics, such as "Mode 2" of Knowledge Production and the "Triple Helix Model" (Gibbons et al. 1994; Leydesdorff and Etzkowitz, 2001; Sanchez and Elena, 2006; Ferlie et al., 2008; Sanchez et al., 2009; Canibano and Sanchez, 2008).

The "Mode 1" of knowledge production, developed during the Cold War, was based on very basic R&D programs mainly developed by firms and grounded on linear models of innovation and tending to emphasize particular disciplinary research agendas. On the contrary, the "Mode 2", developed at the end of transatlantic tensions, has led to the introduction of modern techno-economic paradigms, in a global-market scenario, in the aim of improving business transactions, by proposing new R&D models for private and public organisations (Sanchez and Elena, 2006; Canibano and Sanchez, 2008). In the light of "Mode 2", knowledge creation expands its boundaries in order to respond to socioeconomic, institutional and corporate needs through open, collaborative and dynamic relationships between university and industry, thus combining theoretical research with practical experimentation (Sanchez and Elena, 2006). According to Gibbons (1998, p. 1) "In this new "mode", the main change regarding universities is that "knowledge production and dissemination – teaching and research – are no longer self-contained activities, carried out in relative isolation. They now involve interaction with a variety of other knowledge producers".

This theory is strictly related with the "Triple Helix" model in which university-industry-government relations are analysed "in terms of three interlocking dynamics: institutional transformations, evolutionary mechanisms and the new position of the university" (Etzkowitz and Leydesdorff, 2001, p. 6). Differently from the "national systems of innovation" approach<sup>101</sup>, the "Triple Helix" approach places universities at the center of the knowledge and innovation creation process together with Industry and Government. This theory overcomes the concept of supremacy of the private enterprise in the innovation field, by proposing a relational and collaborative approach between the three entities in which each of them has the same importance (Etzkowitz and Leydesdorff, 1996). In this scenario, universities, industries and governments are engaged in more dynamic and interdependent relationships, resulting in the creation of frequent hybrid organisations and alliances

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<sup>101</sup> The model of national systems of innovations (Lundvall, 1992; Nelson, 1993) is fundamentally based on the leading role of company in innovation processes and on hierarchically organized relationship between university - industry and government.

between them (Sanchez et al., 2009). According to Etzkowitz and Leydesdorff (2001, pp. 12-13) “Triple Helix III model can be expected to generate a knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other and with hybrid organizations emerging at the interfaces. The overlay partially integrates the underlying arrangements, but in a distributed network mode. Thus, the system remains incomplete and therefore in flux (...) The common objective is to realize an innovative environment consisting of university spin-off firms, tri-lateral initiatives for knowledge-based economic development, and strategic alliances among firms (large and small, operating in different areas, and with different levels of technology), government laboratories, and academic research groups”.

Therefore, these theories are of paramount importance as they draw the picture of what is the new role played by universities in the new knowledge-based economy and to what extent the Intellectual Capital is relevant in the light of this evolution. Today, universities must not only ensure an adequate level of education for users but are considered to be key vehicles in the production and dissemination of knowledge.

Indeed, today Universities, besides the first mission related to the education, are involved in two more fundamental missions: the generation of complex and productive research programs (second mission) and the sharing of research and knowledge into the external environment in the aim of contributing to the socio-economic development of the territory (third mission) (Etzkowitz and Leydesdorff, 2001; Molas-Gallart et al., 2002; Canibano and Sanchez, 2008; Veltri and Mastroleo, 2011; Venditti et al., 2013; Secundo et al., 2016; Sangiorgi and Siboni, 2017). According to Molas-Gallart et al. (2002, p. 3) “Universities have been founded principally on two sets of activities: teaching and research. However, universities have always made contributions, both directly and indirectly, to decision-making in the wider society; this is their ‘Third Mission’. Third stream activities are therefore concerned with the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments. In other words, the Third Stream is about the interactions between universities and the rest of society”.

In particular, the third mission consists of networks, collaborations, technology transfer and innovation; continuing education; and social engagement. It comprises activities aiming at improve the social welfare and address private or public economic objectives (Sanchez et al., 2009; Secundo et al., 2016). According to Secundo et al. (2017, p. 609) under the third mission “the main goals for universities must be production, diffusion, and knowledge transfer. Therefore, the traditional roles of universities, as knowledge producers and disseminators, are now being reconsidered (...) Universities have new responsibilities in

helping transform knowledge generated by university researchers in the creation of value in terms of the socio-economic development”.

Therefore, these activities carried out within the third mission spectrum have progressively included universities in networks of knowledge sharing and collaboration, bringing them in contact with a wide range of stakeholders involved in these activities (research centres, other universities, local and national governments, industries and so on) (Secundo et al., 2016; Secundo et al., 2017).

The collective involvement of these actors in the socio-economic development of the territory through the knowledge and technology transfer; innovation; intellectual property creation; continuing education; and social engagement, has stimulated to the need to adopt new management and performance systems that incorporate intangible assets and IC in order to both improve the accountability and the transparency towards this wide stakeholders community and enhance the collaboration between them (Elena and Warden, 2011; Venditti et al., 2013; Secundo et al., 2015; Secundo et al., 2016; Sangiorgi and Siboni, 2017; Secundo et al., 2017). As argued by Ramirez et al. (2016, p. 179) “implementing IC reports to diffuse information could have a positive impact on university-industry collaborations and third mission activities”. In a similar vein, Secundo et al. (2017, p. 612) state “Today, universities need to contribute to a third mission: developing society and economies, technology transfer and innovation, continuing education, and social engagement. In the university system, the question how IC helps to create value for the society and increase the competitiveness of the region in which the university operates has become the real concern”.

### *2.3 The NPM influences in University sector: financial and organizational autonomy*

The role of Universities has radically changed also as a consequence of NPM wave influences which have affected the culture, governance, structure, philosophy and organization of these public entities. As well as in other public sector organisations, also in the case of Universities, NPM logics and principles have emphasized the need to achieve greater efficiency and effectiveness in product and service delivery, by seeking greater outcomes for less input cost (Leitner, 2004; Parker, 2011; Veltri and Mastroleo, 2011). In particular, under NPM, in University sector there was a trend towards a “marketization” and “corporatization” (Parker, 2011). As argued by Habersam et al. (2013, p. 323) in the context of NPM “the university must be a demand-oriented service institution to deliver value for money in terms of knowledge that enhances employability. The institution itself must be

managed like a company, that is, effectively and efficiently, with less organizational slack". Accordingly, since the early of 1980s, Universities have started to import management structures, philosophies and control mechanisms from private sector companies, by considering teachers as middle managers, courses and programs as saleable products, and students as customers<sup>102</sup> (Gray et al., 2002; Parker, 2011).

In this regard, Ferlie et al. (2008, p. 335) has summarized the main consequences of NPM principles application in the higher education sector: (a) Market based reforms: stimulation of competition for students and research funding between higher education institutions; (b) development of real prices for teaching fees and research contracts as basis on which trading in this market can take place; (c) a hardening of soft budgetary constraints: stress on financial control, recovery from budget deficits, efficiency and value for money (d) introduction of higher student fees to empower students as consumers and drive up teaching quality levels; (e) elaboration of explicit measurement and monitoring of performance in both research and teaching; (f) concentration of funds in the highest performing higher education institutions; (g) the Ministry and its agencies attempt to steer the system vertically, through setting explicit targets and performance contracts; (h) development of strong rectorates and non-executive members drawn from business and move to appointed rather than elected senior posts; (i) development of stronger and more overt managerial roles by senior academics at vice chancellor and the head of department level; (j) growth of performance related pay for faculty and private sector style Human Resource Management.

In particular, as a result of the global financial crisis, one of the most relevant implications of NPM policies in University has been the sharp reduction in funding from national and local governments and the consequent push toward a greater entrepreneurship and autonomy in raising financial resources from other sources (Gray et al., 2002; Nelson et al., 2003; Ferlie et al., 2008; Parker, 2011; Ntim et al., 2017).

As reported by Alexander (2000, p. 417), during the 1980s and early 1990s several macroeconomic negative effects contributed to the international trend to limit public expenditures in higher education sector. With the awareness of the availability of lower financial resources, many national governments in order to safeguard basic governmental services, have deprioritized higher education in favor of medical care, social welfare, elderly, primary and secondary education and crime prevention investments.

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<sup>102</sup> As argued by Ferlie et al. (2008, p. 328) "The first mission would encourage students to start to behave more like consumers. Such consumer pressure would in turn act as a helpful spur to greater quality and competition among higher education institutions would increase".

Thus, many world and European governments, particularly in New Zealand, Australia, the United Kingdom, Canada, Finland and Ireland, in an attempt to reduce public spending and tax burden, have launched a series of reforms NPM based, addressed to a drastic reduction in public funding, by forcing Universities to carry out a structural internal reorganization in searching for greater autonomy in obtaining financial resources (Gray et al., 2002; Parker, 2011). In particular, as reported by scholars (Alexander, 2000; Orkodashvili, 2007; Parker, 2011) in some countries such as UK, Australia and USA the public expenditure on higher education as a percentage of GDP have been drastically reduced as well as the ratio between private and public funding has been almost completely overturned<sup>103</sup> in favor of private funding. At the same time, the cost for student enrollment has gradually increased as a result of higher expected quality and the greater need for universities to obtain more financial resources (Ferlie, 2008).

Moreover, in order to rationalize public spending, governments have begun to provide a substantial part of public funds to Universities on a reward basis, in accordance with the performance achieved in terms of the quality of teaching and the results of the research (Turri, 2014; Francesconi and Guarini, 2018). In this context it is to be placed the creation of many national research and teaching evaluation bodies, such as the Higher Education Funding Council for England (HEFCE) in UK<sup>104</sup>, the National Agency for Quality Assessment and Accreditation (ANECA) in Spain<sup>105</sup> or the National Agency for Evaluation of the

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<sup>103</sup> “In Australia, between 1987 and 1997, the proportion of total higher education funding supplied by the commonwealth government fell from 85% to 54%, and by 2003 had fallen to 41%. The trend continues. Since 1995 there has been a one third reduction in Australian government expenditure on higher education from 1.2% of GDP to 0.8% of GDP. Indeed, direct grants to universities by the Commonwealth Government of Australia, have fallen even further: from 0.91% of GDP in 1996 to 0.6% programmed for 2008.... In the 1999–2000 year, UK universities were 64% publicly funded and 36% privately funded. In the same year, US universities overall were 46% publicly funded and 54% privately funded. Furthermore, in the period 2001–2004, UK public expenditure on higher education as a percentage of GDP per capita fell to 27%, while the same ratio for the USA fell to 27%” (Parker, 2011, p. 439). “drastic cuts in the further and HE budget of about 29 per cent in 2010 by the UK Central Government following the 2007/2008 global banking crisis and the subsequent implementation of the recommendations of the Browne’s (2010) report on HE funding and student finance has further heightened the importance of financial management, governance, and accountability within UK HEIs” (Ntim et al., 2017, p. 66).

<sup>104</sup> The Higher Education Funding Councils for England (HEFEC) was created by the Further and Higher Education Act in 1992 in UK as a non-departmental body, with the purpose to improve the quality and quantity of learning and research in higher education institutions, cost-effectively and with regard to national need. It is responsible for the assignment of funding to universities and Colleges of Higher and Further Education in UK. Through the HEFCE, the Department of Education and Employment (DEE) manages a funding system based on performance criteria and quality measures in teaching and research. By using the HEFC system of performance and quality indicators, resources are allocated based on governmentally defined guidelines (Alexander, 2000, p. 424).

<sup>105</sup> The National Agency for Quality Assessment and Accreditation of Spain (ANECA) was set up by the Agreement of the Council of Ministers, of 19 July 2002. It is an Autonomous body whose mission is to provide external quality assurance for the Spanish Higher Education System and to contribute to its constant improvement. The fulfillment of its mission is structured in the following functions:

- To strengthen the enhancement of teaching, research and University Management activities.
- To contribute to the performance appraisal of Higher Education according to objective. Procedures and transparent processes.
- To provide to the Public Administrations with appropriate information for the decision making.
- To keep the society informed about target achievement of Universities in their activities. [www.ANECA.es](http://www.ANECA.es).

University System and Research (ANVUR) in Italy<sup>106</sup>, which have become, over time, powerful tools through which national governments can: stimulate an effective evaluation of value for money within the higher education sector; relate the transfer of public funds to performance achieved; and acquire alternative tools of controlling and steering university activities directly (Turri, 2014, p. 72).

The introduction of performance-based funding systems, based on research and teaching performance evaluation and on reward mechanisms coupled with the need to obtain external financial resources have further emphasized the relevance of adopting new reporting systems IC based. In particular, IC reports can both simplify the presentation of results and performance achieved in order to attract institutional grants or additional funds of research and facilitate the tasks of National evaluation agencies (Elena and Warden, 2011; Ramirez and Gordillo, 2014; Ramirez et al., 2016). IC reporting tools can also help universities in showing the results and the performance achieved to potential investors, research centers and partners in order to raise new financial resources (Secundo et al., 2016).

The long series of NPM-based reforms has progressively attributed greater autonomy and independence to universities not only in the procurement of financial resources but also in courses implementation, student fees definition, researchers and teachers' recruitment, collaboration and governance models adoption (Parker, 2011; Ntim et al., 2017). As a result, the role of Universities governance has gained more relevance and the structure has radically changed with the progressive entry of professionals, managers and external members within the universities board of directors. Within this new scenario of strong autonomy, governance members are considered pivotal actors to assure a sound financial management and stimulate a greater public accountability, transparency and better performance (Ntim et al., 2017).

Therefore, in the light of these substantial evolutions NPM based, public universities have gradually started to assume an "hybrid" structure, in which, in spite of the juridical substance of a public body, managerial and organizational patterns inherited from private companies predominate to the point that these public universities are defined as autonomous "entrepreneurial" entities (Parker, 2011; Habersam et al., 2013; Secundo et al., 2015; Secundo et al., 2016).

As a consequence, stakeholders such as citizens and tax payers, taking into consideration the greater autonomy attributed to universities, started to ask for a greater transparency

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<sup>106</sup> See the next sub-paragraph devoted to the NPM influences in Italian university sector.

and accountability about the use of public funds as well as about the programs and the activities developed with public funds employment. Accountability about research and education performance are particularly required by these groups of stakeholders which want to know whether resources are used efficiently or effectively (Coy et al., 2001). According to European Commission (2003, p. 1) “Universities have a duty to their stakeholders (students, the public authorities funding universities, the labour market, society as a whole) to maximise the social return of the investment”. In a similar vein, Canibano and Sanchez (2009, p. 95) affirm “Although public universities do not make profits and there is no market value in the same sense as for companies, there is an increasing need for them to show that the public and private money they receive is used to produce new knowledge and knowledge useful to society”.

### *2.3.1 The NPM influences in University sector: The Italian case*

Under the NPM paradigm, several reforms in the last twenty years have changed the bureaucratic structure of the Italian university system, in the aim of improving the quality of research and teaching and at the same time of reducing public spending by ensuring greater financial autonomy for universities. These long series of reforms have also entailed substantial changes in Italian universities’ accounting system (Turri, 2014; Sangiorgi and Siboni, 2017).

In this sense, for Italian universities, the first important step is represented by the Law 212 n. 168/1989, “Legge Ruberti<sup>107</sup>” which is a partial attempt to establish the general didactic, organizational and scientific autonomy for all universities. In particular, under this law, the central government decided both the amount of financial resources to provide to each university and the economic destination of these resources. At the same time, this law ensures for the first time a degree of organizational autonomy for universities in managing their resources (Capano, 2010; Aversano et al., 2017).

Then, under the law 537/1993 the Observatory for the Evaluation of the University System (OVSU) has been set. It was an advisory body of the ministry of Universities and Research and had as its main purpose the assessment of university performance in relation to the efficiency and productivity of the academic activities carried out. Further task was to analyse the programs of development and to verify the balanced distribution of state funds to universities according to territory and disciplines (Capano, 2010; Turri, 2014). The art. 5 of this law established the ordinary funding fund (FFO) which represent the main state

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<sup>107</sup> Antonio Ruberti was the former rector of Rome’s ‘La Sapienza’ University who was appointed the first Minister for Universities and Research in 1988 (Capano, 1998).

funding provided to universities and consists of two parts: a "base share" and a "rebalancing share" then modified in the subsequent years. The basic fee was automatically allocated to universities, but the rebalancing quota should be allocated on the basis of quantitative parameters. Moreover, this law also introduced the internal evaluation units having the purpose to verify the correct management of public resources as well as research and education productivity (Turri, 2014; Aversano et al., 2017).

Subsequently, the Budgetary act of 1994 represents a further crucial step in ensuring financial autonomy for universities. It introduced a lump-sum budget assigned by the Ministry and based on the coverage of universities historical expenditure. Further, this act also planned to provide a part of national funding to universities on the basis of performance achieved and supplementary funds related to particular contracts agreed upon by the State and the universities (Capano, 2011; Turri, 2014).

The Law 370/1999 introduced the National Committee for the Evaluation of Universities (CNVSU), replacing the OVSU created in 1994. The CNVSU was an advisory body having the main purpose of monitoring the performance of universities. It was responsible for several tasks: developing the general criteria for the assessment of universities' activities; drafting an annual assessment report on the State of the University System; promoting best practices; implementing an annual plan for the external review of universities; developing special reports on student conditions; advising ministers on matters of a technical nature (Capano, 2010, p. 44). This law has also improved the power and the role of the internal evaluation units introduced in 1993<sup>108</sup>.

In 2006, the law 286/2006 established the National Agency for Evaluation of the University System and Research (ANVUR) which, replacing the previous committee, has become operative in 2011. It is an independent agency responsible for quality assurance of teaching (also at doctorate level); research evaluation; definition of criteria for national selection procedures and career progression for academic staff; guidance for the work made by the evaluation units. ANVUR also develops guidelines for the setting up, merging and closing down of universities, as well as plays a central role for the allocation of state funding (by request of the Ministry) (Turri, 2014, p. 69).

The law n.1/2009 represents the first concrete step toward the introduction of performance-based funding system grounded on research and teaching performance, by establishing that a share of not less than 7 percent of the FFO should be allocated taking into

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<sup>108</sup> Law 370/1999 (article 1) stated that universities are forced to set up an "internal evaluation system of their administrative management, teaching and research activities, and of the actions they take to guarantee the constitutional right to study: the said system should verify, using among other things a comparative analysis of costs and results, the correct use of public funds, the performance of their research and teaching, and the impartiality and correct functioning of administrative procedures".

account: (a) the quality of the training offer and the outcomes of the training processes; (b) the quality of scientific research; and (c) the quality and efficiency of educational establishments. After the establishment of this law, the performance-based funding system has improved its effectiveness and the share of FFO allocated according to performance achieved has gradually increased over the years.

Today, the FFO is allocated for 80% on an expenditure basis and for 20% on a performance basis (i.e., 18% in 2014–2015 and 16% in 2013-2014). In particular, the expenditure basis is assigned for the 80% on the previous year's expenditure allocation and for the 20% on a standard cost per regular student (i.e., increasing up to 100% in 2018). On the other hand, the 20% performance-based share of FFO (the so-called premium portion) is assigned as follows:

- 70% based on university performance in the national research evaluation framework “Valutazione della Qualità della Ricerca” (VQR);
- 10% based on the quality of recruitment (i.e., the VQR research performance of newly hired faculty);
- 20% based on the internationalization of teaching activities (i.e., number of Erasmus students and credits from courses attended overseas. (Francesconi and Guarini, 2018, p. 294).

The Italian legislation on Universities (Law n. 240/2010, called “Decreto Gelmini”), based on the principles of simplification, autonomy, efficiency, effectiveness and transparency of administrative activity and of access to information on the university has led to decisive changes in governance, internal articulation, resource recruitment mechanisms, evaluation criteria and financing system (Aversano et al., 2017; Sangiorgi and Siboni, 2017). Among the novelties introduced, this law stated that university boards must consist of a maximum of 11 members, by including at least three external non-university members. At the same time, it has strengthened the role of the board with the attribution of several responsibilities such as the strategic direction, the approval of annual and three-year financial planning and staff; the supervision of the financial sustainability of assets; and, the competence to deliberate, after the opinion of the academic senate, the activation or suppression of courses and venues. Moreover, this law has led to the simplification of the internal organizational articulation, with the simultaneous attribution to the departments of autonomy in carrying out scientific research, teaching and training activities.

Finally, the decree 18/2012 required all universities to implement, from the 1st of January 2014 (limit extended later to 2015), an accrual accounting systems with the drafting of a single annual report composed of income statement, balance sheet, explanatory notes,

management commentary and cash flow statement together with the implementation of cost accounting procedures, for the purpose of management control (Sangiorgi and Siboni, 2017).

#### 2.4 *Bologna Process and Lisbon strategy*

In addition to the economic changes imposed by the NPM, in recent years, universities, particularly in the European area, have also been influenced by political changes which also have contributed to improve the autonomy, competitiveness, comparability, flexibility, transparency and dynamism in both research and teaching activities (Sanchez and Elena, 2006; Ramirez, 2013; Siboni et al., 2013; Secundo et al., 2015; Ramirez et al., 2016; Sangiorgi and Siboni, 2017).

In particular, the Bologna Process and the Lisbon Strategy represent the most influential development programs concerning Universities implemented by the member States of the European Union.

The Bologna Process is a radical restructuring plan begun in 1999 with an intergovernmental agreement subscribed by 29 European Governments<sup>109</sup>. With the Bologna Declaration of 1999, which followed the preliminary Sorbonne Declaration<sup>110</sup> signed in the previous year, the 29 signatories countries have expressed their willingness to collaborate in order to establish the European area of higher education (EHEA) and promote the European system of higher education world-wide by highlighting the need to stimulate the independence and autonomy of all Higher Education Institutions. Thus, through the Bologna Declaration, a set of voluntary measures for the harmonization process of European Higher Education systems was established (Bologna Declaration, 1999).

In particular, the main objectives of Bologna Process listed in Bologna Declaration of 1999 are:

- The adoption of a system of easily readable and comparable degrees, also through the implementation of the Diploma Supplement, in order to promote European citizens' employability and the international competitiveness of the European higher education system.

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<sup>109</sup> Bologna Declaration signatories in 1999 were: Austria - Belgium - Bulgaria - Czech Republic - Estonia - Denmark - France - Finland - Germany - Hungary - Greece - Ireland - Iceland - Latvia - Italy - Luxembourg - Lithuania - Malta - the Netherlands - Norway - Poland - Portugal - Romania - Slovak Republic - Slovenia - Spain - Sweden - Swiss Confederation - United Kingdom ([www.EHEA.info](http://www.EHEA.info)).

<sup>110</sup> The Sorbonne declaration of 25th of May 1998 emphasised the Universities' central role in developing European cultural dimensions. It highlighted the creation of the European area of higher education as a key way to promote citizens' mobility and employability and the Continent's overall development (Bologna Declaration, 1999).

- The adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years.
- The establishment of a system of credits - such as in the European Credit Transfer System - ECTS - as a proper means of promoting the most widespread student mobility. Credits could also be acquired in non-higher education contexts, including lifelong learning, provided they are recognised by receiving Universities concerned.
- Promotion of mobility by overcoming obstacles to the effective exercise of free movement with particular attention to: for students, access to study and training opportunities and to related services; for teachers, researchers and administrative staff, recognition and valorization of periods spent in a European context researching, teaching and training, without prejudicing their statutory rights.
- Promotion of European co-operation in quality assurance with a view to developing comparable criteria and methodologies.
- Promotion of the necessary European dimensions in higher education, particularly with regards to curricular development, inter-institutional co-operation, mobility schemes and integrated programmes of study, training and research (Bologna Declaration, 1999, p. 4).

After the declaration of 1999, the Bologna process has experienced a rapid evolution over the years, with the adoption of a series of reforms focused on the objectives set in 1999. To date, the signatory countries of the Bologna process are 48<sup>111</sup> together with several representative organisations operating at the European level, including representatives of students (National Unions of Students in Europe - ESIB), higher education institutions (European University Association - EUA and European Association for Institutions of Higher Education - EURASHE), quality assurance agencies (European Association for Quality Assurance in Higher Education - ENQA), employers (Union of Industrial and Employers' Confederations of Europe - UNICE) and the academic trade unions (Education International). The thrust of attraction that has been at the beginning of the Bologna process

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<sup>111</sup> In addition to the 29 first signatory countries, Croatia, Cyprus and Turkey joined the Prague Convention of 2001. In 2003, with the Berlin Convention, the number rose to 40, with the new memberships of Albania, Andorra, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Russia, Vatican City, Liechtenstein, Serbia and Montenegro. Other 5 are added to Bergen in 2005: Armenia, Azerbaijan, Georgia, Moldova and Ukraine. In 2007, Montenegro joined Kazakhstan in 2010 and Belarus in 2015.

has given great satisfaction. Not just the narrow European Community is participating in these works, but also many of the neighboring states (Keeling, 2006).

As well as Bologna process, also the Lisbon strategy represents an important pillar for the Higher Education system evolution and transformation. The aim of the Lisbon Strategy, launched in March 2000 with the extraordinary Spring conference of 23 and 24 March 2000 by the EU heads of state and government, was to make Europe "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Council, 2000). The overall strategy defined to achieve this objective includes:

- The transition to a knowledge-based economy and society by improving information society and R&D policies, and accelerating the structural reform process for competitiveness and innovation and completing the internal market.
- Modernize the European social model by investing in human resources and combating the social exclusion.
- Support the healthy economic environment and prospects for favorable growth by applying an appropriate combination of macroeconomic policies (European Council, 2000, p. 2).

The Lisbon Strategy then adopted the Open Method Coordination to provide a common framework for coordinating actions to be taken at the Member states level. A ten years period (2000-2010) was set to reach the established objectives, with yearly monitoring to be carried out by the Spring European Council. Further, with subsequent documents issued by the European Commission, universities have been put at the center of the project to achieve the objectives of the Lisbon Strategy (Keeling, 2006). In particular, the Communication: "The Role of the Universities in the Europe of Knowledge" (European Commission, 2003), followed in 2005 by the communication "Mobilising the Brainpower of Europe" (European Commission, 2005a) have highlighted that European universities are the engines of the new paradigm based on knowledge and that Europe needs to strengthen the three elements on which its knowledge is based, that is: education, research and innovation. Universities are deemed essential in each of these three areas. Investing more and better in the modernization and quality of universities is a direct investment on the future of Europe and Europeans.

Moreover, these Communications have underlined that in an open, competitive and dynamic environment, autonomy is indispensable to enable universities to respond to changing society's needs and take full responsibility for these responses.

In particular, on this point, European Commission (2005a, p. 8) has established that Universities should be responsible for:

- The definition of medium - term specific priorities (defining in particular types of research, teaching and services in which they intend achieve the level of qualitative excellence) and the address of the collective effort of their staff to such priorities.
- The management and development of their human resources.
- The definition of their own study plans - based on the internal mechanisms of quality assurance and in accordance with the common principles of European space of higher education.
- The professional management of their own structures (property, management and development), of financial resources (budgets, investments and loans) and of communication external (creating a brand image).

In order to attract greater financial resources, universities must first convince key stakeholders in the sector (governments, companies, families) that existing resources are being used effectively and that new resources would create added value for their benefit. An increase in funding cannot be justified without radical changes: allowing such changes is the main justification and the first goal of any new investment (European Commission, 2005a, p. 9).

Finally, it is worth to mention that also the recent “Europe 2020” strategy has recognized explicitly the central role of universities in helping Europe to become a smarter, greener and more inclusive economy by 2020, by underlining the need to improve the performance and international attractiveness of Europe's higher education institutions. It also stressed the necessity to raise the overall quality of all levels of education and training in the EU, combining both excellence and equity, by promoting student mobility and trainees' mobility, and improve the employment situation of young people (European Commission, 2010, p. 11).

Therefore, Bologna Process and Lisbon strategy have encouraged greater comparability and competition between Universities. As a consequence, new management and reporting systems incorporating IC assets, are strongly required in order to enhance competitiveness and allow comparisons between universities belonging to different countries (Secundo et al., 2015; Ramirez and Gordillo, 2014; Ramirez et al., 2016). Again, by considering the mobility of students and teachers also promoted within Bologna Process, a IC based report can be extremely useful for their decision-making process: for students in choosing where to go to

study and for teachers and researchers, in choosing where to go to work and increase their skills and competences (Ramirez et al., 2016).

### 3. The Intellectual Capital reporting in Universities: European experiences and studies

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#### 3.1 *IC in Universities: reporting experiences*

Notwithstanding the claimed need for a greater and significant accountability IC based, the above described changes which have radically transformed the Higher Education sector have not been followed by adequate changes in university management and reporting systems. As a result, a relevant gap has gradually emerged between the information provided by the universities through their current accounting systems and the information requested by the vast audience of stakeholders involved in university activities such as taxpayers, governments, students, research centres, external funders, and national agencies, causing a serious lack of accountability (Leitner, 2004; Sanchez and Elena, 2006; Elena and Warden, 2011; Ramirez and Gordillo, 2014; Ramirez and Lizano, 2015; Secundo et al., 2015; Secundo et al., 2016; Sangiorgi and Siboni, 2017).

As matter of fact, the information, mainly of financial and economic type, currently provided by universities in their annual reports, are deemed no longer adequately sufficient in satisfying the information needs of universities stakeholders which, as above observed, progressively demand greater transparency about the strategic assets and the value creation drivers of universities (Ramirez et al., 2011; Ramirez and Lizano, 2015; Sangiorgi and Siboni, 2017).

According to Ramirez (2016, p. 179) "In this scenario, and given the growing social concern about establishing processes of accountability in public higher education institutions and ensuring information transparency in these institutions, there is a need for major changes in the existing communication systems, such as the information on IC that these institutions should provide. So, through the presentation of this new information the external stakeholders may have at their disposal reliable and comparable information on the performance of institutions of higher education in all their areas of activity and may thus form judgments and take decisions."

Nevertheless, despite the awareness of the pivotal role played by IC in universities and the consequential overwhelming need to develop IC reports, with the exception of Austria,

no country has an obligation to draw intellectual capital statement and, there are very limited instruments to manage and report IC in universities (Canibano and Sanchez, 2004; Leitner, 2004; Sanchez and Elena, 2006; Bezhani, 2010; Ramirez et al., 2011; Sangiorgi and Siboni, 2017).

As a result, regulators, accounting profession bodies, observatories and accounting scholars have begun to formulate and develop suitable guidelines and frameworks in order to support the correct identification of IC components and stimulate the diffusion of common practices of managing and reporting of IC within universities (Ramirez et al., 2011; Sangiorgi and Siboni, 2017).

Besides the Wissensbilanz (the mandatory IC report for Austrian Universities), the most significant experience of IC reporting in Universities include: The Observatory of the European University (OEU) project; RICARDIS project; INGENIO and HERO project.

### 3.2 *The Austrian experience: The Wissensbilanz*

In 2002 Austria became the first European country in which the Intellectual Capital report has become mandatory for universities and research organizations. Indeed, in 2002 the Austrian Ministry for Education, Science and Culture released a new University Law for the reorganisation of all public Austrian universities based on the principles of NPM of autonomy, effectiveness and efficiency (Sanchez and Elena, 2006; Bezhani, 2010; Habersam et al., 2013; Ramirez, 2013).

This law, aiming at ensure more autonomy to Universities, introduced: a new output orientation logic; performance-based funding instruments; and, performance contracts in which the duties of both the universities (studies offered, human resources, research programs, co-operation and social goals) and the ministry (funding) were defined together with the budget allocation (Leitner, 2004, p. 132). According to University Law of 2002, together with the introduction of principles and instruments NPM based, the Austrian Ministry for Education, Science and Culture has obliged Austrian universities to draft an IC report (Wissensbilanz) annually starting from 2007 in order to facilitate the reporting process for universities about the activities and performance achieved by simplifying at the same time the evaluation activity of the Ministry. According to European Commission (2005a) "The IC statement should serve as a management instrument for the university as well as a communication instrument between universities and the Ministry".

In particular, IC reporting for Austrian universities has two basic purposes. Firstly, it has to provide useful information for the internal management of intangible resources in order to improve the objectives fixation and the strategies implementation. Secondly, IC report has

to satisfy the information needs of external stakeholders by disclosing information about the development and productive use of intellectual capital (Leitner, 2004; Bezhani, 2010; Silvestri and Veltri, 2011).

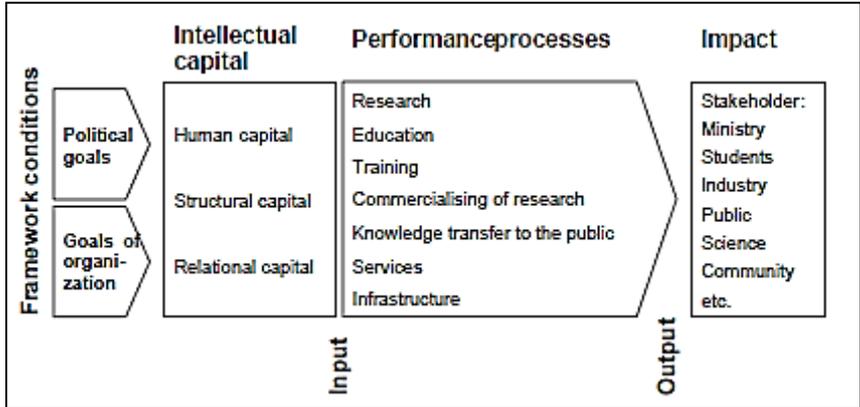
According to the Universities Act 2002, the intellectual capital report has to include, at least, the following elements:

- . the university’s activities, social goals and self-imposed objectives and strategies;
- . its intellectual capital, divided into human, structural and relational capital;
- and
- . the processes set out in the performance agreement, including their outputs and impacts (Federal Ministry of Education, Science and Culture of Austria, 2002; Sanchez and Elena, 2006; Ramirez et al., 2011; Ramirez, 2013).

The IC reporting in Austrian Universities draws its origin from the pioneering experience of the Austrian Research Centers “Seibersdorf” which, in 1999, became the first European entity to publish an IC report for the entire organization (Leitner, 2004; Sanchez and Elena, 2006; Habersam et al., 2013; Ramirez, 2013).

More specifically, the *Wissensbilanz* is based on a process-oriented approach. It proposes a visualization of the entire knowledge-production process through the main universities’ activities. Therefore, the Austrian University IC model is articulated into four main sections (see figure 6): *the goals* (divided in *political goals* defined by the Austrian Ministry and *organizational goals* established by universities); *the Intellectual Capital* (divided, according to Meritum Project, into three main components: Human Capital, Structural Capital and Relational Capital); *the performance processes* (identifiable in Research, Education, Training, Commercialising of research, Knowledge transfer to the public, Services, Infrastructure) and the *impact* (representing the different category of university stakeholders: Ministry, Students, Industry, Public, Science, Citizens’ community and so on).

**Figure 6.**  
The model of IC reporting of Austrian Universities (Leitner, 2004, p.133)



As shown in figure 6, the model follows an input-output logic. In particular, the IC components are considered as inputs for the Knowledge-production processes that enabled the university to achieve both political and organizational goals. Finally, the processes implemented through IC elements support impact directly on a wide range of stakeholders, thus, it becomes necessary to assess the process performance achieved (Leitner, 2004; Silvestri and Veltri, 2011). So that, a battery of non-financial and financial indicators for the different elements of the model was developed by the Ministry within a subsequent decree in 2004<sup>112</sup>. The use of these indicators, to which universities can add others according to processes developed and the stakeholders involved, has the final purpose of allowing a better assessment of the processes implemented by fostering comparisons and benchmarking between different universities and providing more useful information to external university stakeholders (Leitner, 2004; Silvestri and Veltri, 2011).

### 3.3 *The Observatory of the European University (OEU)*

The OEU project was born in 2004 within the European “Network of Excellence” PRIME (Policies for Research and Innovation in the Move towards European Research Area)<sup>113</sup> and involved researchers and research institutes of 15 different universities coming from eight European countries<sup>114</sup> (Sanchez and Elena, 2006; Ramirez et al., 2007; Canibano and Sanchez 2008). The purpose of this project is to foster a better understanding of the relevance of managing and reporting intangibles within universities in order to improve their level of quality and competitiveness by providing universities with the suitable instruments for the governance of research activities (Sanchez and Elena, 2006; Ramirez et al., 2007; Canibano and Sanchez, 2008; Sanchez et al., 2009; Bezhani, 2010). The main

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<sup>112</sup> Leitner (2004, p. 139) provides a sample list of Indicators suggested: *Human capital* (Number of scientific staff total; Number of scientific staff total (employed); Number of full-time professors; Number of student assistants; Fluctuation of scientific staff (as percentage of all scientific staff); Fluctuation of scientific staff (not employed) (as percentage of total; scientific staff [not employed]); Percentage growth of scientific staff; Percentage growth of scientific staff (not employed); Average duration of scientific staff Expenses for training; *Structural Capital* (Investments in library and electronic media); *Relational Capital* (Research grants abroad (as percentage of scientific staff); International scientists at the university (total in months); Number of conferences visited; Number of employees financed by non-institutional funds; Number of activities in committees, etc.; Hit rate European research programs; New co-operation partners; *Research* (Publications (referred); Publications (proceedings, etc.); Publications total; Number of publications with co-authors from the industry; PhDs; Non-institutional funds (contract research, etc.); *Education* (Graduations; Average duration of studies; Teachers per student; Drop-out ratio; PhDs and master theses finalized; *Commercialising* (Number of spin-offs; Employees created by spin-offs; Income generated from licences; Knowledge transfer to the public; Hits on Internet site; Lectures (non-scientific); *Services* (Measurement and lab services and expert opinions; Leasing of rooms and equipment)

<sup>113</sup> PRIME is composed by more than 40 European Universities and Research Institutions and more than 200 senior researchers (Canibano and Sanchez, 2008).

<sup>114</sup> Germany, Spain, France, The Netherlands, Hungary, Italy, Portugal and Switzerland.

output of this project is a Methodological Guide (OEU, 2006) in which a two dimensional “strategic matrix” is presented as an analytical framework to facilitate the analysis of university research management. (Sanchez and Elena, 2006, p. 539).

This matrix (see figure 7) is structured through five thematic dimensions and five transversal questions. The five thematic dimensions are: *funding* (all budget elements, analysing revenues and expenses; *human resources* (administrative staff, researches/teachers and PhDs); *academic production* (research activities outcomes in all fields (i.e. articles, academic publications, non-written results, and the knowledge embodied in PhDs); *third mission* (all the activities and relations between universities and non-academic partners (i.e. firms, non-profit organisations, public authorities, local government, and society as a whole); and *governance* (the process by which the university converts its inputs (funding and human resources) into research outputs (academic outcomes and third mission). The five transversal questions are: *autonomy* (the degree of freedom of the university to allocate resources or to use funds); *strategic capabilities* (the university’s real capacity to implement its own strategic choices; *attractiveness* (the university’s ability to attract resources of different nature within a context of scarcity; *differentiation profile* (the main characteristics of a university that differentiate it from the other strategic actors; and *territorial embedding* (geographical distribution of university involvement, contacts, collaborations, etc) (Sanchez and Elena, 2006, p. 539).

Each cell of the matrix represents the inter-relations between thematic dimensions and transversal questions and embeds key questions and a battery of indicators (provided by the Guide) to answer these questions (Ramirez et al., 2007; Sanchez et al., 2009).

Thus, this matrix represents a useful tool in order to support the assessment of universities research activities. It represents a suitable common framework to foster comparisons between universities. It also helps universities to analyse their strategic strengths and weaknesses and allow to individuate the most virtuous universities (Sanchez and Elena, 2006).

**Figure 7.**  
The strategic matrix developed within the OEU project

	Funding	Human Resources	Academic Outcomes	Third Mission	Governance
Autonomy	- Key Questions - Indicators				
Strategic Capabilities					
Attractiveness					
Differentiation Profile					
Territorial Embedding					

The last chapter of OEU project contains a propose for an Intellectual Capital Report (ICU Report) specifically designed for universities and research centres (Ramirez et al., 2011). The ICU report proposed has been fully tested at the Autonomous University of Madrid – UAM and only partly tested on other OEU universities (Canibano and Sanchez, 2009; Sanchez et al., 2009; Ramirez et al., 2011; Siboni et al., 2013). Grounded on previous guidelines developed for IC reporting in the private sector (e.g. DATI guidelines, 2000; MERITUM project, 2002), the ICU report provides a useful structure for the disclosure of university information on research.

In particular, the ICU report is articulated into three section: *Vision of the institution* (a section based on the description of the universities' general objectives and the strategies to reach team); *Summary of intangible resources and activities* (a section concerning both the description of the intangible elements owned by the universities and the different activities carried out or planned to develop and enhance them. It also contains a description of unique resources held by the institution as well as of the main areas of interest of the university) and *System of indicators* (a section containing a battery of indicators<sup>115</sup> classified according to a well-established taxonomy into Human Capital, Organisational Capital and Relational Capital and having the purpose to allow to internal and external stakeholders to assess the performance and estimate the future of the university correctly. These indicators are also considered very useful for the internal management control) (Canibano and Sanchez, 2009; Sanchez et al., 2009; Siboni et al., 2013).

### 3.4 *The RICARDIS project*

The RICARDIS (Reporting intellectual capital to augment research, development and innovation in Small and medium enterprise SME) project was developed in December 2004 by a high-level expert group selected by the Directorate General for Research of the European Commission (EC), in order to stimulate the IC reporting in research intensive Small and Medium-Sized Enterprises by providing on the one hand several recommendations to research intensive SME's and private stakeholders (financial organisations, accounting and other business organisations) and on the other hand public policy options to encourage research intensive SME's to report on their intellectual capital elements (European Commission, 2005b).

The Expert Group focused its attention on companies that either invest in Research and Development (R&D), or use the results of R&D to innovate by also taking into account the

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<sup>115</sup> A list of about 43 resource indicators for measuring IC in universities was suggested. These indicators were selected among the 141 indicators listed by the Strategic Matrix (Siboni et al., 2013).

implications for the specialist R&D units of larger companies, dedicated Research & Technology Organizations and Universities. Indeed, SMEs are considered as fundamental vehicle for economic growth, employment, technological development and structural change (European Commission, 2005b).

The output of RICARDIS' project is a report which mainly contains a guidance and seven policy recommendations<sup>116</sup> aiming to “stimulate the reporting of Intellectual Capital in SMEs by raising awareness, improving reporting competencies, promoting the use of IC Reporting and facilitating standardization” (European Commission, 2005b, p. 9). The IC reporting is defined as “the process of creating a story that shows how an enterprise creates value for its customers by developing and using its Intellectual Capital. This involves identifying, measuring, and reporting its Intellectual Capital, as well as constructing a coherent presentation of how the enterprise uses its knowledge resources” (European Commission, 2005b, p. 11).

The rationale of this project is that the Intellectual Capital represents a critical success factor for all organizations and an hidden driver able to ensure a sustainable competitive advantage and thus future potential earnings. Nevertheless, current accounting systems based on historic cost, backward-looking orientation and an overly prudential attitude are inadequate in providing a significant and correct evaluation of IC elements or intangibles. This in turn results in negative consequences both in the effective management of these resources and in reporting them to investors and stakeholders. Indeed, those SMEs which are IC intensive fail to provide an adequate representation of their activities and future earnings prospects to investors by encountering significant barriers in R&D investments implementation because are perceived as high-risk businesses and thus face considerable difficulties in obtaining the necessary financial resources.

Based on this assumption, RICARDIS' project considers the IC reporting as a suitable tool able to overcome these weaknesses by creating transparency about the organizational IC. In particular, the IC report can help managers in improving intangibles management, increases the staff's confidence and motivation as well as it can provide greater certainty to investors and other stakeholders about firms' future earnings potential, so addressing the above described barriers (European Commission, 2005b). Therefore, the RICARDIS believes

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<sup>116</sup> The seven policy recommendation are: 1) Establish a European Adoption Task Force; 2) Produce a practical guide on IC Reporting; 3) Use IC Reporting as an important criteria for public support for research intensive SMEs; 4) Apply IC Reporting as a tool for government agencies, Higher Education and Research Organisations; 5) Commence further research on IC Reporting; 6) Set up a Standardization Steering Group for IC Reporting; 7) Encourage the Banks to develop new forms of finance.

essential to promote the reporting of IC by SMEs companies as well as universities and research and technology organizations (Sanchez and Elena, 2006).

### 3.5 *INGENIO and HERO projects*

In 1999 in Spain was created “INGENIO” the Innovation and Knowledge Management Institute born as a joint initiative carried out by the Spanish Research Council (CSIC) and the Polytechnic University of Valencia, with the collaboration of the Technological University of Venezuela.

The INGENIO project has the purpose to create a center for reflection and action, open to learning and having three research lines: *innovation systems; organizational innovation; and knowledge management* (Sanchez and Elena, 2006; Bezhani, 2010).

By following these research lines, the INGENIO has begun to develop models and applications in the aim of improving the knowledge management processes in Spanish Higher Education Systems (Sanchez and Elena, 2006; Bezhani, 2010).

The main output of the INGENIO project has been the development of a research project named “Knowledge Portal”, a tool having the purpose to facilitate knowledge management and improve quality management in Spanish universities through the use of a set of “follow-up” indicators and the identification of “best practices” to follow within the Spanish Higher Education sector.

IC in Higher Education Institutions and Research Organizations (HERO) is a project developed by member of European Association of Research Manager and Administrators (EARMA) in collaboration with the European Center for the Strategic Management of Universities (ESMU).

This main aim of this project is to shed light on the relevance of IC in universities by promoting good practices for the IC management and reporting between universities and research centers (Leitner and Warden, 2003; Sanchez and Elena, 2006; Bezhani, 2010). This project requires, as a starting point, the necessary definition of strategic objectives since the value of the IC components is calculated on the basis of the contribution provided by them to the organization's goals achievement (Sanchez and Elena, 2006).

### 3.6 *Previous studies on IC in Universities*

Besides the above described projects, in recent years, several academic scholars, in the absence of compulsory IC reporting, have started to carry out empirical research in order to

investigate the type and amount of IC disclosure provided by universities through different accounting sources (annual reports, performance plans, social reports).

In particular, Bezhani (2010) has empirically analysed the extent and the nature of the voluntary intellectual capital (IC) disclosure provided by a sample of 30 UK universities through their annual reports, by utilizing a framework of 39 IC items grouped into eight IC categories: *human capital*, *structural capital*, *relational capital*, *research*, *education*, *knowledge transfers* and *services*. Moreover, the authors also analysed the relation between university performance measured in terms of ranking and amount of IC disclosed provided and the opinion of UK universities' directors of finance about a possible mandatory disclosure of IC for universities by sending them an online questionnaire. The study results highlighted that the extent of IC information disclosed by UK universities through their annual reports for the year 2005 was quite low and mainly in discursive form and that the most disclosed IC categories were *research*, *relational capital* and *human capital*. Further, the author found that the level of IC disclosure provided by UK universities was not influenced by the ranking position and that there is scarce awareness of the relevance of IC among UK universities.

On the other hand, in the Italian university context, Siboni et al. (2013) have analysed the performance plan, a document introduced in Italy with the Decree n.150/2009<sup>117</sup>.

In particular, by utilizing a framework based on the Danish guideline (DMSTI, 2003) and composed of a hierarchy of items grouped in three categories (*management challenges* (6), *actions and initiatives* (35) and *indicators* (119)), they have conducted a content analysis on a sample of 44 Italian state universities performance plans, published at the end of 2011, in order to assess the frequency, the incidence and the type of IC disclosure provided. The research results showed that Italian state universities' PPs place a particular attention on both the *external dimension* (i.e. developing knowledge networks and supporting the visibility of the institution), and the *internal one* (i.e. managing the institution process on IC issues) of IC. Moreover, all the *management challenges* suggested by the Danish guideline were reported, with a variable trend, while, the most frequent *actions and initiatives* cited were related to the IC categories of *structural/organizational* and *relational capital*, while little attention has been paid to *human capital*. Finally, the majority of IC information found on PPs was reported in a *declarative* form.

Low et al. (2015) have carried out a comparative and longitudinal empirical research over three a year period (2009 - 2011) on a sample of 90 universities (8 New Zealand

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<sup>117</sup> This decree has required the public administrations (including Universities) to draw up a three-year performance plan which identifies the strategic and operational objectives, and defines, with reference to the final and intermediate objectives and resources, the indicators for measuring and evaluating the performance of the administration.

universities, 38 Australian universities, and 44 UK universities). By adapting an IC framework developed by previous scholars (Sánchez et al., 2006; Schneider and Samkin, 2008; Yi and Davey, 2010) consisting of 19 IC items grouped in three main categories (*Internal Capital*, *External Capital* and *Human Capital*), they have performed a content analysis in order to assess the quality and the trend of voluntary IC disclosure provided by selected Universities through their annual reports. The study results showed that New Zealand and Australian universities outperformed the UK universities in terms of voluntary IC disclosures. Further, results showed moderate increases in the levels of voluntary IC disclosures over the three years investigated for all the countries. With reference to the individual IC categories, *Internal capital* and *human capital* were the most disclosed, while although *external capital* was the less disclosed category in all three countries, in terms of quality it outperformed both *internal capital* and *human capital*. Finally, most IC disclosures were disclosed in a *narrative* way.

Finally, Sangiorgi and Siboni (2017) have focused their attention on the social reports by investigating a sample of 17 Italian universities drafting a social report for the year 2013. In particular, by employing the framework developed by Bezhani (2010), they have performed a content analysis in order to assess the incidence, the frequency and the typology of IC disclosure provided by Italian universities through their social reports. Moreover, they have investigated the view of universities concerning IC managing and reporting and the possibility to have a compulsory IC reporting for universities in Italy by submitting an online questionnaire to universities' top managers. The study results evidenced significant levels of IC disclosure in universities' social reports with a prevalence of *structural capital* category followed by *knowledge transfer to the public* and *services* categories. Furthermore, the IC information were mainly conveyed in a *discursive* form. Finally, the results of the survey highlighted that most universities' top managers showed a fairish knowledge of IC and an awareness of advantages deriving from IC managing and reporting practices especially for the evaluation of universities' policies and strategies. Moreover, the majority of the respondents of the survey agreed with the possible policy of introducing compulsory IC reporting for Italian universities.

In addition, a parallel strand of IC literature, mainly located in the Spanish universities context, rather than analyzing the level of voluntary disclosure provided through the different accounting tools by universities, has concentrated its efforts in developing surveys in order to assess the universities stakeholders' information needs about IC (Ramirez et al., 2011; Ramirez and Gordillo, 2014; Ramirez et al., 2016).

Ramirez et al. (2011) have investigated a sample of 247 members of the Social Councils of Spain's public universities by sending them an online questionnaire during the period May-July 2009 in order to analyse the relevance attributed to publishing information on IC and the extent to which the different universities' stakeholder categories ask for IC information. The research results showed that most respondents attached pivotal importance to the publication of IC information by universities in order to improve the relevance and the transparency of current Spanish universities' accounting systems and enhance their decision-making process.

In the same vein, Ramirez and Gordillo (2014) by continuing the previous research of 2011 have submitted an online questionnaire to the same sample in order to identify the intangible elements on which the universities' stakeholders ask for more information and then formulate a definitive list of indicators to measure these key intangible elements. The results of the survey highlighted 13 key intangible elements: *academic and professional qualifications of the teaching and research staff, mobility of teachers and researchers, scientific productivity and teaching capacities and competences* (human capital); *effort in innovation and improvement, intellectual property and management quality* (structural capital); *graduate employability, efficiency of graduate teaching, student satisfaction, relations with the business world, the university's image and collaboration with other universities* (relational capital). Moreover, a battery of 30 indicators was proposed in order to measure these key intangible assets. Finally, Ramirez et al. (2016) have surveyed a sample of 327 members of the Social Councils of Spain's public universities during the period September - November 2013 in the aim of analyzing the views of Spanish university stakeholders about the usefulness of the current university's annual reports and the importance attributed to the presentation of information on IC. The results of the questionnaires showed the dissatisfaction of the stakeholders regarding the current information flow provided by Spanish universities through their annual reports due to the absence of relevant information about university's activities such as social and corporate responsibility, future resource distribution, the quality of teaching and research or efficiency and effectiveness of the institution and the excessive prevalence of financial information. Moreover, the majority of respondents demonstrated great interest in Spanish universities presenting information on IC.

Thus, in conclusion, despite the presence of these studies on IC disclosure in Universities, the empirical research on this field is still limited and offers great room for future investigations. According to "Secundo et al. (2015, p. 419) The public sector is one of the least addressed areas of intellectual capital (IC) research". In particular, a gap emerges in

literature because most of the research analysed are limited in the selection of the investigated geographical contexts and are mainly focused on static and traditional accounting tools such as annual reports. Furthermore, these research did not analyse the potential explanatory factors of the level of IC disclosure provided by Universities.

As a response, the three empirical researches presented in the next chapter tried to fill this gap by analyzing different universities' information sources, the potential determinants explaining the level of IC disclosure provided and different geographical contexts.

# THE LEVEL OF INTELLECTUAL CAPITAL DISCLOSURE IN UNIVERSITIES: EMPIRICAL EVIDENCES

**SUMMARY: 1. Introduction - 2. Research methodology - 3. The level of IC disclosure in Italian State Universities and its determinants - 4. The level of online IC disclosure in Italian Universities and its determinants - 5. Comparing Intellectual Capital disclosure in European Universities: towards a different accountability?**

## 1. Introduction

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The third section proposes the discussion of the results of three empirical researches that have been conducted and presented at three international conferences<sup>118</sup>.

These empirical researches have been carried out following a precise and specific literary seam, allowing to achieve several results whose discussion offers interesting and useful insights that contribute to the IC literature.

In particular, starting from the reference literature on IC, widely analysed in the previous chapters both in the private sector and in the public sector, the attention was focused on the context of universities and the investigation of the level of IC disclosure provided.

By considering the above discussed relevance of IC disclosure, the absence of compulsory specific IC reports in the European University context turns out to be rather paradoxical and have stimulated IC scholars to carry out empirical research in order to analyse the level of IC disclosure provided by Universities through other report and tools.

The empirical researches carried out and discussed in the following paragraph, can be situated in that seam of studies which investigates the level of IC disclosure provided by Universities in the absence of mandatory requirements, by analysing how current accountability tools utilized by Universities can be useful in order to disclose such information.

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<sup>118</sup> The three conference papers are:

“The level of IC disclosure in Italian State Universities and its determinants”, written with Natalia Aversano; Johan Christiaens; Francesca Manes Rossi and Paolo Tartaglia Polcini (2016);

“The level of online IC disclosure in Italian Universities and its determinants”, written with Francesca Manes Rossi and Paolo Tartaglia Polcini (2017);

“Comparing Intellectual Capital disclosure in European Universities: towards a different accountability?”, written with Isabel Brusca; Sandra Cohen and Francesca Manes Rossi (2017).

In particular, the three research have been developed by following a precise logical *continuum*<sup>119</sup>:

The first empirical research, presented at the “12th interdisciplinary EIASM<sup>120</sup> workshop on intangibles, intellectual capital and extra-financial information” held in St Petersburg in Russia<sup>121</sup>, aims to analyse the level of IC disclosure provided by Italian Public Universities through their annual reports for the year 2014. By applying a content analysis method and an un-weighted Disclosure Index, the research focuses on a sample of 61 Italian Public Universities, in order to investigate the extent of IC disclosure provided through the annual reports. The research also tests, through a linear regression model, the relationship existing between six explanatory factors (size, age, financial independence, financial performance, board size and board independence) determined according to the theories and previous research and the level of IC disclosure represented by the Disclosure Index. The results of content analysis show a medium level of IC Disclosure provided by sampled universities. Moreover, consistent with the results of previous research, the IC categories most disclosed are Internal Capital (42.14%) and Human Capital (34.74%). Therefore, the regression analysis results show that both the size and the board independence positively affects the level of IC disclosure. However, no significant statistical relationship has emerged between the other four potential explanatory factors and the level of IC disclosure.

The second empirical research, presented at the “16th biennial CIGAR<sup>122</sup> conference - future avenues for public sector accounting: engaging research, practice and use” held in Porto in Portugal<sup>123</sup>, has the purpose to go beyond the annual reports, by exploring new ways to disclose IC for Universities by focusing on the websites of a sample of 58 Italian Public Universities. In particular, by applying the content analysis method, the research, through the development of three un-weighted Disclosure Indexes, investigates the extent of online IC disclosure provided by a sample of Italian Public Universities and also the level of accessibility of their websites for the year 2017. Moreover, the research also tests the relationship existing between some explanatory factors identified in previous research (size, age, complexity, internationality, internet visibility and board size) and the level of online IC

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<sup>119</sup> The purpose of this paragraph is to briefly introduce the researches carried out and the results obtained to provide a first overview to the reader. Research methodology used, hypothesis and results will be analyzed and described in detail in the following paragraphs.

<sup>120</sup> European Institute for Advanced Studies in Management (EIASM) is an international network for management research and teaching that includes more than 50,000 management scientists from all over the world. Its mission is to enhance high quality in research and doctoral studies in management and related disciplines. [www.EIASM.com](http://www.EIASM.com).

<sup>121</sup> September 22-23, 2016.

<sup>122</sup> Comparative International Governmental Accounting Research Network (CIGAR) is an international network whose main aim is to promote worldwide discussion and research on comparative governmental accounting. Its main means to realize this mission are the organisation of biennial conferences, biennial workshops dedicated to more specific research themes, and a regularly appearing Newsletter. [www.CIGAR-network.net](http://www.CIGAR-network.net).

<sup>123</sup> June, 8-9, 2017.

disclosure represented by the Disclosure Index. The analysis shows an extensive use of IC disclosure via the website, with a particular focus on *human* and *internal capital*, while disclosure of *external capital* is still limited. It also demonstrates that Italian sampled universities are exploiting the potentialities offered by websites by providing a good level of accessibility to their users. Furthermore, Internationality and media visibility are two factors which positively affect the level of online IC disclosure provided by universities analysed.

Finally, the third empirical research, presented at the “13th interdisciplinary EIASM workshop on intangibles, intellectual capital and extra-financial information” held in Ancona, in Italy<sup>124</sup> represents a further evolution of previous research conducted because it extends the geographical boundaries of analysis by investigating three university European contexts: Italy, Greece and Spain. In particular, it analyses the level of IC disclosure provided by a sample of 128 universities coming from Italy (58); Greece (22) and Spain (48) through their websites, also assessing the accessibility of the same.

The comparative analysis, carried out through a content analysis of the websites for the year 2017, shows that the web is a suitable tool in order to provide IC information in all the countries, although with some differences, and that *Human capital* and *Internal Capital* are the most disclosed categories. Furthermore, results show that Italian Universities outperform both Spanish and Greek universities in terms of scores in all types of IC disclosure while the Greek universities with the exception of *Internal Capital* are the last in IC disclosure intensity.

Thus, after a brief introduction, the empirical research conducted will be illustrated and discussed in detail in the following paragraphs.

In particular, the present chapter is organized as follows. The next section describes the common research methodology employed to carry out the empirical research. The subsequent sections are each devoted to the presentation of the three research.

## 2. Research methodology

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### 2.1 *The content analysis*

In conducting any empirical research, the researcher must make clear the methodological approach employed to reach the research objectives and answer the research questions. According to Guthrie et al. (2004b, p. 419) the “methods are the means whereby one collects

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<sup>124</sup> 21-22 September, 2017.

and analyses data”, whereas “methodology refers to the philosophical issues which underlie those methods” (p. 419). However, the boundary between the two terms has assumed over the years rather nuanced outlines for which it is very common today to find in scientific articles and books the two terms as synonyms.

The common methodology adopted in all the three empirical research is based on a combination of quantitative and qualitative approaches utilized in a systematic way during the different phases of the analysis.

Basically, the first phase of the three empirical research carried out has involved the analyses of the data sources (annual reports and web sites) and the collection of the necessary information (IC content). This phase, which is the most delicate and important, has required the use of a purely qualitative methodological approach: the content analysis.

According to Krippendorff (1980, p. 3) “Content analysis entails a systematic reading of a body of texts, images, and symbolic matter, not necessary from an author's or user's perspective”. The author also argues that “Content Analysis is a “research technique for making replicable and valid inferences from data according to their context. As a technique, content analysis involves specialized procedures. It is learnable and divorceable from the personal authority of the researcher. As a research technique, content analysis provides new insights, increases a researcher's understanding of particular phenomena, or informs practical actions. Content analysis is a scientific tool.” (Krippendorff, 1980, p.18).

In the same vein, Weber (1990, pp. 5-8) argues that “content analysis classifies textual material, reducing it to more relevant, manageable bits of data. Social scientists who must make sense of historical documents, newspaper stories, political speeches, open-ended interviews, diplomatic messages, psychological diaries, or official publications - to name a few - will find the technique indispensable”. He defines content analysis as “a research method that uses a set of procedure to make valid inferences from text. These inferences are about the senders of the message, the message itself, or the audience of the message (...) Content analysis can be used for many purposes as disclose international differences in communication content; compare media or “levels” of communication etc...”.

In recent years Guthrie et al. (2004, p. 287) by referring to content analysis as a useful method to inquire into IC reporting state “As a technique for gathering data, it involves codifying qualitative and quantitative information into pre-defined categories in order to derive patterns in the presentation and reporting of information. Content analysis seeks to analyse published information systematically, objectively and reliably”.

Thus, taking into account the specific peculiarities, the content analysis has been considered as the most suitable research method in order to carry out the empirical

research based on the investigation of different data source as annual reports and websites in order to find IC information. Indeed, according to McMillan (2000) the content analysis advantages could be extended equally to the web content analysis.

More specifically, by considering the IC disclosure research field, this method seemed to be particularly suitable. Indeed, the structured literature review on IC disclosure studies conducted by Cuzzo et al. (2017) has revealed that the content analysis is the most common utilized research method by confirming a data already highlighted by other authors (Dumay, 2014; Dumay and Guthrie, 2017).

Indeed, despite the drawbacks related to the subjectivity and the possible absence of comparability and reliability (Dumai and Cai, 2014; 2015), the content analysis is considered as a popular and empirically valid research method in this field (Guthrie et al., 2004; Goebel, 2015; Low et al., 2015).

According to Guthrie (2014) “Disclosure studies and the use of CA are a legitimate method of collecting data. They make possible the understanding of certain research issues in the IC field, in ways that other methods cannot”. Furthermore, this method has several advantages: is not overly time-consuming; is less costly than other methods and, is mainly a deskbound activity with immediate access to data source and which can be applied to different geographical settings, organisational form and type of documents (Guthrie, 2014; Cuzzo et al., 2017; Dumay and Guthrie, 2017).

According to Steenkamp and Northcott (2007, p. 12) “two generic approaches to content analysis can be identified: “form oriented” (objective) analysis, which involves the routine counting of words, concepts or themes; and “meaning oriented” (subjective) analysis, which focuses on inferring the underlying meanings present in the texts being investigated”. In this case, in all the three empirical researches carried out, the second approach has been followed.

Indeed, by considering the necessity to investigate a social phenomenon, particularly subjective and abstract nature as IC which (Low et al., 2015, p. 784), in data sources not specifically designed to convey IC information (Dumay and Tull, 2007), it was fundamental to adopt an interpretative approach by analysing the specific meaning of sentences in relation to the context, the discourse or the purpose. In this way, it has been possible to correctly draw the specific inferences IC based from the data sources analysed by avoiding the risk of utilizing simple words, concept or themes which were not linked to the phenomenon examined (Steenkamp and Northcott, 2007).

Moreover, according to several authors (Krippendorff, 1980; Weber, 1990; Bozzolan et al., 2003), a correct content analysis process involves different phases: (1) the selection of a

theoretical framework employed to classify information and derive the items list; (2) the definition of the unit of analysis; (3) the definition of rules for the coding process; and (4) the assessment of the level of reliability achieved.

As regards the first point, for the three studies conducted, in accordance with previous ICD scholars (Guthrie et al. 2004, p. 289; Steenkamp and Northcott, 2007; Dumay and Cai, 2015), in order to improve the reliability and the comparability of researches, a well-established in IC literature theoretical framework has been selected. Thus, a theoretical framework developed by Low et al. (2015) adapted from Yi and Davey (2010), Schneider and Samkin (2008) and Sanchez et al. (2006) was employed. Low et al. (2015) investigated with a qualitative approach (Disclosure Index 1-5) the level of voluntary IC Report in New Zealand, Australia and United Kingdom universities, using a list of 19 items divided between the three main categories (see table 4).

**Table 4.**  
Low et al' s (2015) original theoretical framework

<b>IC category</b>	<b>IC components</b>	<b>Description</b>
<b>Internal Capital</b>		
1	Intellectual Property	All copyright (in relation to phonograms and broadcasts), patent rights, plant varieties, registered and unregistered trademarks, and publications ( journal, books, e-journals, chapters, etc.) held by sample university.
2	University Culture	Comprising the vision, attitudes, experiences, beliefs, and values of a university.
3	Management Philosophy	Information referred to in mission statement.
4	Management Processes	Information relating to the process in the university.
5	Information system/ networking system	Information on the development, use application, and influence of systems.
6	Research projects	Research projects conducted by a university.
7	Financial relations	Information referring to the relationships between the university and its financial supporters.
<b>External Capital</b>		
1	Brands	Information on brands associated with the university.
2	Students/student satisfaction	Information relating to students and their satisfaction about learning.
3	Business/university partnership	All the activities and collaboration between universities and other organisations (firms, non-profit organisations, public authorities, local government, and society as a whole).
4	Student database	Database of all students.
5	Quality standards	All the activities and collaboration or partnership between universities and other organizations (Other universities, no profit organizations, local governments, firms and so on)
<b>Human Capital</b>		
1	Work-related knowledge/ know-how	Individual competencies of researchers, knowledge or skill obtained from the job or training.

2	Employees	Information regarding staff, researchers, lecturers, PhD students, and administrative personnel.
3	Employee's experience in profession	Information referring to employees' international or national experiences in their profession.
4	Employee qualification	Information relating to employees' qualifications.
5	Employee Compensation or benefit	Information referring to welfare or other benefits for employees and PhD students provided by a university.
6	Cultural diversity	Demographic information of employees.

Source: Low et al. (2015, p. 787)

In addition, according to previous scholars suggestions (Guthrie et al., 2006; Steenkamp and Northcott, 2007; Husin et al., 2012; Dumai and Cai, 2015) in order to improve the accuracy of the analysis, the Low et al.'s (2015) list has been partially modified in all the three researches in order to adapt the framework to the peculiarities of the context and data sources analysed<sup>125</sup>.

As regards the second point, according to previous scholars (Guthrie and Petty, 2000; Oliveras et al., 2008; Schneider and Samkin, 2008; Bezhani, 2010; Siboni et al., 2013) sentences and paragraphs have been used as unit of analysis; about sentences Milne and Adler (1999, p.243) stated: "As a basis for coding sentences are far more reliable than any other unit of analysis....Individual words have no meaning to provide a sound basis for coding social and environmental disclosures without a sentence or sentences for context"; while Oliveras et al. (2008, p.173) remarked that "Content analysis that identifies sentences in which words are used in an appropriate context is regarded as superior to simple word incidence counts".

Regarding the third point, in all cases, in order to ensure the reliability and the validity the content analysis was manually performed (Goh and Lim, 2004; Oliveras et al., 2006; Taliyang et al., 2011) by registering on a coding sheet the data gathered from the annual reports or the web sites. As argued above, by following an interpretative approach, the content analysis process has been carried out by coding for real meaning rather than looking for simple words, avoiding broad and misleading concepts. In this way, only sentences or paragraphs with clear and precise reference to the items selected have been accepted.

Finally, as regards the reliability assurance, in all the empirical researches conducted, the researcher was assisted by another researcher which has independently codified a sample of annual reports (or websites). In particular, a first round of coding on a reduced sample (5 universities) has been conducted by the two researchers in order to assess the potential

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<sup>125</sup> The item lists and the changes made to the original framework will be presented in the next specific sections dedicated to the three empirical research.

differences and clarified the grey areas. Then, after a second round usually conducted on a larger sample (10 universities), the test to assess the reproducibility aspect of reliability has been performed by calculating the Krippendorff's  $\alpha$  with SPSS macro which, in all cases, returned a value above the minimum acceptance threshold of 0.80 (Nurunnabi et al., 2011; Krippendorff, 2013, p.278; Dumay and Cai, 2015).

## 2.2 *The disclosure index*

Generally, in performing the three researches, after a first phase of the analysis conducted by following a qualitative approach content analysis-based, a second phase involving a quantitative approach has been carried out.

Indeed, after having explored the sources and collected the data, it has been necessary to quantify and synthesize the information obtained in order to make comparisons and subsequent statistical analyses.

The most suitable and popular means for quantifying information obtained through content analysis is the Disclosure Index.

According to Coy et al. (1993, p. 122) "A disclosure index amounts to a qualitative based instrument designed to measure a series of items which, when aggregated, gives a surrogate score indicative of the level of disclosure in the specific context for which the index was devised".

Several authors in accounting literature have used one or more disclosure indexes in order to examine and quantify the level of firms' disclosure (e.g. voluntary or compulsory firms' disclosure; risk disclosure; environmental sustainability disclosure; IC disclosure, etc..) by exploring different data sources (annual reports; web sites; management commentaries; analyst reports, etc.) through the content analysis.

Basically, in the accounting literature, the disclosure indexes can be grouped in two main categories: *weighted* and *un-weighted*.

The *weighted* disclosure indexes attribute a different importance to the different items related to the information gathered through the content analysis included in the coding list. In this way, the items are not considered of equally important and a weight is assigned to each of them according to a relevance judgment provided by a particular user group (analysts, accountants and other stakeholders) (Shingvi and Desay, 1971; Buzby, 1975; Botosan, 1997; Schneider and Samkin, 2008; Nurunnabi et al., 2011).

On the other hand, the *un-weighted* disclosure indexes attribute the same importance to all the items included in the coding list without assigning a specific weight. This approach presupposes that the selected items have the same relevance for all users group and allow to

avoid the possible drawbacks related to the subjectivity which can affect the assignment of weights to the items (Cooke, 1989; Raffournier, 1991; Brennan, 2001; Haniffa and Cooke, 2002; Olivera et al., 2006; Bukh et al., 2007; White et al., 2007; Li et al., 2008; Allegrini and Greco, 2011; Hidalgo et al., 2011; Ferreira et al., 2012).

In all the empirical researches included in this thesis only *un-weighted disclosure indexes* have been developed. This choice is based on the consideration all the information analysed and gathered in the indexes were of equally important and that the focus of the research was not only on a particular user group but on all University stakeholders (Cooke, 1989; Raffournier, 1995; Akhtaruddin, 2005); moreover this choice allowed to reduce potential problems linked to the subjectivity in assigning weights and quality judgments to the items (Williams, 2001)<sup>126</sup>.

A typical un-weighted disclosure index is structured as follows:

$$\text{Index} = \frac{\sum_{i=1}^m di}{m}$$

Where:

$\sum_{i=1}^m d$  = the sum of the items found in the documents analyzed;

m = the maximum number of items obtainable.

In this way the higher the value of the index (the maximum is 1) and the higher the number of information found in the document and thus the informative capacity.

### 2.3 *Statistical analysis*

The third and last phase of the empirical researches has involved the use of inferential statistical analysis. In particular, after having quantified the information gathered through the content analysis in specific disclosure indexes, a set of hypothesis has been statistical tested. Indeed, the final objective of the empirical researches has been that to identify some explanatory factors influencing the level of IC disclosure provided by sampled Universities through the annual reports and the websites.

Thus, multivariate linear regression models have been utilized.

The linear regression is a statistical procedure for predicting the value of a dependent variable from an independent variable when the relationship between the variables can be described with a linear model.

A linear regression equation can be written as:

$$Y_p = mx + b,$$

Where:

$Y_p$  = the predicted value of the dependent variable,

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<sup>126</sup> The different disclosure indexes developed within the empirical researches will be illustrated and described in the next devoted sections.

$m$ = the slope of the regression line and,  
 $b$ = the Y-intercept of the regression line.

The variable of interest,  $y$ , is conventionally called the "dependent variable". The other variables  $x$  are called the "independent variables" and represent the statistical factors which are presumed to influence the variability of the dependent variable.

Multivariate regression models involve the use of multiple independent variables and thus are considered better than univariate regression model (Akhtaruddin, 2005) in order to test several hypotheses simultaneously. Such models have been utilized by several authors in IC literature in order to examine different potential factors affecting the type and the extent of IC disclosure (Akhtaruddin, 2005; Nurunnabi et al. 2011; Oliveira et al., 2011; Taliyang et al. 2011; Allini et al. 2016).

In particular, in the present case, the dependent variable was represented by the disclosure indexes obtained and representing the level of IC disclosure provided by universities (through the annual reports and web sites), while the independent variables both of financial and non-financial type were selected according to previous studies and theories.

In this way, it has been possible to analyse not only the informative capacity with the reference to the IC of the different universities' data sources analysed but also the statistical probability that certain factors can affect the level of IC disclosure provided by selected universities through such means.

### 3. The level of IC disclosure in Italian State Universities and its determinants

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#### 3.1 *Research objectives and research questions*

This research aims to provide a clear picture of the state of the art of ICD in Italian public universities context and then analysing some of the potential factors affecting this type of disclosure.

To this end, the universities' annual reports for the year 2014 have been considered and a disclosure index representing the level of IC disclosure has been developed after the content analysis in order to test some of the determinants generally considered by the literature on voluntary disclosure.

Italy has been selected because, as argued in previous chapter, is an example of country in which several changes have been enforced by law in accounting for the high education

system context, management and performance evaluation systems in the aim of ensuring greater transparency and efficiency (Esposito et al. 2013; Siboni et al. 2013).

Annual reports have been selected as a source of data because, being the main universities' accounting outcomes, presented to stakeholders every year, allow the dissemination of the image and relevant information to external stakeholders in a systematic and regular way by also fostering easier comparisons and assessments between them (Guthrie et al., 2004; Yi and Davey, 2010; Low et al., 2015).

As discussed above, considering the previous research on ICD a gap emerges in the public sector, especially in the university field because previous studies are few and do not analyse possible explanatory factors of the levels of ICD. To fill this gap, this study aims to answer two main research questions:

RQ1: • What is the level of the ICD in Italian universities?

RQ2: • To what extent potential explanatory factors can influence the level of ICD in Italian universities?

### 3.2 *Development of hypothesis*

Based on previous research, a set of potential drivers affecting the level of ICD are selected and coherent hypothesis are tested. Moreover, this research, as previous studies on IC disclosure, can be grounded in several theories (Guthrie et al., 2006) such as *agency theory* (Jensen and Mackling, 1976; Li et al., 2008), *stakeholder theory* (Guthrie et al., 2004; Whiting and Miller, 2008; Yi and Davey, 2010), *signalling theory* (Guthrie and Petty, 2000; Whiting and Miller, 2008), *political costs theory* (White et al., 2007) and *resource dependence theory* (Pfeffer and Salancik, 1978; Abeysekera, 2010); these theories, considered in a separate way or in an integrated way, help to explain voluntary ICD.

#### 3.2.1 *Size*

According to the *stakeholder theory*, all stakeholders (investors, creditors, citizens, governments, employees, etc.) have the right to access any relevant information ranging from mandatory information about profitability or financial performance to voluntary information of non-financial nature (e.g. social, environmental and intellectual performance data) (Guthrie et al., 2006). In accordance with Garcia-Meca et al. (2005), Lopes and Rodrigues (2007), and Oliveira et al. (2011) larger companies are more visible and are more subject to external pressures and political attacks, so they tend to disclose more information in order to enhance confidence, reduce external pressure and decrease political costs. In this

regard, as White et al. (2007) argue, the ICD can represent a valid attempt to mitigate political costs. In the case of universities, as public institutions they have high political costs due to high number of stakeholder which they are responsible to (taxpayers, governments, students, etc.) (Gordon et al., 2002; Gallego-Alvarez et al., 2011). Thus, as their size increases, it is reasonable to expect a more extensive disclosure.

Several authors have empirically studied the relationship between firm size and the level of ICD in the private sector domain by generally finding a positive relationship. As regards the university's context, Gordon et al. (2002); Maingot and Zeghal (2008) and Gallego-Alvarez et al. (2011) found a positive and significant relationship between respectively colleges and universities size and the extent of disclosure. Thus, according to *stakeholder theory*, *political costs theory* and the previous studies, a positive relationship between university size and the level of ICD is expected.

***H1: There is a positive relationship between university size and the level of IC disclosure.***

### 3.2.2 Age

According to Sonnier et al. (2009), younger firms which have a reduced history and less experience on the market can face several problems in obtaining external capital at low price because they might be perceived as high-risk companies (Anderson, 1966). For this reason, the disclosure of information, especially the IC resources disclosure, can be particularly useful in order to reduce the risk perception and, in turn, the equity cost (Sonnier, et al., 2009).

On the other hand, Bukh et al. (2005) supposes that company's disclosure can be positively related to the years of experience in the business. Similarly, in university context, Banks et al. (1997, p.211) stated that "established universities tended to have better quality disclosure than new universities in the categories of service performance and financial performance".

Scholars have studied the relationship between firms age and the level of ICD in the private sector domain by finding conflicting relationships. In the same vein, in the university's context, both Alvarez et al. (2011) and Bisogno et al. (2014) did not find a significant relationship between university age and online disclosure.

According to the theory and based on the previous mixed results, a relationship without a particular sign between university age and the level of IC disclosure is expected.

***H2: There is an association between university age and the level of IC disclosure***

### 3.2.3 *Financial Independence*

According to the *agency theory*, firms with a high level of debt generate higher monitoring costs given the high presence of external funders (Jensen and Mackling, 1976; Gordon et al., 2002). In particular, creditors and lenders due to their bargaining position tend to stimulate the firms' managers to disclose more information in order to reduce the information asymmetry and the potential wealth transfer (Jensen and Mackling, 1976; Oliveira et al., 2006; Nurunnabi et al., 2011).

This is also true as for public sector entities, in particular for public universities. Indeed, according to Gallego-Alvarez et al. (2011), public European universities are largely funded with external financial resources provided by the State, Local governments and research centres. Thus, according to the *agency theory*, one could expect a more extensive disclosure since this higher presence of external funders.

Scholars have studied the relationship between the level of ICD and leverage, obtaining different mixed results. In the university's domain, Gordon et al. (2002) did not find a significant relationship between university leverage and disclosure as well as Alvarez et al. (2011), who found no significant relationship between university leverage and online disclosure.

Thus, according to the *agency theory* and previous studies, a relationship without a specific sign between university financial independence and the level of ICD is expected.

***H3: There is an association between university financial independence and the level of IC disclosure.***

### 3.2.4 *Financial performance*

According to the *agency theory*, when an organisation obtains good economic and financial results its managers is particularly prone to disclose more and detailed information in order to strengthen their position and attain more benefits and rewards (Giner, 1997; Garcia-Meca et al., 2005; Oliveira et al., 2006).

Further, from a *signalling theory* perspective, in the presence of high profitability, managers are more stimulated in communicating "good news" in the aim of improving the stock price (Giner, 1997; Garcia-Meca et al., 2005; Oliveira et al., 2006). Therefore, Li et al. (2008) evidence that organisations may be induced to corroborate the good performance with information about existing IC resources which the good performance is based on.

From an empirical perspective several authors have studied the relationship between the level of firms' ICD and profitability, by finding predominantly a positive association (Cerbioni and Parbonetti, 2007; Li et al., 2008; Nazli and Ghazali, 2013).

However, universities are public entities, thus, as Brown (2005) highlights, there are several problems in measuring performance, as typical profitability indicators are not suitable. Thus, the approach of Ingram and Copeland (1982) and Brown (1993; 2005) has been followed, considering the ratio between revenues and expenses as a proxy for financial performance.

Consistent with *agency theory*, *signalling theory* and the results of previous studies, a positive association between university financial performance and the level of ICD is expected.

***H4: There is a positive relationship between university financial performance and the level of IC disclosure.***

### 3.2.5 Board size

Several authors have investigated the association between board size and the level of firms' disclosure and in recent years this debate has involved also the ICD. From an *agency theory* perspective larger boards may be less able than smaller boards in monitoring managers' actions due to the problems deriving from an increase in decision-making time as well as from communication and coordination issues (Lipton and Lorsh, 1992; Cerbioni and Parbonetti, 2007; Allegrini and Greco, 2013).

On the other hand, from a *resource dependence theory* point of view, the board can be seen as an incubator of valuable resources for the organization (Pfeffer and Salancik, 1978). In particular, board members are seen as bearers of skills, experiences, competences and capabilities (Abeysekera, 2010). In this way, according to Nazli and Ghazali (2013), larger board can positively influence the managers monitoring activity effectiveness. In the same way, Hidalgo *et al.* (2011, p.486) argue that a large number of board members enhances the "pool of expertise" of a firms.

In the private sector domain, several empirical studies have investigated the relationship between the level of IC disclosure and the board size by finding a positive relationship (Hidalgo *et al.*, 2011; Nazli and Ghazali, 2013). However, in the University's context, Bisogno *et al.* (2014) didn't find a significant association between university board size and online website disclosure.

In this study, according to *resource dependence theory* and previous studies a positive relationship is expected between university board size and the level of ICD.

**H5: There is a positive relationship between university board size and the level of IC disclosure.**

### 3.2.6 Board independence

According to the *agency theory* external and independent board members, due to their neutrality and professionalism, are able to better exert their monitoring role, reducing agency costs and promoting greater disclosure, thus, mitigating potential conflicts between board members (Fama and Jensen, 1983; Cheng and Courtenay, 2004).

The role of independent and external directors is also emphasized by the *resource dependence theory*. Haniffa and Cooke (2002) underlines that the external directors, thanks to their expertise and prestige, provide several benefits to the firms especially in terms of external relations with the external environment. Moreover, as Li et al. (2008) argue, independent directors can decisively influence also the ICD improvement.

In IC empirical research, several authors (Cerbioni and Parbonetti, 2007; White et al., 2007; Li et al., 2008; Nazli and Ghazali, 2013) found a significant and positive relationship between board independence and the level of ICD provided by private firms.

Thus, according to *agency theory*, *resource dependence theory* and previous studies a positive relationship is expected between university board independence and the level of ICD.

**H6: There is a positive relationship between university board independence and the level of IC disclosure.**

Table 5 summarises hypothesis, variables definition, proxies, reference authors, supporting theories and expected signs.

**Table 5.**  
Definition, proxies, supporting theories and predicted sign for independent variables.

HP	Variable	Variable proxy	Reference authors	Theories	Expected sign
HC1	Size	Natural log of Number of employee	Bontis (2003); Bukh et al. (2005); Boesso and Kumar (2007); Sonnier (2009)	<b>Stakeholder Theory; Political costs Theory</b>	+
HC2	Age	Very Old University, if the University was founded before 1964= 2; old University if it was founded between 1964 and 1994=1 and New university if it was founded after 1994=0	Akhtaruddin (2005)	<b>Signalling Theory</b>	+ / -

<b>HC3</b>	<b>Financial Independence</b>	Own revenues on total revenues	Ingram and Copeland (1981); Ingram and Copeland (1982); Windel and Christiaens (2006)	<b>Agency Theory</b>	+ / -
<b>HC4</b>	<b>Financial Performance</b>	Total revenues on total expenses	Ingram and Copeland (1982); Brown (1993); Brown (2005)	<b>Agency Theory; Signalling Theory</b>	+
<b>HC5</b>	<b>Board Size</b>	Number of board members	Cerbioni and Parbonetti (2007); Allegrini and Greco, (2013); Nazli and Ghazali (2013) and Allini et al. (2016)	<b>Resource Dependence Theory</b>	+
<b>HC6</b>	<b>Board Independence</b>	Number of External (independent) directors on number of total board members	Lopes and Rodrigues (2007); White et al. (2007); Hidalgo <i>et al.</i> (2011); and Allini <i>et al.</i> (2016)	<b>Agency Theory-Resource Dependence Theory</b>	+

### 3.3 Sampling

This research focuses on Italian public university in the year 2014. This represents a crucial year because, as stated in previous chapter, Dlg.18/2012 forced all universities to adopt, from the 1 January of 2014 (limit extended later to 2015), an accrual accounting systems with the drafting of a single annual report drafted in an economic-patrimonial key and the implementation of cost accounting procedures, for the purpose of management control. Due to this change, in 2014 some universities still prepared their financial statements based on cash-accounting, while others already adopted the new accrual systems. To facilitate the conversion, the law obliged universities which already prepared their financial statements using the accrual system, to also draw up the financial statement in a cash-based form.

A sample of all Italian Public universities, including 61 State universities, 3 High Education Centers and 3 PhD School was initially selected. Private universities (including those promoted by public bodies) and telematics universities have been excluded due to different accounting data, legislative background and funding sources. Thus, from the initial sample of 67 units, due to lack of data, 6 universities are eliminated, leading to a final sample of 61 units.

### 3.4 Theoretical framework development

As specified in the previous paragraph specifically devoted to the general research methodology explanation, in all the three research conducted, the Low et al. 's (2015) framework reference list has been partially modified.

In this case, this list has been partially modified because of the peculiarities of the Italian context. More specifically in the *Internal Capital* category the item “Information Systems/networking system” has been split in two items: “Infrastructural facilities” (which includes the basic equipment like classes, laboratories, libraries) and “Infrastructural ICT”, (including technologies: database, connections, new technologies and so on). In the *External Capital* category three new items have been added: “Mobility programs for students” (such as Erasmus programs); “Post-graduation, high education and specialization programs” (masters, training, specializations for students who have finished their studies) and “GSR” (for the universities that prepare the Global Social Report, in which information about IC are often included).

The *Human capital* category includes five new items: “Mobility programs for researchers and professors”; “Phd Student information” (Information about active courses, programs, funds and so on); “Database of employee as professors and researchers” (Information about the number of full professors, associate professors and researchers); “Database of staff and administration” (Information about the number of staff and administrative employees divided by categories B – C – D – EP and directors) and “Recruitment plans of New employee/Turnover” (Politics about turnover and recruitment of new employee).

Thus, a final list of 24 items as detailed in Table 6 has been obtained.

**Table 6.**  
Intellectual capital category, components, and descriptions

<b>IC category</b>	<b>IC components</b>	<b>Description</b>
<b><i>Internal Capital</i></b>		
1	Intellectual Property	Information about patents rights held by University or publications, books, articles developed by researchers.
2	University Culture	Comprising the vision, attitudes, experiences, beliefs, values and future programs of universities
3	Management Philosophy	Information referred to university mission and main objectives
4	Management Processes	Information about university processes
5	Infrastructural facilities	Information about infrastructural framework and facilities as poles university, classes, laboratories and libraries
6	Infrastructural ICT	Information about ICT technologies as database, connections, new technologies, new instruments and software.
7	Research Projects	Research projects conducted by University
8	Financial relationships	Information about the relationships between the University and its financial supporters
<b><i>External Capital</i></b>		
1	Brands	Information on brands associated with University
2	Student satisfaction	Information relating to students and their satisfaction about learning
3	International programs for students - mobility	Information about mobility programs for students and international programs as Erasmus and so on
4	Post-graduation, high education and specialization programs	Information about agreements with companies and public institutions for students placements, masters, training, collaboration, programs post graduate or post doctorate, specialization
5	Business/University partnership	All the activities and collaboration or partnership between universities and other organizations (Other universities, no profit organizations, local

		governments, firms and so on)
6	Students database	Database of number of students per faculty or departments
7	Quality standard	Information referring to teaching quality or learning quality
8	GBS	Social financial statement (Bilancio sociale)
<b>Human Capital</b>		
1	Employee Database	Information about the number of researchers, associate professors and full professors employed in University
2	Phd students Information	Information regarding Phd students, courses, programs, subsidies, funds
3	Mobility programs for employee	Information about mobility programs for researchers and professors and international programs as Erasmus and so on
4	Employee Database as staff and administration	Information about the number of staff and administrative employee employed in University.
5	Employee Compensation or benefit	Information about payments, compensations and benefit for employee
6	Cultural diversity	Demographic information of employee
7	Training programs	Education or training programs for employee provided by University
8	Recruitment of new employee - turnover	Information about turnover, recruitment of new employee as staff, researchers or professors.

### 3.5 Disclosure Index and Empirical model

In order to quantify the information gathered through the content analysis process and carry out subsequent statistical analysis to test the six hypothesis above mentioned, an un-weighted disclosure index has been developed.

It represents the level of IC disclosure provided by the sampled Italian universities through their annual reports and is a ratio structured as follows:

$$UICD = \frac{\sum_{i=1}^m d}{m}$$

Where d =1 if the item is disclosed and 0 otherwise;

m = maximum number of items (24 items as showed in the framework above illustrated)

Once calculated the IC disclosure index for each university, a multivariate regression model has been used in order to test to what extent the potential explanatory factors associated with the six hypothesis could influence the level of IC Disclosure of Universities represented by such Disclosure Indexes.

So, an ordinary least square (OLS) regression model with robust standard errors (Lopes and Rodrigues, 2007; Allini et al. 2016) has been employed in order to test the six hypothesis as follows:

$$UICD = \beta_0 + \beta_1 (\text{Size}) + \beta_2 (\text{Age}) + \beta_3 (\text{Financial Indipendence}) + \beta_4 (\text{Financial Performance}) + \beta_5 (\text{Board Size}) + \beta_6 (\text{Board Indipendence}) + \epsilon_i$$

Where:

UICD = Intellectual capital disclosure of University<sub>i</sub>

Size<sub>i</sub> = Size of University<sub>i</sub>

Age<sub>i</sub> = Age of University;  
 Financial Independence<sub>i</sub> = Level of financial independence of University<sub>i</sub>  
 Financial Performance<sub>i</sub> = Level of financial performance of University<sub>i</sub>  
 Board Size<sub>i</sub> = Board Size of University<sub>i</sub>  
 Board Independence<sub>i</sub> = Board Independence of University<sub>i</sub>  
 $\beta_0$  = Constant  
 $\beta_1 - \beta_6$  = Coefficient of the explanatory variables  
 $\epsilon_i$  = Error or disturbance terms of company.

### 3.6 Results and discussion. Content analysis

The results summarised in table 7 show that the mean score of the UICD is 0.52 and that, on average, each Italian public university, discloses 12.41 IC items in its annual report. No university has obtained the maximum possible score (100% - 24 items disclosed). The maximum score is 0.92 (22 out of 24 IC items disclosed), while, the minimum score is 0.08 (2 on 24 IC items disclosed).

**Table 7.**  
Content analysis results

IC category	Items					
	Total	% on total	mean	variance	min	max
<b>Internal Capital</b>	319	42.14%	5.23	4.71	0	8
<b>External Capital</b>	175	23.12%	2.87	3.12	0	6
<b>Human Capital</b>	263	34.74%	4.31	5.52	0	8
<b>Total</b>	757	100.00%	12.41	32.71	2	22
<b>UICD Index</b>			0.52	0.06	0.08	0.92

*Internal capital* is the most debated category with a percentage of 42.14% on the total and an average of 5.23 items disclosed by each university, followed by *Human capital* having a percentage of 34.74% and an average of 4.31 items disclosed by each university. Finally, *external capital* is the less disclosed category with a percentage of 23.12% and an average of only 2.87 items disclosed by each university.

This result is consistent with the comparative study of Low et al. (2015) but is in contrast with the majority of the results obtained in IC disclosure studies in the private sector (Guthrie and Petty, 2000; Oliveira et al., 2006; Whiting and Miller, 2008; Ferreira et al., 2012) in which it was found that the most disclosed category was the *external capital* and the less disclosed *the human capital*.

These results could be explained in different ways: firstly, as Sanchez and Elena (2006, p. 529) stated, “universities’ main goals are the production and diffusion of knowledge, and their most important investments are in research and human resources”, so it was

reasonable to expect that the focus of university ICD was on *internal capital* and *human capital* categories which embed this type of information; secondly, recent legislative developments in Italy have emphasised the importance of research activities, thus Italian university are more inclined to disseminate this information embedded in *internal capital*; thirdly, recent government regulations by introducing a performance-based funding system, have started to attribute progressively part of public funds (increasing over the years) according to the performance achieved in terms of research and teaching activities results by encouraging university to disclose these results in order to obtain more financial resources.

Table 8 shows the results of the Content Analysis for each IC item.

The most disclosed IC component is “financial relationship”, belonging to the *internal capital* category: 58 universities (98.05% on the total) have disclosed this item; the second most debated IC component is “employee compensation or benefits”, included in *human capital* category and disclosed by 51 universities (83.61% on the total). On the contrary, the IC components less discussed are both embedded in *external capital* category and are: “Student satisfaction” with only 2 occurrences (3.28% of universities) and “brands” with 6 occurrences (9.84% of universities). Finally, the most disclosed item in *external capital* category is “post-graduation, high education and specialization programs”, disclosed by 47 Universities.

**Table 8.**  
Content analysis results for each item.

Category	IC items	N. of Universities	% of Universities
<b>Internal Capital</b>	1 Intellectual Property	28	45,90%
	2 University Culture	29	47,54%
	3 Management Philosophy	31	50,82%
	4 Management Processes	42	68,85%
	5 Infrastructural facilities	44	72,13%
	6 Infrastructural ICT	38	62,30%
	7 Research Projects	49	80,33%
	8 Financial relationship	58	95,08%
<b>External Capital</b>	1 Brands	6	9,84%
	2 Student satisfaction	2	3,28%
	3 International programs for students - mobility	34	55,74%
	4 Post-lauream, formation and specialization programs	47	77,05%
	5 Business/University partnership	41	67,21%
	6 Students database	19	31,15%
	7 Quality standard as VQR research quality evaluation	12	19,67%

8 GBS		14	22,95%
<b>Human Capital</b>	<b>IC items</b>	<b>N. of Universities</b>	<b>% of Universities</b>
	1 Employee Database	41	67,21%
	2 Phd students Informations	37	60,66%
	3 Mobility programs for employee	23	37,70%
	4 Employee Database as staff and administration	24	39,34%
	5 Employee Compensation or benefit	51	83,61%
	6 Cultural diversity	18	29,51%
	7 Training programme	28	45,90%
	8 Recruitment of new employee - turnover	41	67,21%

### 3.7 Results and discussion. Linear regression model

Table 9 shows the results of the descriptive statistics for independent variables. Size, measured as the natural logarithm of the number of employee, presents an average value of 2.99 with a minimum of 1.53 and a maximum of 3.88. The results related to the variable age underline that 33 universities (54%) can be considered “very old” having been founded more than 50 years ago, 18 universities (30%) can be considered “Old” having been founded between 1964 and 1994, while 10 universities (16%) can be considered “new” having been founded after 1994.

Moreover, the financial independence variable values vary from a minimum of 0.01 to a maximum of 0.40 with an average score of about 0.18; while the financial performance variable values range from a minimum of 0.73 to a maximum of 1.35 with a mean score of about 1.01.

Board size highlights that the number of board members ranges from a minimum of 6 members to a maximum of 11 members with an average of about 9.78 members for University board. Further, the mean score of the board independence variable is of about 0.26 with a proportion of independent/external directors on board size that ranges from a minimum of 11% to a maximum of 45%.

**Table 9.**  
Descriptive statistics for independent variables

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Size</b>	61	1.53	3.88	2.9879	0,47013
<b>Age</b>	61	<b>Frequency</b>	<b>Percentage</b>		
	0	10	0.16		
	1	18	0.30		
	2	33	0.54		
<b>Financial Independence</b>	61	0.01	0.40	0.1783	0.07014
<b>Financial Performance</b>	61	0.73	1.35	1.0119	0.11769

<b>Board Size</b>	61	6.00	11.00	9.7868	1.09719
<b>Board Independence</b>	61	<b>0.11</b>	<b>0.45</b>	0.2602	0.06977

Finally, Table 10 shows the results of the OLS regression model employed to test the six hypothesis. The assumptions underlying the regression model have been tested for *multicollinearity* (Variance influence factor test) and *heteroskedasticity* (Hidalgo et al., 2011; Nurunnabi et al. 2011; Nazli and Ghazali, 2013). The variance inflation factor (VIF) score was calculated for each independent variable, in order to assess *multicollinearity* problems. In this case, the highest VIF obtained is 2.176 for the variable size, discharging *multicollinearity* problems. Moreover, White's and Breusch-Pagan's *heteroskedasticity* tests have been executed, with negative results (Table 10). Therefore, the regression model is statistically significant (P-value <0.05) with an Adjusted R-Squared of 0.073.

**Table 10.**  
OLS Regression model results and tests.

	<i>Hp</i>	<i>Exp. Sign</i>	<i>coefficient</i>	<i>Standard Error</i>	<i>T- statistic</i>	<i>p-value</i>	<i>Sign.</i>
const			-0.356116	0.33467	-1.0641	0.2920	
<b>Size</b>	H1	+	0.223707	0.0938838	2.3828	0.0207	**
<b>Age</b>	H2	+/-	-0.0616706	0.0428916	-1.4378	0.1563	
<b>Fin. Independence</b>	H3	+/-	0.0745031	0.404172	0.1843	0.8544	
<b>Fin. Performance</b>	H4	+	0.0835141	0.20374	0.4099	0.6835	
<b>Board Size</b>	H5	+	-0.00670195	0.0292132	-0.2294	0.8194	
<b>Board Independence</b>	H6	+	0.995525	0.458363	2.1719	0.0343	**
<b>Model specification:</b>							
Mean dependent variable		0.517077	Standard deviation dependent variable			0.238312	
Sum of squared residuals		2.842192	Regression Standard Error			0.229419	
R-Squared		0.165916	Adjusted R-Squared			0.073239	
F(6, 54)		2.678284	P-value(F)			0.023870	
<b>Notes:</b>							
The asterisks indicate statistical significance at the following levels: * 10%; ** 5%; *** 1%.							
<b>Test:</b>							
<b>Breusch-Pagan Test:</b> T Statistic: LM = 1.36958; p-value = P(Chi-quadro (6) > 1,36958) = 0.967683 (Not heteroskedasticity);							
<b>White Test:</b> T Statistic: LM = 21.2427; p-value = P(Chi-quadro (27) > 21,2427) = 0.774792 (Not heteroskedasticity);							
<b>Variance Influence Factors Test=</b> Maximum value Size 2.176 (Not Collinearity)							

In general, two variables out of six are statistically significant: *size* and *board independence*.

*Size* has a positive coefficient and is statistically significant at the 5% level (P-value <0.05). This result is consistent with the *stakeholder theory* and demonstrates that larger universities tend to disclose more IC information in order to satisfy the information needs of

a large number of stakeholders (taxpayers, governments, students, research centres, external funders, and national agencies) interested in university activities and demanding greater transparency especially regarding universities' critical IC resources and research activity results and educational institutions' performance (Secundo et al., 2016; Sangiorgi and Siboni, 2017).

This positive association also highlights that larger universities are more prone to disclose IC information in order to enhance the confidence with the external environment and reduce the political costs which are particularly evident in the university context (White et al., 2007). Moreover, this study's findings are consistent with those obtained by Gordon et al. (2002), Maingot and Zeghal (2008), and Gallego-Alvarez et al. (2011) in the university domain.

*Board independence* is positively related with the dependent variable and statistically significant at the 5% level.

This result is consistent with the *agency theory* that highlights the ability of external/independent members in stimulating a greater disclosure in the aim of improving their reputation as external and professional experts (Fama and Jensen, 1983; Haniffa and Cooke, 2002; Cerbioni and Parbonetti, 2007; Oliveira et al., 2011). Moreover, it is consistent with the *resource dependence theory* which evidence how the external board members provide many benefits to the organizations in terms of relationships with external entities and better disclosure quality (Haniffa and Cooke, 2002). According to Li et al. (2008) this benefits can be also extended to ICD quality.

Furthermore, this result is also in accordance with previous studies of Cerbioni and Parbonetti (2007); White et al. (2007); Li et al. (2008) and Nazli and Ghazali (2013) who have found a positive and significant relationship between the board independence and the ICD in the private sector context.

Finally, the *age* has a negative coefficient but is not statistically significant as well as the *board size*; while both *financial independence* and *financial performance* have a positive coefficient but are not statistically significant.

## 4. The level of online IC disclosure in Italian Universities and its determinants

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### 4.1 *Research objectives and research questions*

This empirical work represents a second step of the research on IC disclosure in Italian Universities. In this case, the research explores a new way to disclose IC in order to contribute to the new IC knowledge in the public sector (Guthrie, 2014; Dumay and Cai, 2015; Dumay, 2016; Cuzzo et al., 2017).

In particular, unlike the previous research focused on annual reports analysis, this work is focused on the websites analysis of a sample of 58 Italian public universities and has two main objectives:

- to examine the level of online IC disclosure in Italian universities for the year 2017, by performing a content analysis on institutional websites based on the theoretical framework developed by Low et al. (2015), appropriately adapted to the peculiarities of the Italian university system as well as of the specific source analysed, and, at the same time, to investigate the way in which IC information are provided by examining the structure of websites in terms of accessibility and usability;

- to test, through two linear regression models, the relationship between some potential explanatory factors selected according to previous research and the level of online IC disclosure represented by two Disclosure Indices, the first embedding only the IC items and the second comprising also the features related to websites accessibility.

The rationale behind the choice to analyse the websites as data sources for IC disclosure in universities derives from the growing awareness of the limits of the annual reports as means to provide IC information due to the fact that they are not originally designed to provide IC information; they are prevalently backward-looking with limited forward-looking information and, finally, they could be subject to manipulations that can make them unreliable (Abeysekera, 2006; Dumay and Tull, 2007; Dumay and Cai, 2014; Dumay, 2016; Dumay and Guthrie, 2017). From this awareness, in recent years has emerged the necessity to go “beyond the IC reporting”, by exploring other and innovative data sources such as websites which could convey IC information in a better way (Cormier et al., 2009; Lardo et al., 2017; Pisano et al., 2017). In particular, Dumay (2016, p.179), by emphasising the role of web-based disclosure in IC, argued that it is “dynamic” and “followed”. Moreover, in the realm of public sector, many authors (Meijer 2007; Gandía and Archidona, 2008; Serrano-Cinca et al., 2009; Gallego-Alvarez et al., 2011) highlighted several internet disclosure

advantages linked to a better accessibility and a greater transparency and accountability towards stakeholders, as well as to lower costs and a timelier dissemination of information.

Thus, as above argued, considering the previous research on ICD, a gap emerges in the public sector, especially in the university setting, because previous studies are mainly focused on annual report as data source and do not identify nor analyse possible explanatory factors of the level of ICD. To fill this gap, this study aims to answer two main research questions:

RQ1: • What is the level of online IC disclosure in Italian universities?

RQ2: • To what extent can potential explanatory factors influence the level of online IC disclosure in Italian universities?

## 4.2 *Development of hypothesis*

Given the scarcity of previous studies on online ICD in public sector, the potential determinants and related theories influencing the level of online ICD in universities have been selected according to the previous studies on online disclosure in public sector entities (mainly universities and local governments). Thus, this research attempts to determine associations in the university sector by contextualising those relationships in the IC research field.

### 4.2.1 *Size*

Several studies on public sector transparency and disclosure underline that larger public entities are more prone to disclose information through technological and innovative tools (websites) than smaller entities since they have more resources and are subjected to a greater demand for transparency and accountability by a larger number of stakeholders (Caba-Perez et al., 2008; Serrano-Cinca et al., 2009; Cuadrado-Ballesteros et al., 2014). From a *Stakeholder theory* perspective, stakeholders require to access any relevant information, ranging from mandatory to voluntary information of non-financial nature with a particular interest on IC contents (Guthrie et al., 2006; Schneider and Samkin, 2008; An et al., 2011). In this vein, websites, due to their great accessibility, can represent effective and efficient communication means to discharge accountability to university stakeholders (Ismail and Abu Bakar, 2011).

Moreover, as public institutions, universities face high political costs due to the presence of a vast number of stakeholders involved in universities' operation (taxpayers, governments, students, etc.) which exert a strong pressure on results and accountability (Gordon et al., 2002; Gallego-Alvarez et al., 2011). Thus, as a university's size increases, it is

likely to engage in more extensive disclosure in order to reduce the external pressures and enhance the confidence with the external environment.

In public sector studies the majority of the scholars found a positive relationship between size and different types of voluntary online disclosure provided by local governments (Gandía and Archidona, 2008; Serrano-Cinca et al., 2009; Cuadrado-Ballesteros et al., 2014; Brusca et al., 2015). In the context of academia Gordon et al. (2002) found a positive and significant relationship between colleges' and universities' size and the extent of disclosure and Gallego-Alvarez et al. (2011) show a positive correlation between size and the extent of web-based university disclosure.

Thus, according to previous studies, a positive relationship between university size and the level of online ICD is expected.

***H1: There is a positive relationship between university size and the level of online ICD.***

#### 4.2.2 Age

Banks et al. (1997, p.211) stated that “established universities tended to have better quality disclosure than new universities in the categories of service performance and financial performance”. In the same way, Ismail and Abu Bakar (2011) in their study on a sample of Malaysian public universities found that established universities disclose more information both on their annual report than on their websites than new universities.

On the other hand, younger organisations tend to disclose more information to reduce the information asymmetry between insiders and outsiders (Saxton and Guo, 2011). Moreover, some scholars underline how younger organizations are more innovative and more prone to adopt new communication technologies in order to improve accountability practices in comparison with older organisations, where inertia problems due to internal consolidated routines and resistance to change may occur (Saxton and Guo, 2011; Lee and Joseph, 2013).

From an empirical perspective, besides the positive relationship found by Ismail and Abu Bakar (2011) in Malaysian University context, in the university context, both Gallego-Alvarez et al. (2011) and Bisogno et al. (2014) did not find a significant relationship between university age and online disclosure.

Thus, according to previous conflicting results, a relationship without a particular sign between university age and the level of online IC disclosure is expected.

***H2: There is an association between university age and the level of online ICD.***

### 4.2.3 Complexity

Gallego-Alvarez et al. (2009, 2011) underlining that the complexity of university may be identified with the number of faculties, argued that more complex universities tend to disseminate more information on their websites than smaller ones. Moreover, Bisogno et al. (2014) argued that the complexity could influence the extent of the web-based disclosure provided by universities and the navigability of websites. Both Gallego-Alvarez et al. (2009, 2011) and Bisogno et al. (2014) hypothesised a positive relationship between university complexity and online disclosure, but the former found a positive but no significant relationship while the latter found a positive and significant relationship.

Thus, based on previous studies, this study posits the following hypothesis:

***H3: There is a positive relationship between university complexity and the level of online ICD.***

### 4.2.4 Internationality

In the last decades, several programs (TEMPUS, ERASMUS) and policy reforms (Bologna Process) have prompted the academic international mobility of students (Papatsiba, 2006; Altbach and Knight, 2007; Gallego-Alvarez et al., 2011). As argued by scholars (Kim, 2009, Gallego-Alvarez et al., 2011), universities develop internationalisation programs to recruit the most capable students and researchers in order to gain a competitive advantage. In particular, universities offer the possibility to learn about other cultures and access higher education in other countries (Altbach and Knight, 2007).

So, this new kind of competition stimulates universities in disseminating more information about their education and research activities, in particular to address potential international students and researchers as well (Ramírez et al., 2016). According to Gallego-Alvarez et al. (2011), the website can be a useful tool to promote and disclose activities and opportunities to an international audience, since its immediate accessibility and usability (many websites are in different European languages). Indeed, in their research about Spanish Universities web disclosure, they found a positive relationship between internationality and the extent of web disclosure.

Thus, consistent with previous studies, a positive relationship between university internationality (number of international students) and the level of online ICD is expected.

***H4: There is a positive relationship between university internationality and the level of online ICD.***

#### 4.2.5 *Media (Internet) visibility*

Laswad et al. (2005) highlighted that more visible local authorities tend to disclose more information through alternative communication channels such as the web.

However, some scholars (Zimmerman, 1977; Cuadrado-Ballesteros et al., 2014) discussed about the possible negative effects exercised by media visibility on disclosure. In particular, media have a great influence on communities but, in the aim of selling more copies or increase the audience, often tend to disseminate negative news such as scandals or bankruptcy than good news. As a reaction, local authorities tend to disclose less information to avoid negative news dissemination.

In this regard, Meijer (2007) underlined the superiority of internet as a communication channel for the dissemination of information as it allows stakeholders to formulate a personal opinion about public sector organisations performance without undergoing the influence of the mass media. As this regards, Dumay and Guthrie (2017) in a recent article, underlined how stakeholders prefer other communication forms timelier and dynamic than annual reports and how newspapers are adapting gradually by publishing more information online.

Moreover, it is argued that a greater internet visibility creates a greater pressure on public sector entities which, as a reaction, tend to provide a larger amount of information on their websites to satisfy the growing information needs of internet users and improve their legitimacy (Serrano-Cinca et al., 2009).

Empirically, Gandía and Archidona (2008) found a positive and significant relationship between Spanish city councils' internet visibility and voluntary website disclosure as well as Serrano-Cinca et al. (2009) who found a positive and significant relationship between Spanish local public administrations internet visibility and e-disclosure. Moreover, Laswad et al. (2005) found a positive and significant relationship between New Zealand local government press visibility and internet financial reporting.

Thus, consistent with the previous studies, a positive relationship between university Media (Internet) visibility and the level of online ICD is expected.

***H5: There is a positive relationship between university Media (Internet) visibility and the level of online ICD.***

#### 4.2.6 *Board size*

Recently, several scholars (Cerbioni and Parbonetti, 2007; Li et al., 2008; Cormier et al., 2009; Hidalgo et al. 2011) have analysed the influence of governance on ICD under the

framework of *agency theory*, arguing that, although the increase in the number of board members leads to an enhancement of monitoring capacity and disclosure quality, this advantage can be negatively offset by the increase both in decision-making time and in communication and coordination problems. Thus, an increase in board size does not necessarily imply an improvement in the level of voluntary disclosure provided if the number of board members overcomes a certain threshold (Cerbioni and Parbonetti, 2007; Cheng and Courtenay, 2004).

So, also by considering the recent Italian legislation on universities (law n.240/2010) which placed a limit to the number of board members (a maximum of 11 members), it can be interesting to study the effects of the board size on IC information provided by Italian universities.

From an empirical perspective, Gordon et al. (2002) did not find a significant relationship between university board size and the extent of disclosure, as well as Bisogno et al. (2014) and Gallego-Alvarez et al. (2011) who did not find a significant association between university board size and online disclosure. Based on previous contrasting results, a relationship between university board size and the level of ICD, without a specific sign, is expected.

***H6: There is a relationship between university board size and the level of online ICD.***

Table 11 summarises the hypotheses, definitions of variables, proxies and expected signs.

**Table 11.**  
Summary of hypothesis and independent variables

HP	Variable	Variable proxy	Expected sign
HC 1	Size	Number of students	+
HC 2	Age	Number of years since the foundation year	+ / -
HC 3	Complexity	Logarithm of the number of departments	+
HC 4	Internationality	Logarithm of the number of foreign students	+
HC 5	Media (Internet) visibility	Logarithm of the results of a search in "google.com" in which the university appeared in the last year	+
HC 6	Board Size	Number of board members	+ / -

### 4.3 Sampling

This study focuses on Italian public universities in the year 2017.

As above discussed, the Italian university system has been affected by a large process of change, leading - among others - to the introduction of performance measurement systems, three annual performance plans and accrual accounting adoption. However, these new legislative provisions have not yet foreseen the compulsory adoption of an IC reporting

document (Sangiorgi and Siboni, 2017). In addition, in recent years, the introduction of the “transparency” decree 33/2013 have forced all Italian public administrations to publish on their website a section called “amministrazione trasparente” (transparent administration) including financial, organisational and administrative information in accordance with specific requirements (Esposito et al., 2013; Paolini and Soverchia, 2013; Brusca et al., 2016; Sangiorgi and Siboni, 2017) but without reference to IC information.

A sample of all Italian public universities, including 61 State universities, 3 High Education Centres and 3 PhD Schools has been selected. Private universities (including those promoted by public bodies) and telematics universities were excluded due to differences in accounting data, legislative background and funding sources.

However, from the initial sample of 67 units, the following universities have been eliminated:

The universities for foreigners of Perugia and Siena; the University of Rome “Foro Italico”, the 3 High Education Centres (Firenze, Trieste and Lucca) and the 3 PhD Schools (Pisa and Pavia) as characterized by different organisational structure and engaged in specific activities that makes them incomparable with the others.

Thus, the final sample consists of 58 Italian public Universities.

#### 4.4 *Theoretical framework development*

As well as for the other research conducted, according to previous scholars’ suggestions (Guthrie et al., 2006; Steenkamp and Northcott, 2007; Husin et al., 2012; Dumai and Cai, 2015), in order to improve the accuracy of the analysis, after conducting a first analysis on a sample of five university websites, the Low et al.’s (2015) original list has been partially modified in order to adapt the framework to the peculiarities of the Italian context and source of data (web sites).

More specifically, in the *Internal Capital* category, the item “Intellectual Property” has been split into two items: “Intellectual Property as patent rights” (which includes information about patents rights held by the university) and “Intellectual Property as publications (which includes Information about publications, books and articles developed by researchers) as well as the item “Information Systems/Networking System” which has been divided in: “Infrastructural facilities” (which includes information on basic equipment like classes, laboratories, libraries) and “Infrastructural ICT”, (including information on technologies like databases, connections and other new technologies). Moreover, the item “Research projects” has been divided divided into two items: “National research projects”

(which includes research projects financed by national bodies) and “European and International research projects” (which includes research projects financed by European and International bodies).

In the *External Capital* category, the item “Brands” has been divided into two items: “Brand identity” and “Brand merchandising” as well as the item “Business/University partnership” which has been converted into two items related to University Third Mission: “Spin-off” and “Research Consortia and cluster”. Moreover, three new items have been added: “Mobility programs for students” (such as Erasmus programs); “Post-graduation, high education and specialization programs” (masters, training, specializations for students who have finished their studies) and “Graduate student information” (which includes information about the number of graduate students).

The *Human capital* category includes seven new items: “Teaching staff information” (regarding the presence of a panel with the name, qualification and department of affiliation of researchers, associate professors and full professors employed in the university); “PhD students’ information” (regarding the presence of a panel with the name and department of affiliation of PhD students); “PhD students’ courses Information” (which includes information regarding PhD students courses and programs); “Research fellows information” (regarding the presence of a panel with the name and department of affiliation of research fellows); “Mobility programs for researchers and professors”; “Administrative staff information” (concerning the presence of a panel with the name, qualification and department of staff and administrative employees employed by the university) and “Internationalisation of teaching staff” (which includes information about visiting professor or researcher at university).

In addition, as earlier anticipated, this work also offers an evaluation of the accessibility of the investigated websites by analysing some related features.

According to several scholars (Debreceeny et al., 2002; Caba-Perez et al., 2005; Gandia and Archidona, 2008; Kelton and Yang, 2008; Boubaker et al., 2011; Gallego-Alvarez et al., 2011) web sites disclosure analysis has been divided into two parts: *content* (with reference to the information and content provided by websites, in this case the IC items) and *presentation* (with reference to the way in which the information are conveyed on the web sites and in particular to the specific characteristics related to the accessibility of web sites).

So, in addition to the *content* analysis, *presentation* analysis has a particular relevance in the aim of assessing the added value offered by websites compared to traditional communication means, by examining those features and tools which improve the accessibility, the readability, the quality and the timeliness of the information, allowing web

sites to offer a more complete and transparent disclosure to users (Ettredge et al., 2002; Condit and Fagan, 2004; Kelton and Yang, 2008; Boubaker et al., 2011).

In particular, a web disclosure Index which embeds both *content* and *presentation* items is considered highly reliable and significant because considers not only the extent of information disclosed on web sites but also the quality of information in terms of a better or worse accessibility for internet users (Chatterjee and Hawkes, 2008; Ali Khan and Ismail, 2011).

Thus, based on previous studies (Xiao et al., 2004; Gandia and Archidona, 2008; Caba-Perez et al., 2008; Bisogno et al., 2014) a further list of 17 items grouped in 3 main categories (*Technology, interactivity with users* and *navigability*) has been developed and employed in order to assess the characteristics of Web sites in terms of accessibility.

Finally, table 12 shows the final list with the 25 items related to the IC disclosure (content) and the 17 items related to the web accessibility (presentation).

**Table 12.**  
Content and presentation categories, components, and descriptions

CONTENT			
Category	IC components	Description	Score
<b>Internal Capital</b>			
1	Intellectual Property as patents rights	Information about patents rights held by the university	0-1-2
2	Intellectual Property as publications	Information about publications, books and articles developed by researchers.	0-1-2
3	University Culture	Comprising the vision, attitudes, experiences, beliefs, values and future programs of universities.	0-1-2
4	Management Philosophy	Information referred to as a university's mission and main objectives.	0-1-2
5	Infrastructural facilities	Information about the university's infrastructural framework and facilities (e.g., classes, libraries).	0-1-2
6	Infrastructural ICT	Information about ICT technologies such as databases, connections, new technologies, new instruments and software.	0-1-2
7	National research projects	Research projects financed by National bodies	0-1-2
8	European and International research projects	Research projects financed by European and International bodies	0-1-2
<b>External Capital</b>			
1	Brand identity	Information about university brand identity.	0-1
2	Brand merchandising	Information about university brand merchandising	0-1
3	Student satisfaction	Information about students and their satisfaction with the learning processes.	0-1

4	International programs for students' mobility	Information about mobility programs for students and international programs (e.g., Erasmus)	0-1-2
5	Post-graduation, high education and specialization programs	Information about agreements with companies and public institutions for students' placements as well as masters, training, collaboration, post graduate or post doctorate and specialization programs.	0-1
6	University third mission - spin off	Table with information about number and activities of university spin off	0-1-2
7	University third mission - research consortia and cluster	Information about university research consortia and technological clusters.	0-1-2
8	Students information	Information about the number of students per faculty or department.	0-1
9	Graduate students information	Information about the number of graduate students	0-1
<b>Human Capital</b>			
1	Teaching staff Information	Panel with the name, qualification and department of affiliation of researchers, associate professors and full professors employed in the university.	0-1-2
2	PhD students' Information	Panel with the name and department of affiliation of PhD students.	0-1-2
3	PhD students' courses Information	Information regarding PhD students courses and programs.	0-1-2
4	Research fellows information	Panel with the name and department of affiliation of research fellows	0-1-2
5	Mobility programs for employees	Information about mobility programs for researchers and professors and international programs (e.g., Erasmus).	0-1-2
6	Administrative staff information	Panel with the name, qualification and department of staff and administrative employees employed by the university.	0-1-2
7	Internationalisation of teaching staff	Information about visiting professor or researcher at university.	0-1-2
8	Training programs	Education or training programs for employees provided by the university.	0-1
<b>PRESENTATION</b>			
<b>Technology</b>			
1	Fast download of the main website (<10 sec)		0-1
2	Graphs and images		0-1
3	Use of sound files		0-1
4	Use of video files		0-1
<b>Interactivity with users</b>			
1	Access and link to information on libraries (catalogue, bibliographic databases, etc.)		0-1
2	Access and link to information on social and cultural activities		0-1
3	Information on other university services: sports, radio, etc..		0-1

4	Access to social network (facebook, twitter, instagram, etc)		0-1
<b>Navigability</b>			
1	Help button		0-1
2	Glossary of terminology		0-1
3	High readability (option of switching to high readability version)		0-1
4	Text size (possibility of changing text size)		0-1
5	Web map/table of contents		0-1
6	Internal search engine		0-1
7	Website in english		0-1
8	Website multilanguage (other european and international languages)		0-1
9	Content menu always visible		0-1

#### 4.5 Disclosure Indexes and Empirical Models

In order to quantify the information gathered through the content analysis process and carry out subsequent statistical analysis to test the six hypothesis above mentioned, three un-weighted disclosure indexes have been developed.

Firstly, a disclosure index, taking into account only the 25 IC items (content), has been developed (ICD Index). Secondly, a disclosure index, taking into account only the 17 web accessibility items (presentation), has been developed (PD Index). Finally, a global disclosure index, by considering all the items, has been developed, (GICD Index).

Unlike from previous research, this study, while employing un-weighted disclosure indexes, proposes a different scoring procedure.

In particular, some studies on websites accessibility (Styles and Tennyson, 2007; Chatterjee and Hawkes, 2008) have highlighted how the quality of web-based information can vary depending on the position on website and on the number of necessary steps that are required to user to retrieve it. In particular, Middleton et al. (1999, p.222) in their study about the structure and the content of university web sites, underlined how some universities create an excessive fragmentation of content by disseminating some information only on departmental sites which often have different structures and styles, so, causing confusion and difficulties in finding information to users during the surfing.

So, according to previous studies, by considering that the information more accessible are of better quality and that the structure of the Italian public university websites is rather complex, as shown in table 12, for some IC items a score of 2 is assigned if the item is disclosed on the main university website, a score of 1 is assigned if the item is disclosed only

on the department's web site and not on the main web site and a score of 0 is assigned if the item is not disclosed.

Thus, the three disclosure indexes are calculated as follows:

$$1. \text{ ICD Index} = \frac{\sum_{i=1}^l di}{l}$$

Where  $\sum_{i=1}^l di$  = score obtained in the sub-group of 25 IC items (content);  
 $l$  = maximum score obtainable in the sub-group of IC items.

$$2. \text{ PD Index} = \frac{\sum_{j=1}^m di}{m}$$

Where  $\sum_{j=1}^m di$  = score obtained in the sub-group of 17 web accessibility items (presentation);  
 $m$  = maximum score obtainable in the sub-group of presentation items.

$$3. \text{ GICD Index} = \frac{\sum_{k=1}^n di}{n}$$

Where  $\sum_{k=1}^n di$  = score obtained by considering all the 42 items (content and presentation);  
 $n$  = maximum score obtainable taking into account all the items.

It is important to clarify that the web analysis was restricted to a single information source to perform a more precise and reliable analysis: web pages in web-browser format (Striukova et al., 2008; Cormier et al., 2009). Other documents available on websites such as annual reports or financial reports in pdf files, word files and so on have been excluded being considered as other distinct information sources (McInnes et al., 2007; Striukova et al., 2008; Cormier et al., 2009) and not being coherent with the type of research carried out.

The content analysis of selected universit websites was conducted during January and February 2017, a sufficiently confined time frame that allowed to overcome any drawbacks that may occur in the case of web analysis conducted for longer periods (Lee and Joseph, 2013).

Thus, once calculated the disclosure indexes for each university, two multivariate regression models have been used in order to test to what extent the potential explanatory factors associated with the six hypothesis could influence the level of online IC Disclosure of Italian universities.

Both the ICD index and the GICD index have been used as dependent variables to test the six hypothesis in order to capture any effects of the six potential determinants not only on the simple IC index but also on the composite IC index (GICD) which take into account also the web accessibility features.

So two ordinary least square (OLS) regression models were employed in order to test the six hypotheses as follows:

$$\text{ICD} = \beta_0 + \beta_1 (\text{Size}) + \beta_2 (\text{Age}) + \beta_3 (\text{Complexity}) + \beta_4 (\text{Internationality}) + \beta_5 (\text{Media visibility}) + \beta_6 (\text{Board size}) + \epsilon_i$$

$$\text{GICD} = \beta_0 + \beta_1 (\text{Size}) + \beta_2 (\text{Age}) + \beta_3 (\text{Complexity}) + \beta_4 (\text{Internationality}) + \beta_5 (\text{Media visibility}) + \beta_6 (\text{Board size}) + \varepsilon_i$$

Where:

ICD = Intellectual capital disclosure Index of Universityi

GICD = Global Intellectual capital disclosure Index of Universityi

Sizei = Size of universityi

Agei = Age of universityi

Complexityi = Complexity of universityi

Internationalityi = Internationality of universityi

Media visibilityi = Media visibility (internet penetration) of universityi

Board Sizei = Board Size of universityi

$\beta_0$  = Constant

$\beta_1 - \beta_6$  = Coefficient of the explanatory variables

$\varepsilon_i$  = Error or disturbance terms of university.

#### 4.6 Results and discussion. Content analysis

According to previous studies (Meijer, 2007; Gandia and Archidona, 2008; Serrano-Cinca et al., 2009), the results showed in table 13 shed light on the advantages offered by web sites, as innovative technologies for the dissemination of information, in terms of greater transparency and accountability provided to stakeholders. In particular, the results shown in table 13 demonstrate that the web can be an effective and useful communication vehicle in order to disclose IC information overcoming the limitations of the annual reports (Dumay and Tull, 2007; Striukova et al., 2008; Lardo et al., 2017).

**Table 13.**

Web content analysis results for categories and Indices

	<i>Items</i>					
	<i>Total</i>	<i>mean</i>	<i>%</i>	<i>variance</i>	<i>min</i>	<i>max</i>
<b>Internal Capital</b>	8	6.52	81.5	1.41	1	8
<b>External Capital</b>	9	6.33	70.3	2.54	3	9
<b>Human Capital</b>	8	6.91	86.0	1.13	5	8
<b>Total Content</b>	25	19.76	79.0	9.03	9	25
<b>Technology</b>	4	2.88	72%	0.25	2	4
<b>Interactivity</b>	4	3.76	94%	0.26	2	4
<b>Navigability</b>	9	4.72	52%	2.60	2	8
<b>Total Presentation</b>	17	11.36	67%	3.29	7	16
<b>Total Items</b>	42	31.12	74%	15.30	18	38
<b>ICD Index</b>	1	0.70		0.01	0.35	0.91
<b>PD Index</b>	1	0.67		0.01	0.41	0.94
<b>GICD Index</b>	1	0.69		0.01	0.40	0.85

In particular, the mean value of ICD Index is of 0.7, with a minimum value of 0.35 and a maximum value of 0.91. This high value underlines, as shown in table 13, that most of the items are disclosed on the main university web site, thus, ensuring an easier accessibility and a better usability of information to users.

Moreover, on average, each university discloses 19.76 IC items (79% of total IC items) on its web site with a special focus on *human capital* and *internal capital*: every university, on average, discloses 86% of *human capital* items and 81.5% of *internal capital* items, followed by the 70.3% devoted to *external capital* items disclosure.

This result is consistent with the study of Low et al. (2015) but not with the majority of the results obtained in studies concerning IC in the private sector.

Moreover, the results observed could be explained in different ways: first, how some scholars argued (Leitner, 2004; Sánchez and Elena 2006; Canibano and Sanchez, 2008 Ramirez et al., 2016; Sangiorgi and Siboni, 2017), since universities are knowledge-intensive organisations, they concentrate their efforts on the development of human, innovative and research resources so it could be expected that the focus of university ICD was on *internal capital* and *human capital*; second, as largely discussed in the previous chapter, recent legislative developments in Italy have emphasised the importance of research activities and thus, Italian universities are more prone to disclose information embedded in *internal capital*; third, recent government regulations by amending the funds allocation system to universities have encouraged academics in disclosing research results and educational performance achieved with greater incisiveness. In this vein, how Gallego et al. (2011) argued, web sites can be suitable tools in order to emphasize and disseminate university results and successes in terms of patents and publication.

As regards the *presentation* category, the mean value of PD is of 0.67, with a minimum value of 0.41 and a maximum value of 0.94. So, on average, each sampled university has 67% of the web accessibility features analysed (11.36 item for university) with a predominance of *interactivity* items (each sampled university presents, on average, 94% of these items), followed by *technology* items (each sampled university presents, on average, 72% of these items) and *navigability* items (every sampled university provides, on average, 52% of these items). This result is consistent with the previous study of Gallego-Alvarez et al. (2011) and evidences how Italian public universities are exploiting the potential offered by web sites in order to provide a more accessible and usable IC disclosure.

Table 14 show the results of web content analysis for each item.

**Table 14.**

Web content analysis results for each item

Category	CONTENT	Frequency	% of Universities	0	1	2
<b>Internal Capital</b>	<b>IC items</b>					
	1 Intellectual Property as patent rights	53	91.38%	5	1	52
	2 Intellectual Property as publications	56	96.55%	2	4	52
	3 University Culture	13	22.41%	45	1	12
	4 Management Philosophy	41	70.69%	17	21	20
	5 Infrastructural facilities	50	86.21%	8	33	17
	6 Infrastructural ICT	56	96.55%	2	4	52
	7 National research projects	54	93.10%	4	7	47
	8 European and International research projects	55	94.83%	3	5	50
<b>External Capital</b>	<b>IC items</b>		<b>% of Universities</b>			
	1 Brand identity	35	60.34%	23	35	/
	2 Brand merchandising	19	32.76%	0	19	/
	3 Students satisfaction	55	94.83%	0	55	/
	4 International programs for students - mobility	58	100.00%	0	1	57
	5 Post-graduation, formation and specialization programs	58	100.00%	0	58	0
	6 University third mission – spin offs	51	87.93%	7	3	48
	7 University third mission – research consortia and cluster	50	86.21%	8	5	45
	8 Students information	22	37.93%	36	22	/
	9 Graduate students information	19	32.76%	39	19	/
<b>Human Capital</b>	<b>IC items</b>		<b>% of Universities</b>			
	1 Teaching staff information	58	100.00%	0	53	5
	2 PhD students' information	46	79.31%	12	43	3
	3 PhD students' courses information	58	100.00%	0	1	57
	4 Research fellows information	35	60.34%	23	35	0
	5 Mobility programs for employee	58	100.00%	0	2	56
	6 Administrative staff information	56	96.55%	2	51	5
	7 Internationalisation of teaching staff	33	56.90%	25	18	15
	8 Training programs	57	98.28%	1	57	/
<b>Category</b>	<b>PRESENTATION</b>					
<b>Technology</b>	<b>Items</b>		<b>% of Universities</b>			
	1 Fast download of the main website (<10 sec)	58	100.00%	0	58	/
	2 Graphs and images	58	100.00%	0	58	/
	3 Use of sound files	4	7.00%	54	4	/
	4 Use of video files	47	81.00%	11	47	/
<b>Interactivity with users</b>	<b>Items</b>		<b>% of Universities</b>			
	1 Access and link to information on libraries	58	100.00%	0	58	/
	2 Access and link to information on social and cultural activities	47	81.00%	11	47	/
	3 Information on other university services: sports, radio, etc..	56	97.00%	2	56	/
	4 Access to social network	57	98.00%	1	57	/
<b>Navigability</b>	<b>Items</b>		<b>% of Universities</b>			
	1 Help button	25	43.00%	33	25	/
	2 Glossary of terminology	18	31.00%	40	18	/
	3 High readability	11	19.00%	47	11	/
	4 Text size	6	10.00%	52	6	/
	5 Web map/table of contents	40	69.00%	18	40	/
	6 Internal search engine	58	100.00%	0	58	/
	7 Website in english	50	86.00%	8	50	/
	8 Website multilanguage	14	24.00%	44	14	/
	9 Content menu always visible	52	90.00%	6	52	/

As regards the *content* category, the most disclosed IC components are: “International programs for student-mobility” and “Post-graduation, formation and specialization

programs” for *external capital* category: 58 universities (100% on the total) disclose this item and “Teaching staff information”, “PhD students’ courses information” and “Mobility programs for employee” for *human capital* category: 58 universities (100% on the total) disclosed this item.

Moreover, the most disclosed items in *internal capital* category are “Intellectual property as publications” and “infrastructural ICT” with 56 universities (96.55 %) which disclose this item on their web sites.

On the other hand, the less discussed IC items are “University culture” in *internal capital* category with 13 occurrences (22.41%) followed by “Brand merchandising” and “Graduate students’ information” both with 19 occurrences and belonging to the *external capital* category.

As regards the *presentation* category, related to the web results showed that, under the *technology* category, 100% of sampled universities provide a fast download of their main website and employ graphs and images in order to foster the presentation of their contents on the web site. On the contrary, only 7% of universities employ audio files to enhance web surfing.

Under the *interactivity with users* category, 100% of sampled universities provide specific links to access to information on libraries and, 98% of them offer links to access to social network platforms.

Finally, with respect to *navigability* items, 100% of sampled universities has an internal search engine and in 90% of cases the content menu is always visible. Moreover, it is also interesting to note that, from a perspective of academic internationalisation, a fairly good percentage of sampled universities (86%) offer the opportunity to navigate the web site in English, while, a small percentage (24%) offer the opportunity to surf on websites in other international languages in addition to English. Further, only 10% of universities offer the option to change the text size.

#### 4.7 Results and discussion. Linear regression models

Table 15 shows the results of the descriptive statistics of the independent variables. Size, measured as the number of students, presents an average value of 25458.86 with a minimum of 4219 and a maximum of 99727. The variable age shows a mean value of 277.84 with a minimum value of 18 and a maximum of 1055.

Further, the complexity’s values vary from a minimum of 1.10 to a maximum of 4.14 with an average score of about 2.38 and a median of 2.48, while the internationality variable’s

values range from a minimum of 3.37 to a maximum of 8.60 with a mean score of about 6.36 and a median of 6.53.

Media (internet) visibility shows an average value of 10.14 with a minimum of 7.77 and a maximum of 12.20. Finally, Board size results underline that the number of board members ranges from a minimum of 6 members to a maximum of 11 members with an average of about 9.91 members and a median of 10.00.

**Table 15.**  
Descriptive statistics for independent variables

	N	Minimum	Maximum	Mean	Median	Std. Deviation
<b>Size</b>	58	4219.00	99727.00	25458.86	18861.50	20411.2380
<b>Age</b>	58	18.00	1055.00	277.84	92.50	307.2309
<b>Complexity</b>	58	1.10	4.14	2.38	2.48	0.6790
<b>Internationality</b>	58	3.37	8.60	6.36	6.53	1.3094
<b>Media (Internet) visibility</b>	58	7.77	12.20	10.14	10.24	0.8877
<b>Board size</b>	58	6.00	11.00	9.91	10.00	1.0477

Finally, Table 16 and 17 show the results of the two OLS regression models employed to test the six hypothesis.

The assumptions underlying the regression models have been tested for *multicollinearity* (Variance Influence Factor Test) and *heteroskedasticity* (Xiao et al., 2004; Gandia and Archidona, 2008; Boubaker et al., 2011; Bisogno et al., 2014). The variance inflation factor (VIF) score was calculated in both models for each independent variable in order to examine potential *multicollinearity* problems. In this case, the highest VIF obtained in both models was 3.677 for the variable *complexity*, thus discharging multicollinearity problems since the threshold value is about 10. Moreover, White's and Breusch-Pagan's heteroskedasticity tests were executed and yielded negative results (Table 16 and table 17).

Furthermore, both the regression models are statistically significant at the 1% level (P-value <0.01).

**Table 16.**  
OLS regression model results and tests. Model 1. Dependent variable ICD Index

ICD Index	Coefficient	Standard Error	T- statistic	p-value	Sign.
const	0.115071	0.159399	1.0211	0.4737	
<b>Size</b>	-9.48571e-07	9.48571e-07	-1.0964	0.3120	
<b>Age</b>	-6.74446e-06	3.91263e-05	-0.1724	0.8638	
<b>Complexity</b>	0.0486653	0.0282742	1.7212	0.0913	*
<b>Internationality</b>	0.0316814	0.0103911	3.0489	0.0036	***
<b>Media (Internet) visibility</b>	0.0438911	0.0151369	2.8996	0.0055	***
<b>Board size</b>	-0.015523	0.0116461	1.3329	0.1885	
<b>Model specification:</b>					
Mean dependent variable	0.697273		Standard dev. dependent variable		0.102208

Sum of squared residuals	0.288940	Regression Standard Error	0.075592
R-Squared	0.510586	Adjusted R-Squared	0.453008
F(6, 51)	8.867712	P-value(F)	0.000001
<b>Notes:</b>			
The asterisks indicate statistical significance at the following levels: * 10%; ** 5%; *** 1%.			
<b>Test:</b>			
<b>White Test:</b> T Statistic: LM = 26.1973; p-value = P (Chi- quadro (27) > 26.1973) = 0.50767 (Not heteroskedasticity);			
<b>Breusch-Pagan Test:</b> T Statistic: LM = 4.85048; p-value = P (Chi- quadro (6) > 4.85048) = 0.563129 (Not heteroskedasticity);			
<b>Variance Influence Factors Test:</b> Maximum value Complexity 3.677 (Not Collinearity)			

**Table 17.**

OLS regression model results and tests. Model 2. Dependent variable GICD Index

GICD Index	Coefficient	Standard Error	T- statistic	p-value	Sign.
const	0.247062	0.143316	1.7239	0.0908	*
Size	-3.56748e-07	8.35198e-07	-0.4271	0.6711	
Age	-7.93342e-06	3.51785e-05	-0.2255	0.8225	
Complexity	0.0330361	0.0254213	1.2995	0.1996	
Internationality	0.026425	0.00934265	2.8284	0.0067	***
Media (Internet) visibility	0.0294162	0.0136096	2.1614	0.0354	**
Board size	-0.00922791	0.010471	-0.8813	0.3823	
<b>Model specification:</b>					
Mean dependent variable	0.689080	Standard dev. dependent variable	0.087334		
Sum of squared residuals	0.235579	Regression Standard Error	0.067965		
R-Squared	0.458129	Adjusted R-Squared	0.394380		
F (6, 54)	7.577127	P-value(F)	0.000014		
<b>Notes:</b>					
The asterisks indicate statistical significance at the following levels: * 10%; ** 5%; *** 1%.					
<b>Test:</b>					
<b>White Test:</b> T Statistic: LM = 36.3193; p-value = P (Chi-quadro (27) > 22.457238) = 0.713797 (Not heteroskedasticity);					
<b>Breusch-Pagan Test:</b> T Statistic: LM = 4.832021; p-value = P (Chi-quadro (6) > 4.832021) = 0.565531 (Not heteroskedasticity);					
<b>Variance Influence Factors Test:</b> Maximum value Complexity 3.677 (Not Collinearity)					

By observing the two regression models, emerges that the first model which employs the ICD index as dependent variable has a greater explanatory power (R-square and Adjusted R-square are respectively 0.51 and 0.45) than the second model which employs the GICD index as dependent variable (R-square and Adjusted R-square are respectively 0.45 and 0.39). However, both the results confirm that the models explain a fairly good portion of the variability of the two dependent variables.

In general, two variables out of six are statistically significant in both the models: *internationality* and *media (internet) visibility*. *Internationality* has a positive coefficient and

is statistically significant in both models at the 1% level (P-value <0.01) as well as *media (internet) visibility* which has a positive coefficient and is statistically significant in the first model at the 1% level (P-value <0.01) and in the second model at the 5% level (P-value <0.05).

The result of the variable *internationality* is consistent with previous study of Gallego-Alvarez et al. (2011) who found a positive and significant relationship between *internationality* and the level of online disclosure of Spanish universities. Thus, this result confirms that in the competitive and strongly international mobility-oriented scenario post-Bologna process, a global knowledge market has emerged, in which universities are focused on the human resources (students and researcher) recruitment in order to enhance institutional prestige, knowledge and research skills (Papatsiba, 2006; Altbach and Knight, 2007; Gallego-Alvarez et al., 2011; Ramìrez et al., 2016). Thus, the greater the number of international students in university, the higher the IC disclosure provided on the institutional website (Gallego-Alvarez et al., 2011). In particular, some features - such as a website in English, sound and video files - are very helpful for international students.

The results obtained for the variable *media (internet) visibility* are consistent with previous studies on local public administrations (Laswad et al., 2005; Gandía and Archidona, 2008; Serrano-Cinca et al., 2009). So, the more Italian public universities are visible, the more they tend to disclose IC information through websites in the aim of reducing the external pressure and satisfy the information needs of the community of stakeholders who use internet since its immediate accessibility in order to gather useful information. Furthermore, another possible interpretation of this relationship derives from the university's need to ameliorate its reputation and convey a better image to internet users by disclosing more information about the excellence regarding Intellectual Capital.

Moreover, in the Model 1 (ICD Index) also the variable *complexity* is positive and statistically significant although at the 10% level (P-value <0.10). This result is consistent with previous studies of Bisogno et al. (2014) and Gallego-Alvarez et al. (2011), although the latter found a positive but not significant relationship. In particular, this result confirms that the *complexity* exerts a positive influence on the level of disclosure provided by Italian universities through their websites, since that the extent of information to disseminate raises in proportion to the number of departments, thus involving the disclosure of IC contents.

## 5. Comparing Intellectual Capital disclosure in European Universities: towards a different accountability?

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### 5.1 *Research objectives and research questions*

The research on IC disclosure in Italian Universities ends with this last step devoted to a comparative analysis between three Mediterranean countries.

By following previous research, this work aims to provide a comparative analysis of Intellectual Capital (IC) disclosure through University websites, comparing the situation in three European Mediterranean countries: Greece, Italy and Spain. As well as the previous study, also in this case an analysis of the accessibility of websites investigated is offered.

In particular, this study investigates a sample of 128 Universities from Italy (58); Greece (22) and Spain (48) by performing a content analysis on institutional websites for the year 2017<sup>127</sup> based on the same theoretical framework and disclosure indexes utilized in the previous research<sup>128</sup>.

Also in this case the analysis is based on websites since the positive results obtained in the previous research for the Italian context and believing that this type of communication vehicle can represent a more useful and accessible tool in order to discharge accountability and transparency (Meijer 2007; Gandía and Archidona, 2008; Serrano-Cinca et al., 2009; Gallego-Alvarez et al., 2011).

Italy, Greece and Spain have been selected because they have similar accounting traditions and regulations in the public domain. Moreover, in none of these three countries a IC report is mandatorily required.

Thus, considering the previous research on ICD, a gap persists in the public sector, especially in the university setting, because previous studies are mainly focused on annual report as communication means. Further, comparative research on ICD in Universities are limited in number. To fill this gap, this study aims to answer the following research question:

RQ1: • What is the level of online IC disclosure in Italian, Greek and Spanish universities?

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<sup>127</sup> The web content analysis has been conducted during the period January and February 2017, a sufficiently narrow period that allowed to overcome any anomalies that may occur in the case of web analysis conducted for longer periods.

<sup>128</sup> Being an evolution of the previous research, the items list utilized in this research is the same employed in the research "The level of online IC disclosure in Italian Universities and its determinants" presented in the previous paragraph. So, there are 25 items related to the IC disclosure (content) and the 17 items related to the web accessibility (presentation) as well as 3 disclosure indexes ICD index; PD index and GICD index. For this reason, unlike what was done for previous research, in this paragraph the illustration of the theoretical framework and the disclosure indices used was considered superfluous as well as the presentation of the web content analysis results for the Italian case.

## 5.2 *Sampling*

This study focuses on a sample of 128 Universities coming from Greece (22), Italy (58) and Spain (48) for the year 2017.

In all the countries, the analysis was focused on public universities. Private universities (including those promoted by public bodies) and e-learning universities were excluded a priori due to relevant differences in accounting data treatment, legislative background and funding sources.

In the Greek case, the sample consists of the total population of the 22 public universities. Technological institutions were excluded from this sample due to the differences regarding legislative framework and funding procedure.

In the Italian case, all Italian public universities, including 61 State universities, 3 High Education Centres and 3 PhD Schools have been initially selected. In a second moment, some universities have been deleted from the sample for reasons of incompatibility.

In particular: the universities for foreigners of Perugia and Siena; the University of Rome "Foro Italico", the 3 High Education Centres (Firenze, Trieste and Lucca) and the 3 PhD Schools (Pisa and Pavia) have been excluded because they are engaged with specific activities that make them incomparable with the others. So, the final sample for Italy consists of 58 public universities.

For Spain, the total population consists of 50 public universities, but two public universities have been eliminated due to their special characteristics. One of them is the International University Menendez Pelayo (has not degrees and usual teaching activities) and the other is National University of Distance Education (teaching activities are only provided distance learning). As a consequence, the sample for Spain consists of 48 public universities.

## 5.3 *Results and discussion. The Greek case*

Table 18 shows the results of the web content analysis for Greek universities.

The average value of ICD Index is 0.36, the variance is approximately 0.02, while the minimum and the maximum values are 0.07 and 0.53 respectively. This ICD mean value suggests that Greek universities tend to disclose a sufficient, although not high, amount of IC information through their websites, so witnessing the complexity and the limited IC-based informative capacity of their websites.

**Table 18.**

Web content analysis results for categories and Indices in Greek universities

	<i>Items</i>					
	<i>Total</i>	<i>mean</i>	<i>%</i>	<i>variance</i>	<i>min</i>	<i>max</i>
<b>Internal Capital</b>	8	4.86	60.79	4.79	0	8
<b>External Capital</b>	9	2.18	24.24	0.82	1	4
<b>Human Capital</b>	8	3.27	40.90	1.92	0	5
<b>Total Content</b>	25	10.32	41.27	13.37	2	16
<b>Technology</b>	4	2.59	64.77	0.63	2	4
<b>Interactivity</b>	4	3.22	80.68	0.85	1	4
<b>Navigability</b>	9	3.45	38.38	0.93	2	5
<b>Total Presentation</b>	17	9.27	54.54	4.21	5	13
<b>Total Items</b>	42	19.59	46.64	23.39	10	29
<b>ICD Index</b>	1	0.36		0.02	0.07	0.53
<b>PD Index</b>	1	0.55		0.01	0.29	0.76
<b>GICD Index</b>	1	0.41		0.02	0.18	0.58

The PD Index, has an average value of about 0.55. This underlines that most of the Greek universities present those features that make their websites user-friendly.

Finally, the GICD Index has a mean value of 0.41. Its variance is 0.02 and its minimum and maximum values are 0.18 and 0.58 respectively. This mean value testify that Greek universities provide a significant level of IC disclosure through their websites. However, IC information mainly are not conveyed through the main websites, so, the internet users can experience more difficulties in finding this type of information.

Furthermore, the *internal capital* category is the most disclosed category followed by the *human capital* and the *external capital*. This suggests that Greek universities are more focused on the disclosure of culture, knowledge and human resources than on the disclosure of the relationships with the external environment.

On the other hand, the analysis of *presentation* features reveals that *interactivity* and *technology* items are more important for the majority of the Greek universities (80.68% and 64.77% respectively) than *navigability*. This highlights that Greek universities are more prone to promote their social culture and invest heavily in trying to make their sites more user-friendly.

Table 19 shows the web content analysis results for each item for the Greek universities.

Regarding the *internal capital*, the most disclosed items are the “Intellectual Property as publications” (86.36%) and “Management philosophy” (86.36%), followed by “Intellectual Property as patent rights” (77.27%). On the contrary, the items “University Culture” (9%) and “National research projects” (7%) are the less discussed.

In the *external capital* category, the most disclosed item is the “International programs for students mobility”: 22 universities (100%) disclosed this item on their website. On the other hand, the other items belonging to this category seem to attract less importance.

Finally, in the *human capital* category the most disclosed item is the “Teaching staff information” (95.45%) followed by the “Administrative staff information” (81.81%) and the “Mobility programs for employee” (68.18%). On the contrary, the less disclosed items are: “Training programs”; “Research fellow information” and “PhD students’ courses information”, all with only 2 occurrences.

As regards the *presentation category*, under the *technology* category, it can be noted that all Greek universities (100%) allow a “Fast download of the main website” as well as employ “Graphs and images” in order to improve the surfing experience.

With respect to the *interactivity with users* category, it is worth to note that all the items are available in the majority of the universities. In particular, the 95% of Greek universities provide “Access and link to information on libraries”.

Finally, at the *navigability* category, all Greek universities have a “Website in English” (100%). Their “Content menu is always visible” in 95.45% of the cases and there is an “Internal search engine” in 86.36% of the cases. However, no university provides an “help button” on its website, as well as there aren’t universities which employ a “glossary” to simplify the navigation.

**Table 19.**  
Web content analysis results for each item in Greek universities

Category	CONTENT	Frequency	% of Universities	0	1	2
<b>Internal Capital</b>	<b>IC items</b>					
	1 Intellectual Property as patent rights	17	77.27%	5	12	5
	2 Intellectual Property as publications	19	86.36%	3	13	6
	3 University Culture	9	40.90%	13	1	8
	4 Management Philosophy	19	86.36%	3	7	12
	5 Infrastructural facilities	15	68.18%	7	1	14
	6 Infrastructural ICT	11	50.00%	11	1	10
	7 National research projects	7	31.81%	15	7	0
	8 European and International research projects	10	45.45%	12	10	0
<b>External Capital</b>	<b>IC items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Brand identity	8	36.36%	14	8	/
	2 Brand merchandising	2	9.09%	20	2	/
	3 Students satisfaction	1	4.54%	21	1	/
	4 International programs for students - mobility	22	100.00%	0	3	19
	5 Post-graduation, formation and specialization programs	2	9.09%	20	2	/
	6 University third mission – spin offs	1	4.54%	21	1	0
	7 University third mission – research consortia and cluster	8	36.36%	14	1	7
	8 Students information	2	9.09%	20	2	/
	9 Graduate students information	2	9.09%	20	2	/
<b>Human Capital</b>	<b>IC items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Teaching staff information	21	95.45%	1	17	4

2	PhD students' information	9	40.90%	13	8	1
3	PhD students' courses information	2	9.09%	20	1	1
4	Research fellows information	2	9.09%	20	2	0
5	Mobility programs for employee	15	68.18%	7	0	15
6	Administrative staff information	18	81.81%	4	11	7
7	Internationalisation of teaching staff	3	13.63%	19	2	1
8	Training programs	2	9.09%	20	2	/
<b>Category PRESENTATION</b>						
<b>Technology</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Fast download of the main website (<10 sec)	22	100.00%	0	22	/
	2 Graphs and images	22	100.00%	0	22	/
	3 Use of sound files	4	18.18%	18	4	/
	4 Use of video files	9	40.90%	13	9	/
<b>Interactivity with users</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Access and link to information on libraries	21	95.45%	1	21	/
	2 Access and link to information on social and cultural activities	17	77.27%	5	17	/
	3 Information on other university services: sports, radio, etc..	17	77.27%	5	17	/
	4 Access to social network	16	72.72%	6	16	/
<b>Navigability</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Help button	0	0.00%	22	0	/
	2 Glossary of terminology	0	0.00%	22	0	/
	3 High readability	2	9.09%	20	2	/
	4 Text size	7	31.81%	15	7	/
	5 Web map/table of contents	5	22.72%	17	5	/
	6 Internal search engine	19	86.36%	3	19	/
	7 Website in English	22	100.00%	0	22	/
	8 Website multilanguage	0	0.00%	22	0	/
	9 Content menu always visible	21	95.45%	1	21	/

#### 5.4 Results and discussion. The Spanish case

Table 20 shows the results of the web content analysis for Spanish Universities.

On average, each Spanish university disclosed 13.73 IC items. The average value of the ICD index is of 0.50, with a minimum value of 0.21 and a maximum value of 0.88.

These results suggest that Spanish universities tend to disclose a significant but not very high level of IC information through their websites, placing itself at a medium level, and that there are relevant differences between universities. Indeed, although some of them disclose most of the IC items, the others only disclose a low number of IC items.

The mean value of PD index is of 0.61. On average, each Spanish university presents about 10 presentation items out of a total of 17. This witnesses that, according to the previous results obtained by Gallego-Alvarez et al. (2011), Spanish universities are continuing to invest in improving the accessibility of their websites by making them more user-friendly for the vast number of universities' stakeholders.

The GICD index shows a mean value of 0.54 with a minimum of 0.31 and a maximum of 0.81. This confirm the medium level of online IC disclosure provided by Spanish universities

through their websites and the not high accessibility of the IC information since many of them are discussed only on the departmental websites.

**Table 20.**

Web content analysis results for categories and Indices in Spanish universities

	<i>Items</i>					
	<i>Total</i>	<i>mean</i>	<i>%</i>	<i>variance</i>	<i>min</i>	<i>max</i>
<b>Internal Capital</b>	8	4.60	57.50	4.54	1	8
<b>External Capital</b>	9	4.79	53.22	2.59	3	9
<b>Human Capital</b>	8	4.33	54.13	3.80	1	8
<b>Total Content</b>	25	13.73	54.92	20.41	7	23
<b>Technology</b>	4	2.50	62.50	0.76	1	4
<b>Interactivity</b>	4	3.83	95.75	0.31	1	4
<b>Navigability</b>	9	4.08	45.33	1.01	2	6
<b>Total Presentation</b>	17	10.42	61.29	3.01	7	14
<b>Total Items</b>	42	24.15	57.50	25.83	15	36
<b>ICD Index</b>	1	0.50		0.032	0.21	0.88
<b>PD Index</b>	1	0.61		0.010	0.41	0.82
<b>GICD Index</b>	1	0.54		0.018	0.31	0.83

Moreover, as regards the *content* category, *Human Capital* and *Internal Capital* are the most disclosed categories although, in general, the differences between the three capital are minimal. On the contrary, as regards the *presentation* category the differences are more evident. Indeed, Spanish universities place particular emphasis on *interactivity with users*: on average, each Spanish university presents the 95.75% of *interactivity* items. The second most employed *presentation* items category is *Technology* (on average, 62.50% items of this category are present on Spanish universities' websites), followed by *Navigability* (45.33%).

Table 21 shows the web content analysis results for each item for the Spanish universities.

In the *internal capital* the most disclosed item “infrastructural facilities” (100% on the total), followed “infrastructural ICT” (95.83%). However, despite their importance, surprisingly, most than the half of the universities do not disclose the patent rights and publications (“Intellectual Property as patent rights”; “Intellectual Property as publications”) both of which can be considered as important IC items in these entities.

Similarly, there are many universities that do not provide information about “National research projects” as well as about “European and International research projects” (only 43.75% out of the total disclose these items). This is paradoxical by considering the high amount that Spanish universities receive for these projects and that they also represent an important indicator of the quality of the research production of Spanish university.

Regarding the *external capital*, the most disclosed IC components are “International programs for student mobility” and “Post-graduation, formation and specialization programs” (all universities disclose these items). There is also a high number of universities that disclose “University third mission – research consortia and cluster” (89.58%). Indeed, in Spain, Regional governments recognize research clusters in the universities in order to finance research activities and most of the universities disclose this information.

However, the less *external capital* disclosed items are “Brand merchandising” (only 5 universities disclosed this item) and “Brand identity” (only 11 universities discussed this item).

For *human capital category*, the most disclosed IC items are: “Mobility programs for employees” (100%) and “PhD students’ courses information” (95.83%). On the contrary, only 2 Spanish universities disclosed “PhD students’ information”.

With respect to the *presentation category*, results show that, under the *technology category*, 100% of sample universities allow for a “Fast download of the main website (<10 sec)” and employ “graphs and images” to enhance the presentation of their content on the website. However, only 27.08 % of universities utilize “sound files” to improve web usability.

Within the *interactivity with users category*, most of Spanish sampled universities (95.83%) provide “Access and link to information on libraries” and offer “Access and link to information on social and cultural activities” as well as “Information on other university services: sports, radio, etc..”.

Finally, in the *navigability items*, 91.67% of the analysed Spanish universities have an “Internal search engine” and in 93.75 % of the cases there is a “web map of contents”. Further, in 81.25% of the cases the “Content menu is always visible”.

It is also worth to underline that 91.67% of the Spanish universities provide the “Website in English” and that none of the universities provide the option to change the web “text size” or to switch to “high readability” of text.

**Table 21.**  
Web content analysis results for each item in Spanish universities

Category	CONTENT	Frequency	% of Universities	0	1	2
<i>Internal Capital</i>	<b>IC items</b>					
	1 Intellectual Property as patent rights	19	39.58%	29	5	14
	2 Intellectual Property as publications	20	41.67%	28	7	13
	3 University Culture	23	47.92%	25	3	20
	4 Management Philosophy	23	47.92%	25	4	19
	5 Infrastructural facilities	48	100.00%	0	4	44
	6 Infrastructural ICT	46	95.83%	2	7	39
	7 National research projects	21	43.75%	27	5	16
	8 European and International research projects	21	43.75%	27	5	16

<b>External Capital</b>	<b>IC items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Brand identity	11	22.92%	37	11	/
	2 Brand merchandising	5	10.42%	43	5	/
	3 Students satisfaction	18	37.50%	30	18	/
	4 International programs for students - mobility	48	100.00%	0	5	43
	5 Post-graduation, formation and specialization programs	48	100.00%	0	48	0
	6 University third mission – spin offs	25	52.08%	23	8	17
	7 University third mission – research consortia and cluster	43	89.58%	5	9	34
	8 Students information	10	20.83%	38	10	/
	9 Graduate students information	22	45.83%	26	22	/
<b>Human Capital</b>	<b>IC items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Teaching staff information	30	62.50%	18	17	13
	2 PhD students' information	2	4.17%	46	1	1
	3 PhD students' courses information	46	95.83%	2	15	31
	4 Research fellows information	28	58.33%	20	18	10
	5 Mobility programs for employee	48	100.00%	0	1	47
	6 Administrative staff information	21	43.75%	27	12	9
	7 Internationalisation of teaching staff	7	14.58%	41	4	3
	8 Training programs	26	54.17%	22	26	/
<b>Category PRESENTATION</b>						
<b>Technology</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Fast download of the main website (<10 sec)	48	100.00%	0	48	/
	2 Graphs and images	48	100.00%	0	48	/
	3 Use of sound files	13	27.08%	35	13	/
	4 Use of video files	13	27.08%	35	13	/
<b>Interactivity with users</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Access and link to information on libraries	46	95.83%	2	46	/
	2 Access and link to information on social and cultural activities	46	95.83%	2	46	/
	3 Information on other university services: sports, radio, etc..	46	95.83%	2	46	/
	4 Access to social network	46	95.83%	2	46	/
<b>Navigability</b>	<b>Items</b>	<b>Frequency</b>	<b>% of Universities</b>			
	1 Help button	14	29.17%	34	14	/
	2 Glossary of terminology	1	2.08%	47	1	/
	3 High readability	0	0.00%	48	0	/
	4 Text size	0	0.00%	48	0	/
	5 Web map/table of contents	45	93.75%	3	45	/
	6 Internal search engine	44	91.67%	4	44	/
	7 Website in English	44	91.67%	4	44	/
	8 Website multilanguage	9	18.75%	39	9	/
	9 Content menu always visible	39	81.25%	9	39	/

## 5.5 Results and discussion. Comparative analysis

Table 22 presents a summary picture of the level of online IC disclosure provided by the universities coming from the three selected Mediterranean countries by highlighting the main *content* and *presentation* categories' results. Table 22 also shows the results of the Kruskal Wallis test<sup>129</sup> performed for each category.

<sup>129</sup> The Kruskal Wallis test is a non-parametric method for testing whether samples originate from the same distribution. It is employed in order to compare two or more independent samples of equal or different sample sizes. A significant Kruskal–Wallis test indicates that at least one sample stochastically dominates one other sample and thus there is a significant difference (Kruskal Wallis, 1952).

**Table 22.**  
Comparisons of Indexes among countries

	Greece	Italy	Spain	Kruskal Wallis	
	<i>mean</i>	<i>mean</i>	<i>mean</i>	$X^2$	<i>P- value</i>
<b>Internal Capital</b>	4.86	6.52	4.60	25.322	.000
<b>External Capital</b>	2.18	6.33	4.79	62.815	.000
<b>Human Capital</b>	3.27	6.91	4.33	65.273	.000
<b>Technology</b>	2.59	2.88	2.50	12.787	.002
<b>Interactivity</b>	3.22	3.76	3.83	14.571	.001
<b>Navigability</b>	3.45	4.72	4.08	13.500	.001

Already the analysis conducted for individual countries had allowed to observe some similarities as well as significant differences between individual countries. Table 22 corroborates these results.

More specifically, Italian Universities outperform both Spanish and Greek universities in terms of scores in all types of IC disclosure while the Greek universities with the exception of *internal capital* are the last in IC disclosure intensity. All these differences are statistically significant. Therefore, it seems that, in this moment, Italian universities place more emphasis on communicating their IC content through their websites in comparison to the other countries.

On the other hand, as regards the *presentation* categories the differences are rather nuanced and a more homogeneous behaviour among the countries is observed. Indeed, while the mean values of the three countries differ (as shown by the p-value scores of the Kruscal Wallis test) the mean values do not deviate that much in absolute terms.

This result suggests that, while Italian Universities are exploiting more insistently the potentialities offered by websites in order to convey IC information to their different stakeholders, more in general the level of accessibility features provided do not deviate considerably among the countries.

Table 23 shows the comparison on an item by item basis with reference to the disclosure of the IC (content) items.

**Table 23.**  
Comparisons of IC disclosure items (content) among countries

Category	CONTENT	% of Greek Universities	% of Italian Universities	% of Spanish Universities	Kruskal Wallis - $X^2$	P- value
<i>Internal Capital</i>	IC items					
1	Intellectual Property as patent rights	77.27%	91.38%	39.58%	45,231	0,000
2	Intellectual Property as publications	86.36%	96.55%	41.67%	51,118	0,000
3	University Culture	40.90%	22.41%	47.92%	7,336	0,026

4	Management Philosophy	86.36%	70.69%	47.92%	5,514	0,063
5	Infrastructural facilities	68.18%	86.21%	100.00%	37,584	0,000
6	Infrastructural ICT	50.00%	96.55%	95.83%	22,974	0,000
7	National research projects	31.81%	93.10%	43.75%	50,936	0,000
8	European and International research projects	45.45%	94.83%	43.75%	54,053	0,000
<b>External Capital</b>	<b>IC items</b>	<b>% of Greek Universities</b>	<b>% of Italian Universities</b>	<b>% of Spanish Universities</b>	<b>Kruskal Wallis - X<sup>2</sup></b>	<b>p-value</b>
1	Brand identity	36.36%	60.34%	22.92%	15,334	0,000
2	Brand merchandising	9.09%	32.76%	10.42%	10,087	0,006
3	Students satisfaction	4.54%	94.83%	37.50%	60,665	0,000
4	International programs for students - mobility	100.00%	100.00%	100.00%	<b>4,771</b>	<b>0,092</b>
5	Post-graduation, formation and specialization programs	9.09%	100.00%	100.00%	113,316	0,000
6	University third mission - spin offs	4.54%	87.93%	52.08%	53,614	0,000
7	University third mission - research consortia and cluster	36.36%	86.21%	89.58%	20,418	0,000
8	Students information	9.09%	37.93%	20.83%	7,735	0,021
9	Graduate students information	9.09%	32.76%	45.83%	9,693	0,008
<b>Human Capital</b>	<b>IC items</b>	<b>% of Greek Universities</b>	<b>% of Italian Universities</b>	<b>% of Spanish Universities</b>	<b>Kruskal Wallis - X<sup>2</sup></b>	<b>p-value</b>
1	Teaching staff information	95.45%	100.00%	62.50%	<b>3,738</b>	<b>0,154</b>
2	PhD students' information	40.90%	79.31%	4.17%	55,640	0,000
3	PhD students' courses information	9.09%	100.00%	95.83%	80,225	0,000
4	Research fellows information	9.09%	60.34%	58.33%	18,492	0,000
5	Mobility programs for employee	68.18%	100.00%	100.00%	22,450	0,000
6	Administrative staff information	81.81%	96.55%	43.75%	16,540	0,000
7	Internationalisation of teaching staff	13.63%	56.90%	14.58%	25,110	0,000
8	Training programs	9.09%	98.28%	54.17%	61,542	0,000

By observing the comparative analysis on an item by item perspective related to the disclosure of the IC items (table 23) it is worth to evidence that there is no specific pattern regarding the IC disclosure in the public universities in these countries.

As highlighted by the p-value of the Kruskal Wallis test there is only a limited number of cases in which the universities in the three countries disclose with the same intensity IC items. By fixing the 5% statistical significance level as a threshold, there is only one item "International programs for students - mobility" (external capital) for which it can be observed the same intensity of disclosure (100% for all the countries - p-value of 0.092). However, a similar but not identical intensity in IC disclosure can be observed for other two items: "Teaching staff information" (human capital) and "Management Philosophy" (Internal Capital) with a respectively p-value of 0.154 and 0.063.

Besides the few similarities, the considerable differences obtained could be explained by cultural or historical reasons and in any case they evidence the different attitude of universities while presenting themselves to the public. As noted in previous sections,

although a mandatory IC report has not yet been foreseen in any of the three countries analysed, the IC culture is more widespread in Italy and Spain than in Greece as testified by the empirical studies conducted as well as the framework development attempts carried out (e.g. INGENIO and OEU projects).

Table 24 shows the comparative analysis on an item by item basis with reference to the disclosure of the accessibility (presentation) items.

**Table 24.**

Comparisons of accessibility disclosure items (presentation) among countries

<i>Technology</i>	Items	% of Greek Universities	% of Italian Universities	% of Spanish Universities	Kruskal Wallis - X <sup>2</sup>	p-value
	1 Fast download of the main website (<10 sec)	100.00%	100.00%	100.00%	0,000	1,000
	2 Graphs and images	100.00%	100.00%	100.00%	1,667	0,435
	3 Use of sound files	18.18%	7.00%	27.08%	6,609	0,037
	4 Use of video files	40.90%	81.00%	27.08%	32,319	0,000
<i>Interactivity with users</i>	Items	% of Greek Universities	% of Italian Universities	% of Spanish Universities	Kruskal Wallis - X <sup>2</sup>	p-value
	1 Access and link to information on libraries	95.45%	100.00%	95.83%	2,535	0,282
	2 Access and link to information on social and cultural activities	77.27%	81.00%	95.83%	6,360	0,042
	3 Information on other university services: sports, radio, etc..	77.27%	97.00%	95.83%	9,955	0,007
	4 Access to social network	72.72%	98.00%	95.83%	16,759	0,000
<i>Navigability</i>	Items	% of Greek Universities	% of Italian Universities	% of Spanish Universities	Kruskal Wallis - X <sup>2</sup>	p-value
	1 Help button	0.00%	43.00%	29.17%	13,940	0,001
	2 Glossary of terminology	0.00%	31.00%	2.08%	21,874	0,000
	3 High readability	9.09%	19.00%	0.00%	10,305	0,006
	4 Text size	31.81%	10.00%	0.00%	16,611	0,000
	5 Web map/table of contents	22.72%	69.00%	93.75%	36,261	0,000
	6 Internal search engine	86.36%	100.00%	91.67%	6,902	0,032
	7 Website in English	100.00%	86.00%	91.67%	3,641	0,162
	8 Website multilanguage	0.00%	24.00%	18.75%	6,287	0,043
	9 Content menu always visible	95.45%	90.00%	81.25%	3,208	0,201

The comparative analysis conducted on an item by item basis for the *presentation* items offers useful insights (table 24).

As already noted from the more general comparative analysis shown in table 22, from an accessibility perspective, emerge more similarities among the three countries than from the IC disclosure perspective. Indeed, although the differences are more than the similarities, in

this case, unlike IC disclosure, there is a larger number of items for which similar behaviour can be observed.

More specifically, all universities in the three countries allow a “Fast download of the main website (<10 sec)” as well as employ “Graphs and images” in order to enhance their websites structure by improving the surfing experience of their internet-users. Thus, it seems that Italian, Spanish and Greek universities are greatly investing in improving the *technology* of their websites.

From an *interactivity with users* perspective, the level of content offered is rather similar among countries. However, it can be observed a particular common emphasis on “Access and link to information on libraries” provision, according to the growing relevance that e-book and e-journals are acquiring in recent years.

Finally, under the *navigability* category, Kruskal Wallis test highlights similar behaviours for two items. In particular, Italian, Spanish and Greek universities are particularly prone to provide “website in English” by making sure that “Content menu is always visible”.

These results are consistent with the Higher education system harmonisation prompted by the Bologna process and the consequential academic internationalization of researchers and students who are asking for more accessible information in English language.

## CONCLUDING REMARKS

In the last decades characterized by the rise of the new Knowledge-based economy, the Intellectual Capital, basically identifiable in the set of intangible assets owned, managed or developed within an organization, has established itself as a pivotal factor in ensuring the competitive advantage and driving the value creation, by acquiring, in turn, greater importance compared to the other kinds of capital such as financial and economic ones.

Due to this particular relevance, it has become crucial for organizations to develop appropriate tools to identify, manage and report these knowledge-related assets which decisively contribute to the growth of organizations as well as of economic systems in which they are rooted.

However, current accounting systems, due to the overly-conservative standpoint of standard setters and the backward-looking orientation historical cost-based, have proven to be inadequate in correctly identifying IC elements by failing in the attempt to provide the real economic value of these assets to the point that the Intellectual Capital is still considered as an “hidden capital” which escapes from financial statements evaluations.

So, it seems that only the market, through the consultation of other information sources, can be able to attribute an economic value to this broad spectrum of assets, which are intangibles in nature such as human resources skills, customer loyalty, company reputation, knowledge by valorising the share prices of those firms which invest in these elements.

As a consequence, in recent years, several practitioners, academics, institutes and associations have developed a plethora of frameworks and models in order to identify and report the IC components in the hope of reaching a universally accepted and compulsory IC reporting model which could reduce the information asymmetries by improving the decision making processes.

Nevertheless, despite an initial period of practical experimentation in some companies, especially in northern Europe, the many IC models and frameworks developed have mostly stopped at a theoretical stage of academic study. Thus, a mandatory IC report has remained fundamentally a mirage that has partially resumed life in recent years thanks to the gradual introduction and dissemination of integrated reporting which embeds IC information although is not IC specific neither compulsory with the exception of South Africa .

The IC management and reporting issues, already deeply felt in the private sector, have also progressively affected the public sector where value creation process has more intangible connotations being mainly service-based.

In particular, in the university context, already influenced by significant social, economic and political changes (e.g. NPM, Bologna Process, Lisbon strategy, third mission emerging) mainly aiming at increasing the autonomy, comparability, competitiveness, efficiency and effectiveness of Universities, the need to develop specific IC management and reporting tools has vigorously emerged.

Indeed, the main universities' inputs and outputs are intangibles and all the processes developed are knowledge-based involving fundamentally human resources such as students and researchers and non-tangible or non-physical assets.

Therefore, considering the wide range of stakeholders orbiting around these institutions, it seems paradoxical today do not assure a complete bundle of information to them which also takes into account the main strategic elements and the value creation drivers of this type of institutions.

Indeed, the growing stakeholders' community involved in university activities under the third mission (firms, research centres, spin-offs) requests detailed information on the value creation process and its outcomes. The national evaluation agencies, spread like wildfire throughout Europe (e.g. ANVUR, ANECA, HEFCE), also require more detailed information about Universities performances in terms of research and teaching results in order to assign part of public funds. In a similar vein, the citizens' community and tax payers demand greater transparency and accountability about the use of public funds and the results achieved with their employment. Lastly, the competition and benchmarking between universities prompted by Bologna process and Lisbon strategy principles has further emphasized the introduction of new management and reporting systems IC based.

However, to date, with the exception of the Austrian case, no country has an obligation to draw an IC statement and, there are very limited tools to manage and report IC in universities.

Thus, in recent years, given the absence of compulsory IC reporting, different scholars and experts have made considerable efforts in order to develop suitable frameworks and guidelines to identify and report the IC in universities (e.g. OEU, INGENIO, HERO projects) as well as have carried out empirical research in order to examine the type and amount of IC disclosure provided by universities through different and alternative accounting sources (annual reports, performance plans, social reports).

Based on these premises, this thesis offered, in a non-exhaustive manner, an overview of the IC phenomenon genesis from the private sector to the public sector and in particular in universities, by proposing, in the last section, the illustration of three empirical research

conducted along a logical continuum, representing concrete practical developments of what was said at the theoretical level in the previous sections.

Thus, this thesis by gathering the results of previous research, has provided interesting and useful insights.

In particular, it has been demonstrated that Italian public universities provide a significant level of ICD through their annual reports by putting a particular emphasis on *internal capital* and *human capital* disclosure, while, on the other hand, consideration of *external capital* is rather low.

Besides the immediate consideration that Universities' main goals are the production and diffusion of knowledge, and their most important investments are in research and human resources and that, as a consequence, it was reasonable to expect a focus on *Internal* and *Human Capital*, further conclusions can be drawn.

Firstly, from a *stakeholder theory* perspective, it seems that there is a precise willingness to privilege specific stakeholders' that have been considered most relevant, including public funding agencies, research centres, students and citizens by providing more accountability and transparency related to IC information based on research activity results (internal capital) and educational institutions' performance (human capital), which are primarily requested by these groups of stakeholders.

In this regard, a fundamental role is played by the gradual introduction of a performance-based funding systems together with the establishment of the National Agency for Evaluation of the University System and Research (ANVUR) which is involved in state-funding allocation tasks. Indeed, the annual report which represent the main accounting outcome for universities seems to be a useful tool in order to address the attention of these bodies towards such IC components (*Internal* and *Human Capital*) by facilitating the evaluation processes as well as drawing the attention on the excellences which can ensure further financial resources. In the same vein, *Internal* and *Human Capital* information involving also intellectual properties such as patents rights and licenses as well as management Processes, infrastructural facilities and ICT disclosure, are very useful also for research centres, external investors and firms which finance universities and thus are interested in universities' results and processes developed. However, these informations could result to be incomplete if the consideration of the *external capital* components specifically related to universities' relationship will continue to be low.

Moreover, it has been observed that the size, in terms of the number of employees, and the board independence, as the proportion of the number of external board members out of the total, positively influence the level of ICD provided by Italian public universities through

their annual reports. This confirmed a fairly good level of compliance with the policies adopted by the national government aimed at stimulating mergers among universities and the inclusion of independent and external expert members on university boards, both of which positively influence the development of ICD.

The modern knowledge and innovation-based era has certainly promoted the web as main mass communication means, able to penetrate all environments and reach all segments of the population. In this sense, many both private and public organisations have gradually begun to disseminate information through the websites by ensuring timeliness, interactivity and accessibility to a wider and wider audience of stakeholders. Thus, it seemed interesting to investigate this relevant communication vehicle in the context of Italian public universities by expanding the previous research conducted on annual reports.

So, by moving the focus of the analysis from the annual reports to the websites, further significant reflections can be drawn.

Italian universities are exploiting the potentialities offered by websites by disseminating a large amount of IC information coupled with an adequate level of web accessibility to their users. This is the signal that beyond the annual reports, more dynamic and interactive tools such as websites represent a new frontier in order to disclose information to stakeholders by reaching a greater accountability and transparency degree.

In particular, it is worth to emphasise that universities provide a good amount of information on intellectual capital on the web as well as it is important to note that these informations are conveyed in a widely accessible way being prevalently located on the main universities' web pages. This ensures celerity and immediacy in information searching and, at the same time, reduces the frustration resulting from extensive content research on the web. Indeed, one of the possible drawbacks of the websites is the difficulty that users can experience in finding information when these are dispersed in sub-pages and sub-sites. In this sense, it is fundamental the correct placement of information on websites.

Moreover, the analysis of individual features related to the accessibility has contributed to corroborate these results. Indeed, Italian public universities are heavily investing in the websites' structure by creating multifunctional and interactive platforms.

Each university has an internal search engine and employs graphs and images in order to enhance the presentation of the contents. The majority of Italian public universities also provide access and link to information on library, social and cultural activities as well as on other university's services.

Further, it is fundamental to underline that, in an academic internationalization context, most of the universities provide the website in English and a reduced number of them also employs other world languages (e.g. French, German, Chinese languages).

However, the consideration attributed to the *external capital*, albeit higher than what was observed for the annual reports, is still less than that attributed to *Internal* and *Human Capital*. This certainly confirms what was said above regarding the annual reports and the importance attached to particular stakeholders' categories such as public funding agencies, research centres, students and citizens but, at the same time, imposes greater attention this capital.

Indeed, by considering the emerging of third mission and the progressive increase in the number of stakeholders, this category requires greater reporting efforts in order to enhance the confidence and the collaboration with the external environment and increase the possibilities to raise new financial resources.

With the awareness of the usefulness of websites in IC information disclosure, the analysis has been further expanded to other European countries which has shown considerable similarities with respect to the Italy as regards the accounting traditions and regulations in the public domain as well as the economic background.

In particular, it has been noted that the web is a suitable tool in order to provide IC information in Italy as well as in Greece and Spain although there are several differences that deserve particular attention.

The common aspect among the three countries is related to the prevalent focus on the *Internal* and *Human Capital* disclosure which is symptomatic of the existence of a similar university system largely based on public funding and evaluation agencies.

In the Italian context there is the FFO which represent the main state funding provided to universities and the ANVUR which play a central role for the allocation of state funding. In Spain, after a process of decentralization of higher education, Regional Governments, have begun responsible for this public service and provide the main financial resources to Spanish universities. The ANECA is responsible for evaluating the quality of teaching and institutions, as well as accrediting university teaching staff.

Also in Greece the State plays a central role in higher education system and the Special Account for Research Grants is a body which provides and manages funds designed to satisfy the needs of research and development projects.

Thus, these similarities in a certain manner justify the common greater attention to the *Internal* and *Human Capital* categories since the willingness to communicate such

information which could simplify the tasks of these bodies and highlight the positive performance IC-based in the aim of obtaining more public funds.

Nevertheless, despite this common aspect, Italian public universities seem to be more convinced of the usefulness of websites for the IC disclosure since the general level of IC information provided is significantly greater than that of Greek and Spanish universities. This could be representing a serious limit with a view of harmonizing the European higher education systems under the Bologna process and makes it necessary to develop a common IC framework which can drive the IC disclosure on the websites of European universities.

However, this observed imbalance in the level of IC web disclosure between Italian, Spanish and Greek universities must not lead to underestimate the importance and the usefulness of websites. Indeed, despite the differences observed in the IC web disclosure intensity, the general level of accessibility is roughly the same. In particular, there is a common great attention towards some *technology's* features such as the fast download of the main website and the internal search engine as well as towards some *Interactivity's* characteristics as access and link to information on libraries, social and cultural activities and, other university services (sports, radio, etc..). Moreover, the possibility to translate the website in English has become a must.

These data witness that there is a common awareness of the potentialities of the websites and that there is a convergence towards the websites' structure development and improvement. However, these potentialities are not fully exploited to provide IC information, especially in the Greek case. Thus, together with an adequate investment in the websites accessibility features it would be desirable to invest more also on the content and in particular on IC information in order to increase the accountability and the transparency towards stakeholders.

Therefore, at the end of this discussion it can be argued that, according to the suggestions of Bologna process and Lisbon strategy, universities must represent the beating heart of the economic growth of European countries. With the emerging of the third mission and the NPM' influences, the universities, have achieved a great financial and organizational autonomy degree. Moreover, their higher intangibility degree gives them a leg up in this knowledge-based economy by forcing them to reach ever-increasing performance.

Nevertheless, in order to achieve the highest levels of excellence it is necessary to be aware of the relevance of own critical resources and manage them in a better way. In this sense, it has become fundamental to collect and systematize all the information IC-related in order to implement specific management control processes aimed at maximizing the IC development in universities. Only by monitoring in a careful and specific way the different

phases of the processes linked to research as well as to education, it would be possible to evaluate the performances IC-based in a correct way and disseminate useful information to the stakeholders. The relevance of intellectual capital must therefore become a widespread concept at all levels of universities and not just a theoretical academic concept. Who is part of the intellectual capital or those who produce intellectual capital must be aware of being part of a general process value creation oriented. Only in this way, European universities can aim for the highest level of excellence.

Obviously, by assuming that the IC creation and development processes becomes routine in universities, the dissemination of information IC related can only happen through dynamic and timely means such as websites. Therefore, in the opinion of the writer, no means can be accessible and usable as the websites. The above discussed results have demonstrated that the annual reports are overly static and cannot be fully adequate in disseminating all types of IC information. Moreover, the universities stakeholders' community has increased a lot embedding several categories of economic operator which require useful and accessible information.

Thus, it would be desirable to create appropriate sections on the websites, constantly updated, in which specific IC information are conveyed in the better accessible way. In this sense, research centres, evaluation agencies, students and other stakeholders can gather all the necessary information for their purposes.

However, this requires a double effort.

Firstly, a change of culture that, as mentioned, invests all levels of the organization. The awareness of the IC relevance should be transmitted on a large scale and management control processes IC-based must be implemented.

Secondly, a common accepted IC framework should be developed in order to disseminate homogeneously the information on the websites of European universities through specific sections.

As above argued, the attempt to introduce specific and compulsory IC reports in the private sector has failed as well as for the difficulty to enclose a so vast and dynamic phenomenon such as the IC in a static report, also for the absence of a generally accepted framework. In the Universities' context, there has been only the Austrian model which is unique in the world.

In this sense the errors of the past must not be repeated. It is not necessary to follow the Austrian model but to propose something new that also ensures also a minimum of flexibility.

So, clear guidelines which orient the creation of specific IC sections on the websites of the various European universities could be the better solution in order to foster the harmonization, comparability and competitiveness among them and improve the accountability and transparency towards stakeholders with homogeneous but also dynamic and timely information.

The internet-user (stakeholder) must be aware that he can find the information on the IC in a specific section of the website and according to a commonly accepted framework, but obviously the contents, the frequency of updates and other possible variations must be left to the free will of the universities.

In this way, in the opinion of the writer, a decisive change could be made in the IC management and reporting in the universities by encouraging their growth and the development of adjacent communities.

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