INTELLECTUAL CAPITAL IN PUBLIC UNIVERSITIES: A PERFORMANCE-ORIENTED APPROACH TO MANAGE INTANGIBLE

Miguel González-Loureiro(*)», European PhD  
Associated Professor. Department of Management and Marketing, University of Vigo,  
Faculty of Social Sciences and Communication, Campus A Xunqueira, s/n 36005, Pontevedra (Spain)  
email: mloureiro@uvigo.es

Antonio Moreira Teixeira, PhD  
Professor. Department of Education and Distance Learning, Universidade Aberta and Centre for Philosophy, University of Lisbon.

(*) Acknowledgements: This research was partially supported by Laboratório de Educação a Distância - LEaD da Universidade Aberta, Lisbon without a specific fund or grant. Authors would like to give thanks to the researchers who contributed with their suggestions to the overall improvement of a previous version of this paper, during the MSKE-2011 Conference held in Famalicão, as well as in the ACEDE-2011 Conference held in Barcelona.
**Abstract:** The paper reviews the main initiatives concerning the measurement, management and disclosure of intellectual capital (IC) in public universities. Those organisations also are facing the challenge of managing intangible in their value creation process.

Several researches have linked some elements of IC (human, structural and relational capital) to performance indicators in firms. However, IC is still not being sufficiently implemented in universities and similar knowledge-based organisations. Three main initiatives are remarkable throughout the academic literature: (1) the ICU-Report; (2) the Danish IC Guidelines; (3) the Austrian Research Centres initiative.

The lack of a more holistic model for managerial purposes is addressed. An original matrix is proposed in this paper, including performance indicators of the three missions of a university (teaching, researching and transferring), trying to relate them with their possible causal IC elements. This original IC and performance-oriented approach could help university managers to deal with their intangible management challenge.

**Keywords:** intellectual capital; intangible management; universities management; performance; mission.

1. The challenge to manage intangible in universities

The main aim of this paper is to review the current initiatives concerning intangible management in public universities. Authors suggest in this paper a more holistic approach to manage intangible in such organisations from the literature review done: an intellectual capital approach to a performance-oriented model, where the main goals of universities are considered.

European public policies regarding Higher Education are highlighting the role of such institutions in the knowledge-based economies. As stated by European Commission (2003), the main goals of universities must be production, diffusion and knowledge transferring. Other authors, who define the main goals of a university today, state similar idea (Gibbons *et al.*, 1994; Bueno Campos,
Those goals are closely related with the resources and capabilities available in any innovative sub-system (González-Loureiro and Figueroa Dorrego, 2010). Such linkages have several linkages with the triple-helix model developed by Etzkowitz and Leydesdorff (1996, 2000), where the key agents come from public sector and universities, as they positively interact with business system.

Moreover, the Bologna Declaration’s challenges for universities go beyond the simple statement of a European Higher Education Area. It suggests the path to achieve the excellence in the educational and, in a lesser extent, in the research function of any university (European Ministers of Education, 1999). Consequently, public sector starts developing systems to acquire and assure the quality of the universities. Nevertheless, those systems are too focused in evaluating the human capital (the researcher-professor) and they do not pay attention to other intangible elements (e.g. relational capital).

Intangible and, more specifically, knowledge management in firms are widely recognised as key factors in the creation and the maintenance of sustainable competitive advantages (Sveiby, 2001). Intellectual Capital (IC, henceforth) is referred to those intangible, hidden assets and knowledge resources, which help in the process of value creation in organisations, increasing their competitive capacity (Stewart, 1997; Sveiby, 2001; Yi and Davey, 2010: p. 328). It is stated that every time a knowledge transfer or a conversion is done, the organisation’s value grows (Sveiby, 2001).

The most successful firms are those that use their knowledge assets best and quickest than their competitors do (Bontis et al., 1999; Teece et al., 1997). Therefore, adequate system to measure the IC through the management performance indicators are required (Roos and Roos, 1997; Marr et al., 2003), because “what you measure is what you get” (Kaplan and Norton, 1992: p. 71).

Further research is needed to apply such statements to public universities, thus helping to disclose what the key elements are in their process of value creation. It is emphasised the relevance of outcome and return of the universities to meet the needs of their diverse stakeholders: business system, society, public sector and academia (Sánchez and Elena, 2006). Consequently, there is a clear need for management systems to identify and to measure one of the main assets of any organisation: the value of its knowledge.

Public sector has specific, different needs than business system has. Therefore, it is suggested to take into account those differences in the development of management systems in public sector (Serrano Cinca et al., 2003; Bossi Queiroz et al., 2005; Sánchez and Elena, 2006). Particularly, they highlight that public sector organisations have multiple non-financial objectives and goals, so they must be managed by measuring and controlling adequate performance indicators (mainly, non-financial). Although universities are not profit-oriented organisations, they have been involved in the competition for performance in value-generating processes (Cañibano and Sánchez, 2009). They are been forced to search for greater efficiency and effectiveness schemes (Bueno Campos et al., 2006).
In this challenge, IC has been proved as a useful approach. IC framework is supported to enhance public sector efficiency and the quality of its services. Cañibano and Sánchez (2009) state these main reasons:

- it can help to identify strengths and weaknesses within the public organisation, because IC management implies a categorisation of resources and capabilities;
- it 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;
- it can be used as a controlling and monitoring instrument, because IC is a set of indicators that can be communicated and, thus, encourage discussion on what has to be managed.

In short and following Fazlagic (2005): «the measurement of Universities’ performance is essential if higher-education system is to continuously regenerate itself by the intelligent use of knowledge management».

The topic is still underdeveloped, although there are an increasing number of scientific production around it. A search by keywords shows it, particularly since 2007 (see Table 1). In this case, a query was done for instance at the ISI-Web of Knowledge by selecting the keywords “universit*”¹ and “intellectual capital”. The database used was the “Social Sciences Citation Index (SSCI)” from 1956 to December 2010 and the “Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH)” from 1990 to December 2010. This query returns 105 papers indexed in such database for that period.

Therefore, further and deeper research is required to achieve wide-extended conceptual bases and the required tools to manage IC in universities. Following Leitner (2004) and Etzkowitz and Leydesdorff (1996, 2000), those bases and tools must include the current challenges of such organisations, as well as the main goals of a university. Namely, production, diffusion and transferring of knowledge through its main functions: Education, Research & Development (including its diffusion), Transferring (innovation, commercialising of research results, entrepreneurship, technological services).

¹ The wild card “universit*” was used to cover both words “university” and “universities” in the topic.
Table 1 Number of papers with “universit*” and “intellectual capital” as keywords in the topic

<table>
<thead>
<tr>
<th>Year</th>
<th>Record Count</th>
<th>% of 105</th>
<th>Bar Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1</td>
<td>0.9524 %</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>0</td>
<td>0.0000 %</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>1</td>
<td>0.9524 %</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>2</td>
<td>1.9048 %</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>2</td>
<td>1.9048 %</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>1</td>
<td>0.9524 %</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>2</td>
<td>1.9048 %</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td>5.7143 %</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>1</td>
<td>0.9524 %</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>6</td>
<td>5.7143 %</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>3</td>
<td>2.8571 %</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>5</td>
<td>4.7619 %</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>8</td>
<td>7.5106 %</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>4</td>
<td>3.8095 %</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>13</td>
<td>12.3810 %</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>9</td>
<td>8.5714 %</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>22</td>
<td>20.9524 %</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>19</td>
<td>18.0952 %</td>
<td></td>
</tr>
</tbody>
</table>

Record count reflects the number of Papers indexed in the Social Sciences Citation Index (SSCI) from 1956 to December 2010 plus the number of Conference Proceedings indexed in the Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH) provided by ISI-Web of Knowledge.

Source: ISI-Web of Knowledge

The remainder of the paper is organised as follows. Section 2 offers the main conceptual framework based on IC statements. In section 3, it is reviewed the main approaches and initiatives in reporting IC in universities. Section 4 concludes with the findings about the existing initiatives. There it is proposed the bases of the model for discussion. Such model is intended to be applied in future research.

2. Intellectual Capital framework

IC is widespread among enterprises and businesses all over the world. The theoretical base of IC came from the Intangible Management theories developed in the 90s, focused in five main research topics:

i. knowledge systems (Probst and Büchel, 1997; Davenport and Prusak, 1998);

ii. knowledge transformation process (Polanyi, 1962; Nonaka and Takeuchi, 1995);

iii. organisational learning (Senge, 1992; Argyris, 1993; Handy, 1995);

iv. capabilities management (Prahalad and Hamel, 1990; Zack, 1999);

v. intellectual capital (Edvinsson and Malone, 1997; Sveby, 1997; Stewart, 1997).

Two main approaches are used for the latter: the strategic approach, dealing with classification, creation, management and use of IC; and the measurement approach, which develops metrics and measurement models to determine IC status (Roos et al., 1997; Tan et al., 2008).
General models of IC usually include three main categories of intangible assets: human, structural and relational (Stewart and Kirsch, 1991; Saint-Onge, 1996; Edvinsson and Sullivan, 1996; Bontis, 1996 1998; Sveiby, 1997; European Commission, 2006). There are several definitions for each element, summarised as follows:

- Human capital (HC, henceforth) can be defined as a set of values, attitudes, qualifications and skills held by employees that generate value for the organisation (Roos et al., 1997; McGregor et al., 2004);
- Structural capital (SC, henceforth) is the worth and value created within the organisation that remains when employees go home. Therefore, it requires a high level of formalisation to avoid dependence on people and to remain it within the organisation (Roos et al., 1997; Boisot, 2002; Ordóñez de Pablos, 2004);
- Relational capital (RC, henceforth) is the result of the value generated by an organisation in their relations with the environment, including suppliers, buyers, competitors, shareholders, stakeholders, and society (Bontis, 1996; Stewart, 1997). It is the result of an organisation’s ability to interact positively with members of the community to increase wealth creation by enhancing HC and SC (Viedma Marti, 2001; Nazari and Herremans, 2007).

Intangible assets are enablers, as they transform productive resources into value-added assets (Hall, 1992), and this should be a key issue for universities. Cañibano and Sánchez (2009: p. 95-97), report some reasons for the possible utility of IC approach to the management of such organisations:

i. The need for creating value. IC can contribute by disclosing the hidden value (where, who or what) and its linkages with performance indicators (how many);

ii. The corporate social responsibility. Universities have to provide crucial information to a wide range of users, namely, society, public sector, business system, academia and science community, students, and that kind of stakeholders. IC can help providing a new approach to university´s managers, focusing on its main goals and performance-oriented;

iii. Alliances and networks. There is an increasing importance of relationships and networks, as they have a positive impact on the innovative capacity of a region. This leads universities to pay attention to the assessment of such relationships, even by quantifying its effect over performance. IC contributes with the RC dimension.

Spite of the research developed, there is still a need for developing further models and clarify how, why, and where value is generated through the management of intangible (McAdam et al., 2010).

The Table 2 synthesises the four general models of IC measurement, including authors, constructs included in each model and the type of measurement developed.
From these, up to 42 models of IC measuring have been reported (Sveiby, 2010). Several researches have been developed linking some elements of IC to performance indicators in diverse business sectors (Bontis, 1998; Do Rosário Cabrita and Bontis, 2008; Halim, 2010). For instance, Bontis (1998) developed a model that links elements of IC and a set of business performance variables. He concluded that causal relationships exist between various elements of IC and explanatory variables for corporate performance. Similar conclusions are achieved when models of IC-performance are applied to innovative firms (González-Loureiro and Figueroa Dorrego, 2010). Therefore, it seems that managing some elements of IC could be a key of success in the overall improvement of performance.

An IC approach helps identifying the combination of activities and intangible resources (HC, SC, RC) of an organisation. This approach enables organisations to transform a set of material, financial and human resources to a system capable of creating value for stakeholders (European Commission, 2006).

It is stated the higher the interactions among HC, SC and RC, the higher the value generated (Petrash, 1996). Therefore, it is advisable to follow the guidelines opened by researchers in assessing IC elements and their influence on the organisational performance.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Constructs included</th>
<th>Type of measurement (*)</th>
</tr>
</thead>
</table>
  • Business internal processes perspective  
  • Learning and growing perspective  
  • Customer perspective | No monetary measurement (it includes both no monetary and monetary measurements)  
  Index values of the four constructs included, does not include a single IC value |
| Intangible Assets Monitor 1988-1997 (Sveiby, 1997) | • External structure indicators  
  • Internal structure indicators  
  • Competence indicators | No monetary through the measurement of growth and renewal, efficiency and stability of the three elements, and its aggregation in a single IC value |
| Skandia’s Navigator 1992-1996 (Edvinsson and Malone, 1997) | • Financial focus  
  • Customer focus  
  • Human focus  
  • Processes focus  
  • Renewal and development focus | Addition of monetary and non-monetary measurements, to reach a single value of CI (CI index) expressed in nonmonetary terms |
| Technology Broker 1996 (Brooking, 1996) | • Market assets  
  • Human assets  
  • Intellectual property assets  
  • Infrastructure assets | Non-monetary measuring, even though it does not reach the definition of quantitative indicators, but it is based on a review of qualitative questions |

Source: own draft from cited authors in the table and Bontis, 2001 and (*)Tan et al., 2008
3. Intellectual Capital in universities: main approaches review

In this section, the main current initiatives and approaches of IC applied to universities are summarised.

The *International Accounting Standards Committee* and their national correspondents have faced the need for standardised accountancy information. They try to disclose the hidden value of organisations—mainly firms—i.e. their IC (Bontis, 2001: p. 59). Models are fitted and applied to various types of organisations and to public sector. For instance, they are applied to universities (Tsai and Ghoshal, 1998; Caba Pérez and Sierra Fernández, 2001; Cañibano and Sánchez, 2009; Xiuyan et al., 2009; Bezhani, 2010) and even to national or regional territories—National IC—(Malhotra, 2000; Bontis, 2004). Most relevant initiatives are summarised in Table 3.

Table 3: Relevant initiatives in IC measurement in Public Sector

<table>
<thead>
<tr>
<th>Year approx.</th>
<th>Denomination</th>
<th>Main authors</th>
<th>Measurement description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>SICAP</td>
<td>Ramírez, 2010</td>
<td>An EU funded project to develop a general IC model specially designed for public administrations and a technological platform to facilitate efficient management of the public services. The model structure identifies three main components of intellectual capital: public human capital, public structural capital and public relational capital.</td>
</tr>
<tr>
<td>2009</td>
<td>ICU Report</td>
<td>Sánchez et al., 2009</td>
<td>ICU is a result of an EU-funded project to design an IC report specifically for universities. Contains three parts: (1) Vision of the institution, (2) Summary of intangible resources and activities, (3) System of indicators.</td>
</tr>
<tr>
<td>2009</td>
<td>IAbM</td>
<td>Japanese Ministry of Economy, Trade and Industry. (Johanson et al., 2009)</td>
<td>Intellectual asset-based management (IAbM) is a guideline for IC reporting introduced by the Japanese Ministry of Economy, Trade and Industry. An IAbM report should contain: (1) Management philosophy. (2) Past to present report. (3) Present to future. (4) Intellectual-asset indicators. The design of indicators largely follows the MERITUM guidelines.</td>
</tr>
<tr>
<td>2008</td>
<td>Regional Intellectual Capital Index (RICI)</td>
<td>Schiuma et al., 2008</td>
<td>Uses the concept of the Knoware Tree with four perspectives: (hardware, netware, wetware, software) to create a set of indicators for regions.</td>
</tr>
<tr>
<td>2006</td>
<td>Intellectus model in Public Sector</td>
<td>Bueno Campos et al., 2006</td>
<td>Intelectus Knowledge Forum of Central Investigation on the Society of Knowledge. The model is structured into 7 components, each with elements and variables. Structural capital is divided in organisational capital and technological capital. Relational capital is divided in business capital and social capital.</td>
</tr>
<tr>
<td>Year approx.</td>
<td>Denomination</td>
<td>Main authors</td>
<td>Measurement description</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>2004</td>
<td>National Intellectual Capital Index</td>
<td>Bontis, 2004</td>
<td>A modified version of the Skandia Navigator for nations: National Wealth is comprised by Financial Wealth and Intellectual Capital (Human Capital + Structural Capital)</td>
</tr>
<tr>
<td>2003</td>
<td>Public sector IC</td>
<td>Bossi Queiroz, 2003</td>
<td>An IC model for public sector. It adds two perspectives to the traditional three of particular importance for public administration: transparency and quality. It also identifies negative elements, which generate intellectual liability. The concept of intellectual liability represents the space between ideal management and real management.</td>
</tr>
<tr>
<td>2003</td>
<td>Danish guidelines Intellectual Capital Statement-ICS</td>
<td>Mouritzen and Bukh, 2003; DMSTI, 2003</td>
<td>A recommendation by government-sponsored research project for how Danish firms should report their intangibles publicly. Intellectual capital statements consist of 1) a knowledge narrative, 2) a set of management challenges, 3) a number of initiatives and 4) relevant indicators.</td>
</tr>
<tr>
<td>2001</td>
<td>IC reporting for Austrian universities</td>
<td>Leitner et al., 2001</td>
<td>It separates this item in performance processes and impact. It includes both financial and non-financial performance indicators</td>
</tr>
<tr>
<td>2001</td>
<td>Value Chain Scoreboard™</td>
<td>Lev, 2001</td>
<td>A matrix of non-financial indicators arranged in three categories according to the cycle of development: Discovery/Learning, Implementation, Commercialization.</td>
</tr>
<tr>
<td>2001</td>
<td>Meritum guidelines</td>
<td>Sánchez et al., 2001</td>
<td>An EU-sponsored research project, which yielded a framework for management and disclosure of Intangible Assets in 3 steps: 1) define strategic objectives, 2) identify the intangible resources, 3) actions to develop intangible resources. Three classes of intangibles: Human Capital, Structural Capital and Relationship Capital. Meritum final report.</td>
</tr>
<tr>
<td>2001</td>
<td>IC measuring model for public sector based on EFQM</td>
<td>Caba Pérez and Sierra Fernández, 2001</td>
<td>An IC measuring model for public sector based on the European Foundation Quality Management Model (EFQM). It integrates the elements from the EFQM model in three blocks which compose intellectual capital: human capital, structural capital and relational capital.</td>
</tr>
</tbody>
</table>

Knowledge management and IC are the main sources of competitive advantages for firms (Viedma Marti, 2001: p. 150). Nevertheless, such linkage is hard to be done when speaking about public organisations, due to their special characteristics (Bossi Queiroz et al., 2005 identify several of them).

Only three main initiatives, which deal with IC in universities, could be highlighted in the existing academic literature:

i. the ICU-Report, in the framework of the Observatory of European Universities and the PRIME Project, funded by the European Commission in the V Framework Programme (Sánchez et al., 2001);
ii. the Danish IC Guidelines (Danish Agency for Trade and Industry (DATI), 2000; Mouritzen and Bukh, 2003; DMSTI, 2003);
iii. the IC reporting model for Austrian universities, developed by Leitner (2004), which is mandatory for Austrian universities since 2006.

Despite the existence of those initiatives, there is a lack of a general model for universities. That model would allow showing more clear linkages between IC elements and the performance obtained from their management. It is advisable that the model considers the diverse goals and mission of such an organisation.

It can be reported some others works, following the premises suggested by the latter three main initiatives:

i. the Poland initiative (Fazlagic, 2005) which does only include HC and SC;
ii. the experiences in Spain (Ramírez et al., 2007; Sánchez et al., 2009), Italia (Palumbo y Di Berardino, 2009), Romania (Dumitru y Dumitru, 2009), Taiwan (Lee, 2010) and United Kingdom (Bezhani, 2010). Although they are focused in academic (research and teaching) performance, as they do not cover all the missions of a university.

Some researchers have reported some interactions among the diverse missions of a university. Ponomariov (2008) have found that the academic quality of universities was negatively related to the interaction with firms. Therefore, high academic performance seems to reduce the likelihood of high performance in transferring, because researchers are focused in creating but not in transferring knowledge.

In the short term, transferring is an increasing trend due to the Bologna´s process. It is expected that, in the long term, the academic prestige of a university will attract firms´ funds by transferring mechanisms (i.e., licenses, patents royalties, start-ups, spin-offs, and similar ones). Hicks et al. (2000) highlighted the relevant linkage between the excellence in science processes of a university and the transferring goal, because the top 1% cited papers in United States are the more cited in US patents.

Consequently, three of the main initiatives are analysed in the next subsections. The systematic analysis follows the next guidelines:

a) What the missions comprised by each initiative are. Accordingly to
European Commission (2003), the main missions to be analysed will be: teaching, researching and the so-called third mission, transferring knowledge.

b) What the IC elements included by each initiative are. In this case, the IC elements to be analysed will be the reported by the general models and the commonly accepted disaggregation (Saint-Onge, 1996; Edvinsson and Sullivan, 1996; Bontis, 1996, 1998; Stewart, 1997; Sveiby, 1997; European Commission, 2006): HC, SC, RC.

c) What the performance indicators included in each initiative are. In this case, it will be categorised in financial and non-financial indicators, following the premises stated by Kaplan and Norton (1992).

Initially, it must be highlighted that the initiatives are focused in IC reporting rather than in managing intangible.

3.1. The ICU Report and the Autonomous University of Madrid

The Observatory of European Universities (OEU) was a pilot project undertaken by researchers of 15 universities and research institutes from 8 European countries (Observatory of the European University, 2006). One of the outputs of such project was a methodological guide where it is suggested the measures and the framework (Sánchez and Elena, 2006). The last chapter of the guide is the Intellectual Capital Report (ICU Report), focused in universities. Due to constrain in budget and time, the exercise was limited to research activities (Sánchez et al., 2009: p. 313).

In Sánchez et al. (2009), it is documented the main characteristics and the test developed at the Autonomous University of Madrid – AUM.

One of its main contributions is the broad definition of performance indicators categorised into the three IC elements (HC, SC, RC). The system of indicators is summarised in Sánchez et al. (2009) and it can be further read in OEU (2006). It was developed an analytical and comprehensive framework, called Strategic Matrix, focused in the governance of the research activities. The full statement can be read in Schoen and Thèves (2006) and it is summarised in Table 4.

Performance indicator includes both financial and non-financial metrics. In the Strategic Matrix, there are five thematic dimensions (funding, human resources, academic outcomes, third mission, governance) and five transversal questions (autonomy, strategic capabilities, attractiveness, differentiation profile, territorial embedding), as it is further explained in Sánchez and Elena (2006).
Despite of their larger contributions to the disclosure and the extension of the IC management at universities, the model also has some improvable questions:

- There is not a clear separation between what are inputs and outputs in the value creation process. As stated by the managerial theories and the New Public Management, it is advisable to separate inputs, processes and outputs. This proposal was also suggested by Leitner (2004: p. 133). In the ICU Reporting model, performance indicators regarding inputs and outputs are mixed within each IC element, with the only exception of academic outcomes. Therefore, for managerial purposes, it is more difficult to know what the key to be improved are.

- There is a need for extending the framework to other activities as, for instance, education and transferring, besides the research activity. It must be highlighted the relevance of a well-established system of scorecard from the goals in order to help managing activities. Thus, it raises the question about the complex missions that a university must develop, considering the demand from their stakeholders in a knowledge-based economy (Sánchez and Elena, 2006: p. 530-532).

- There has not been established a clear linkage between measurements (mainly, based on IC elements) and the achievement of the strategic goals. Thus, the university managers have no enough information about how to manage each IC element for enhancing the overall performance, i.e. adequate tools to manage intangible resources and capabilities.

The Table 5 summarises the findings of the systematic analysis developed about the ICU-Reporting model. IC elements are a summary of intangible resources and activities describing what the institution can mobilise to achieve its goals. However, IC elements are the performance indicators and, therefore, it is not clearly identified what the inputs and the outputs are. Besides this, the missions would be widened to the teaching and transferring dimensions.
Table 5 Missions, IC elements and performance indicators of ICU REPORTING model

<table>
<thead>
<tr>
<th>Missions</th>
<th>IC elements</th>
<th>Performance indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only the research mission has been incorporated, due to constrain in time and budget. However, the ICU Report is organised in three parts. The first section is focused in identifying the vision of the institution (main general objectives, strategy and key drivers).</td>
<td>It comprises the commonly accepted categorisation of IC elements: • Human Capital • Structural Capital • Relational Capital They are a summary of intangible resources and activities, describing what the institution can mobilise to achieve its goals. It is the second section of the ICU-Report.</td>
<td>The system of performance indicators should allow to the internal and external bodies assess the achievement of goals and estimate the future of the institution. Performance indicators are categorised following the taxonomy of human, structural and relational capital. They are elaborated in absolute and relative terms. It is the third section of the ICU-Report</td>
</tr>
</tbody>
</table>

Source: own analysis from Observatory of the European University, 2006; Sánchez and Elena, 2006 and Sánchez et al., 2009

3.2. The Danish IC Guidelines and the Poznan University of Economics

Another remarkable initiative is the Danish Agency for Trade and Industry (DATI henceforth), (Danish Agency for Trade and Industry (DATI), 2000; DMSTI, 2003). Although it has been developed for the application in firms, the model has interesting items useful to the purpose of this paper. The Table 6 illustrates the model and the analysis tool developed with the aim of helping firms to evaluate their IC assets. It disaggregates the model in the called “knowledge narrative”. Subsequently, it assigns each management challenges, initiatives and indicators to the respective knowledge narrative. As defined in DATI (2000: p. 20), the knowledge narrative is:

“[…] how the company’s products or services benefit the users and how they improve their situation. The knowledge narrative explains what it takes to create this improvement and what resources are required within the company in order to achieve it. […]”

These guidelines were developed following the premises of the MERITUM project, as described in Bukh and Johanson (2003).

The knowledge resources are employees, customers, processes and technologies. The model analyse how those knowledge resources (inputs) are managed (activities) to obtain another resources (outputs) and, thus, what
effects (impacts) they have. Further information about the idea of knowledge as narrative is discussed in Mouritsen et al. (2002), where five examples of Danish firms serve to illustrate how the objects of IC statements were constructed.

Table 6 Intellectual capital statement-ICS model and analysis model for ICS

<table>
<thead>
<tr>
<th>Knowledge narrative</th>
<th>Management challenges</th>
<th>Initiatives</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Following this model, Fazlagic (2005) developed an IC measurement matrix for universities, which is summarised in Table 7. He states that, thanks to this taxonomy, it is possible to understand the current paradox in the knowledge creation process in universities:

“[…] why well-established European universities do not produce top quality knowledge” because “the high potential (resources) residing in the universities in many cases does not go hand in hand with their low performance (results) [...]”. Fazlagic (2005: p. 4).

Nevertheless, the IC framework followed by this author is arguable because it only comprised HC and SC and it did not include the RC (the value generated in the relations with the environment of the organisation).
“[…] the intellectual capital of a university consists of human capital and structural capital. The human capital relates to individual competencies of researchers […]” Fazlagic (2005: p. 4)

Table 7 IC measurement matrix in the Poznan University of Economics

<table>
<thead>
<tr>
<th>Types &gt;&gt; Categories</th>
<th>What is there? (Resources)</th>
<th>What has been invested? (Activities)</th>
<th>Which objectives have been achieved? (Results)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Capital</td>
<td>● Number of researchers</td>
<td>● Research spending per employee</td>
<td>● Number of newly recruited staff</td>
</tr>
<tr>
<td></td>
<td>● Share of researchers in total employment</td>
<td>● ITC spending per employee</td>
<td>● Number of contracts turned down with regret</td>
</tr>
<tr>
<td></td>
<td>● Average age of a researcher</td>
<td>● Time spent in internal seminars per employee</td>
<td>● Staff satisfaction</td>
</tr>
<tr>
<td></td>
<td>● Women in science (share of women in workforce)</td>
<td></td>
<td>● Staff turnover</td>
</tr>
<tr>
<td></td>
<td>● Inbreeding (share of researchers who are graduates of the university)</td>
<td></td>
<td>● Added value per employee</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Composite employee satisfaction index</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Average number of publications per researcher</td>
</tr>
<tr>
<td>Structural Capital</td>
<td>● Share of women occupying managerial positions</td>
<td>● Total investment in research infrastructure</td>
<td>● No. of international students</td>
</tr>
<tr>
<td></td>
<td>● Number of chairs (departments)</td>
<td>● Success ratio in project acquisition</td>
<td>● Share of international staff</td>
</tr>
<tr>
<td></td>
<td>● Average employment in a chair (department)</td>
<td>● Research spending per chair (department)</td>
<td>● Name recognition and reputation (based on press ranking lists)</td>
</tr>
<tr>
<td></td>
<td>● No. of PC per employee</td>
<td>● Participation in international conferences</td>
<td>● Student satisfaction index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● (no. of conferences attended, no. of researchers attending conferences)</td>
<td>● Number of students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● No. of research projects underway (including EU projects)</td>
<td>● Number of courses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Average number of publications per chair (department)</td>
</tr>
</tbody>
</table>

Source: Fazlagic, 2005: p. 5

One of the limitations of this model is the lengthy and complicated process to full implementing a scorecard tool at a university (Fazlagic, 2005: p. 6). He also recognises the relevant cultural barriers to the measurement of IC at universities: uncompetitive remuneration, weak leadership due to the tenure of rectors, the high societal status and the self-replicating organisational culture (Fazlagic, 2005: p. 7).

Therefore, the foundations of its definitions are weakness, due to its limited scope: only the research and teaching missions are included and it is only comprised the HC and SC elements of IC.

Neither is it a clear linkage on how each element of IC influence the overall performance of a university. The Table 8 summarises the systematic analysis developed.
Table 8 Missions, IC elements and performance indicators of Intellectual Capital Statement-ICS reporting model

<table>
<thead>
<tr>
<th>Missions</th>
<th>IC elements</th>
<th>Performance indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no proper defined mission. However, it can be stated that it comprises at least the teaching function (as it includes the “student satisfaction” and “the university’s graduates” description areas, as well as the research function. It has not been possible to clear identify whether or not the transferring function is comprised.</td>
<td>It comprises only two categories of IC elements: • Human Capital • Structural Capital</td>
<td>Originally, it was planned to use the Balanced Scorecard logic. However, it includes both financial and non-financial measurements. The description areas included are: • Strategic management • Knowledge goals • Employee satisfaction • Student satisfaction • The university’s graduates • Organisational structure • IC indicators (disaggregated in human and structural capital)</td>
</tr>
<tr>
<td>It has not been found a clear argument for this.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own analysis from cited authors in this subsection

3.3. The IC reporting model for Austrian universities

This is maybe the most remarkable initiative and the most used by academic community and practitioners. The documented initiator was Leitner (2004), where the author reviewed a previous paper presented in 2002 at the conference “The Transparent Enterprise. The Value of Intangibles”\textsuperscript{2}.

The application of New Public Management principles is one of the main contributions of this model. Thus, increased autonomy, output orientation and performance-based funding are applied, as well as the introduction of performance contracts between universities and the ministry in Austria (Leitner, 2004: p. 132). Leitner’s model is full oriented to help performance reporting in Austrian universities:

“[…] an IC model for universities which meets the specifics of their knowledge-production process […]. the publication of the IC report has to be parallel to the development of the performance contract and the performance report.” (Leitner, 2004: p. 132)

As the author states, “[…] this model can be labelled as having a process-oriented approach […].” (Leitner, 2004: p. 133). It comprises the transformation process developed by universities when carrying out activities to achieve their goals (education, research…). Because of this process, outputs affect to several

stakeholders (ministry, students, industry…), defined as Impact Output in the model. The model uses the IC elements (HC, SC, RC) as inputs in such process (see Figure 1). It is remarkable, that the model is very focused in the performance processes.

Figure 1 Model for IC reporting of Austrian universities

![Figure 1 Model for IC reporting of Austrian universities](image)

Source: Leitner et al., 2001

Table 9 summarise the analysis of such model following the aforementioned guidelines. The overall classification of IC elements adopts the widely diffused and proposed by the MERITUM group, (Sánchez et al., 2001).
### Table 9 Missions, IC elements and performance indicators of IC reporting model for Austrian universities

<table>
<thead>
<tr>
<th>Missions</th>
<th>IC elements</th>
<th>Performance indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no a clear definition of university</td>
<td>It comprises the commonly accepted categorisation of IC elements:</td>
<td>It separates this item in performance processes and impact. It includes both financial and non-financial performance indicators</td>
</tr>
<tr>
<td>missions. It comprises political goals and</td>
<td>• Human Capital</td>
<td>Performance processes indicators are categorised into six:</td>
</tr>
<tr>
<td>goals of each university, as framework</td>
<td>• Structural Capital</td>
<td>• Research</td>
</tr>
<tr>
<td>conditions.</td>
<td>• Relational Capital</td>
<td>• Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Commercialising of research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge transfer to public</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Infrastructure</td>
</tr>
<tr>
<td></td>
<td>Impact measures the influence of universities activities in their environment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There is no a full categorisation of stakeholders.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>However, it comprises:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ministry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Public</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Etc.</td>
<td></td>
</tr>
</tbody>
</table>

Source: own analysis from Leitner, 2004

It is, undoubtedly, the most complete model analysed. However, some suggestions can be proposed:

- There is no clear definition of missions and goals. They are comprised as framework conditions. As the author states, each university has to formulate its specific goals (Leitner, 2004: p. 134).
- There is no clear relationship among missions/ goals, IC elements and how their management influence over performance. As the author recognise, it is needed further theoretical research of the synergies between performance measurement and IC theory (Leitner, 2004: p. 139).
- It is no clearly identified how performance processes influence the impact indicators, nor is it clear how they affect to stakeholders.

The lack of clear missions in the model could difficult the comparison among universities: different goals-mix could lead into different performance and impacts over stakeholders. However, the model is quite flexible, as it can be
adapted to different external and internal factors, as well as different goals-mix.

As the author states: “[…] The underlying thesis is that a proper management of IC at universities has a significant impact on the performance and efficient use of the invested financial funds […]” (Leitner, 2004: p. 138).

Nevertheless, this is arguable. In such statement, it seems that the unique resource invested is financial funds, when IC argues that success is based more on strategic direction and knowledge management as a resource and less on physical and financial resources (Bontis, 1998). IC theories also state that knowledge is the most important strategic resource (Choo and Bontis, 2002).

The model was developed to help Austrian Universities in the IC reporting process and, thus, this fact limited a broader scope. Leitner’s IC model is too focused in the reporting question to allow universities evaluation, rather in disclosing the linkages among IC elements that best explain the overall performance. In fact, the most criticisable issue is the inclusion of “floor space in squared metres” within SC indicators when this model was applied to public Austrian universities. It seems that this indicator is inconsistent with IC streamline of intangible management.

Thus it seems that some trouble exists when going from theory to practice. Just as the author states: “[…] the definition and measurement of outputs in universities is problematic” (Leitner, 2004: p. 136). This is due to the fact that “[…] performance management is the process of defining goals, performance categories and performance standards and the reporting and communication to the public owners, according to the National Academy of Public Administration […]”, (English and Lindquist, 1998).

4. Toward a performance-oriented model to manage intellectual capital in universities

IC initiatives in universities are too focused in reporting about the key elements in the value generation process, but not in helping university managers to deal with intangible. The IC elements detected are quite exhaustive, as well as performance indicators. However, there is still no enough information about the impact that IC management (inputs) have in general performance of universities (outputs). Furthermore, it is advisable to deepen in the “whats” and the “hows”, i.e., the key elements that most influence the overall performance in the development of the triple mission of university.

IC management in organisations depends on adequate organisational structures and drivers linking structural, cultural aspects and organisational climate. All of them should lead to a more effective, efficient IC management (Isaac et al., 2009). The starting point is usually the HC (Monavvarian and Khamda, 2010; Adam and Urquhart, 2009; Bontis and Serenko, 2009). Moreover, as stated by several authors, the interactions among the diverse elements in and outside the system are the keys for the improvement of the overall performance (Metcalfe,
Universities, as research organisations, have an eminent regional impact (Nelson, 1993; Cooke et al., 1997). Therefore, RC seems to be a key dimension to be taken into account, through collaborative relations and closeness with regional agents -particularly, firms- (Metcalfe, 1995; Lalkaka, 2002; Kayal, 2008).

It is highlighted the education and R&D as the basic factors in the growth process (Freeman and Soete, 1997: p. 3). However, science is only one of a plurality of knowledge sources that can induce growth based on knowledge and innovation in enterprises, where Universities play a key role (Caraça et al., 2006, 2007; Jensen et al., 2007; Caraça et al., 2009).

The development of the performance-oriented approach is mainly based on the Leitner’s model (three missions of universities, input and output breakdown) and the ICU-Reporting model (separating input and output within the comprehensive IC indicators developed).

A novelty of this proposed model is that the performance construct is disaggregated into the three missions of a university, following the literature reviewed: research, teaching and transferring. As the literature suggests, the management of intangible in universities is conditioned by the goals fixed. The framework condition (political goals, legal framework and so on) is within the RC construct in the IC theories.

In the following paragraphs, the hypotheses are outlined following a compendium of researches around IC theories, performance and IC in universities.

Bontis (1998) initiated the research line linking IC elements and performance through a structural equation model. He developed a pilot study where he concluded the existence of causal relationships among the three IC elements and a performance construct in firms. He designed 63 items grouped in three constructs of IC and one construct grouping performance business.

A recent research is the model linking IC elements with cumulative growth rate in innovative SMEs (González-Loureiro and Figueroa Dorrego, 2010). They found that human capital is the basic, initial point to explain cumulative growth. The key linkage is HC-SC, thus it is necessary internalise the value generated by people mainly within the organisation. This implies the need for appropriating that knowledge through the development of organisational culture and shared values all over the organisation.

The evidences of such model show the weak link from HC to RC (thus, external relationships outside innovative firms) to explain high levels of cumulative growth in value added and turnover. This finding emphasises the relevance of the internal dimension. In the case of IC in universities, the findings of that model have a double perspective. On one hand, interactions between HC and SC play a key role. On the other hand, it is found that the degree of universities usefulness is one of the keys in the RC construct. The latter emphasises the relevance of the transferring mission for universities.
Following the Strategic Matrix tool developed by Sánchez et al. (2007), the proposed framework for discussion is a matrix including the missions, IC elements and performance indicators (see Figure 4). The IC elements are incomes (means) applied in the process of achieve the goals fixed in each mission. This is evaluated by performance indicators.
Mission and goals:

**MISSION and GOALS**

<table>
<thead>
<tr>
<th>IC elements</th>
<th>Human capital</th>
<th>Structural capital</th>
<th>Relational capital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>• NUMBER OF TEACHERS</td>
<td>• NUMBER OF TEACHING ROOMS</td>
<td>• NUMBER OF EXTERNAL EVENTS</td>
</tr>
<tr>
<td></td>
<td>• NUMBER OF TEACHING LABORATORIES</td>
<td>• NUMBER OF EXTERNAL EVENTS</td>
<td></td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td>• NUMBER OF SENIOR RESEARCHERS</td>
<td>• RESEARCH LABORATORIES</td>
<td>• NUMBER OF DATABASE ACCESES</td>
</tr>
<tr>
<td></td>
<td>• NUMBER OF SENIOR RESEARCHERS</td>
<td>• NUMBER OF DATABASE ACCESES</td>
<td></td>
</tr>
<tr>
<td><strong>Transferring</strong></td>
<td>• NUMBER OF ADMINISTRATIVE PEOPLE IN TRANSFER OFFICE</td>
<td>• TRANSFERRING EQUIPMENT</td>
<td>• CONTACTS WITH AGENTS</td>
</tr>
<tr>
<td></td>
<td>• NUMBER OF ADMINISTRATIVE PEOPLE IN TRANSFER OFFICE</td>
<td>• TRANSFERRING EQUIPMENT</td>
<td></td>
</tr>
</tbody>
</table>

**Mission and goals: Performance indicators**

**EDUCATION Performance indicators:**
- NUMBER OF DEGREES PER YEAR
- AVERAGE ACADEMIC QUALIFICATION

**RESEARCH Performance indicators:**
- TOTAL RESEARCH FUNDS
- NUMBER OF PATENTS
- NUMBER OF PAPERS

**TRANSFERRING Performance indicators:**
- TOTAL REVENUES FROM TRANSFERRING
- TOTAL CONTRACTS WITH FIRMS

**INCOMES**

**OUTCOMES**

Source: own draft

This proposed framework is the base to evaluate the whole dimension of the mission and goals of universities in the current environment: education, research and transferring functions. This is a novelty to be highlighted in this approach. IC elements are the means of the university to be managed in order to achieve the adequate performance, and taking into account the mission and goals of such organisation. The utility of this model could be summarised as follows:

- It can help university managers fixing quantitative and qualitative objectives in each of the three missions;
- It will help university managers controlling the performance on each function;
- It could inform about the key IC elements that best help improving each mission;
- It can inform to stakeholders about the achievements in each function and about the overall influence of the university activities in its environment.
This proposed model also could contribute to the overall discourse of IC in universities:

- It rationalises the main existing initiatives by categorising IC in the commonly accepted elements;
- It includes the three dimensions of the universities´ mission, while current initiatives are more focused in research (with exception of Leitner, 2004). Therefore, this approach is more comprehensive while keeping it enough simple and easy to find conclusions;
- Consequently, it will shed some light on the possible interactions among research, teaching and transferring functions during the value creation process in universities, by efficiently managing IC elements.

Further research is required to determine the indicators to measure performance through IC management related with each mission. It is intended to use a structural equation system to identify relationships among the three IC elements and their influence in performance indicators for public universities, following González-Loureiro and Figueroa Dorrego (2010).

Figure 5 Proposed structural equation model to be tested: Intellectual Capital Performance-Oriented Model in Universities (ICPOM)
IC management is the process of extracting value from knowledge, as stated by the IC literature (Egbu, 2004). Knowledge and IC management are the main sources of competitive advantages for firms (Viedma Marti, 2001: p. 150). Therefore, it can be suggested that the latter will be also the key mean to acquire a competitive edge by every university in the current “competition” for excellence.

Acknowledgements: (not included in this version)

References:


García Arrieta, M. 2001. La información contable de los activos intangibles. Tesis Doctoral Universidad San Pablo CEU.


