

The Relevance of Intellectual Capital: An Analysis of Spanish Universities

Yolanda Ramírez, Ángel Tejada, Agustín Baidez

Abstract—In recent years, the intellectual capital reporting in higher education institutions has been acquiring progressive importance worldwide. Intellectual capital approaches becomes critical at universities, mainly due to the fact that knowledge is the main output as well as input in these institutions. Universities produce knowledge, either through scientific and technical research (the results of investigation, publications, etc.) or through teaching (students trained and productive relationships with their stakeholders). The purpose of the present paper is to identify the intangible elements about which university stakeholders demand most information. The results of a study done at Spanish universities are used to see which groups of universities have stakeholders who are more proactive to the disclosure of intellectual capital.

Keywords—Intellectual capital, universities, Spain, cluster analysis.

I. INTRODUCTION

IN the actual Knowledge-based Economy investments in human resources, information technology, research and development and customer relations have become essentials in order to maintain the organization's competitive position and ensure its future [1]-[4]. The source of economic value and wealth is the set up and handling of intangible assets, frequently grouped under the generic term, Knowledge or Intellectual Capital.

Intangible and intellectual capital have become a very important issue, not only for academics but also for users, governments, regulators, enterprises, investors and other stakeholders during the last decade [5]. This growing interest has extended from firms to public institutions, such as universities and research centers.

Intellectual capital approaches become critical mainly due to the fact that universities' main goals are the production and the diffusion of knowledge and their more important investments are in research and human resources [6]; so, both inputs and outputs are mainly intangibles.

Universities become critical elements for the production, transmission and dissemination of knowledge, "due to the key role they play in the three fields of research and use of its results, thanks to industrial cooperation and spin-off; education and training, in particular training of researchers, and regional and local development, to which they can contribute significantly" [7]. For that reason, the European

Union considers that "investing more and better in the modernization and quality of universities is a direct investment in the future of Europe and Europeans" [8].

In this context, European higher education institutions are currently immersed in a process of profound change, the intention of which is to improve the effectiveness, efficiency and transparency of these institutions with the aim of contributing to the development and improvement of the competitiveness of the European economy [9]-[13].

The accounting research is currently focused on the utility paradigm, which stresses the need for accounting information to be truly relevant to users' decision making processes. Consequently, given the new characteristics of the present socio-economic climate of the European higher education sector, we believe that universities should provide all the relevant information on their activities and the key factors of their success –their intangible resources-. So, in our opinion, the universities will have to pay greater attention to their different stakeholders and their respective information interest when designing their communication strategy. It will be necessary to include relevant information on their intangible assets, such as the quality of the institutions, their social and environmental responsibility, the capacities, competences and skills of their staff, etc.

This study aims to seek out the opinion of the university stakeholders regarding the importance they give to completing the information from university financial statements with information relating on intangible elements.

Consequently, the main aim of this study is to determine the type of intellectual capital information Spanish public universities demand most, and to identify university profiles.

The paper is structured as follows: In Section II, we briefly explore the concept of intellectual capital in higher education institutions and justify the importance of measuring and disclosing their intellectual capital. Section III describes the most significant initiatives in measuring and managing intellectual capital in Spanish universities. In Section IV, we define the scope of the empirical study conducted and the results obtained. Final conclusions are drawn in Section V.

II. RELEVANCE OF INTELLECTUAL CAPITAL FOR UNIVERSITIES

The term intellectual capital is used to cover all of the non-tangible, or non-physical, assets and resources of an organization, including its processes, innovation capacity, patents and the tacit knowledge of its members and their network of collaborators and contacts. So, intellectual capital (IC) has been defined 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” [14].

The intellectual capital is often represented as consisting of three basic and strongly interrelated components: Human Capital, Structural Capital and Relational Capital [9], [15]-[19].

In the case of universities, we could define the components in the following way:

- Human Capital: The set of explicit and tacit knowledge of the universities personnel (professors, researchers and assistants) acquired through formal and informal educational and actualization processes embodied in their activities.
 - Structural Capital: The explicit knowledge related to the internal process of dissemination, communication and management of scientific and technical knowledge in the organization. Structural capital may be divided into:
 - Organizational Capital: this refers to the operational environment derived from the interaction between research, management and organization processes, organizational routines, corporate culture and values, internal procedures, quality and the scope of the information system, etc.
 - Technological Capital: this refers to the technological resources available at the university, such as bibliographical and documentary resources, archives, technical developments, patents, licenses, software, databases, etc.
 - Relational Capital: it gathers the wide set of economical, political and institutional relationships between the university and its non academic partners: enterprises, non-profit organizations, local government and society in general. It also includes the perception others have of the university: its image, appeal, reliability, etc.
- Below are some of the reasons why it is a major necessity for higher education institutions to measurement and management their intellectual:
- Knowledge is the principal output and input of higher education institutions. Universities produce knowledge, either through scientific and technical research (the results of investigation, publications etc.) or through teaching (students trained and productive relationships with their stakeholders). Their most valuable resources also include their teachers, researchers, administration and service staff, university governors and students, with all their organizational relationships and routines [15]. It is true to say then that universities’ input and output are largely intangible [16].
 - The existence of continual demands for greater information and transparency about the use of public money [13], mainly due to the fact that most of the funding for public universities is handed over by the government [20].
 - The greater independence of universities regarding their organization, management and budget distribution requires greater social responsibility which will lead

universities to prepare accounting information to report to society as well as to facilitate and satisfy the information needs of participants in the institution itself.

- The implementation of the European Space for Higher Education promotes the mobility of both students and teachers within the territory of Europe, while at the same time encouraging both collaboration and competition between universities. This environment of greater competition and necessary collaboration means that these institutions are now committed to accessing citizens and transmitting relevant information on their activities. All this could well play an important role in the decision-making processes of the users of the accounting information, for example in the case of potential students choosing where to study.
- Lastly it is important to point out that universities are now facing growing competition due to lower funding, which puts them under greater pressure to communicate their results.

The higher education institutions have to elaborate models especially designed to identify and provide information on the organisations’ strategy, objectives, visions, activities and key intangible resources, based on financial and non-financial indicators. The intention of these models is to contribute to the progressive recognition of intellectual capital as a key strategic factor to confront the competitive challenges currently facing universities.

III. MODELS FOR MEASURING AND MANAGING INTELLECTUAL CAPITAL AT SPANISH INSTITUTIONS OF HIGHER EDUCATION

This section describes two important initiatives in measuring and managing intellectual capital that are being developed at Spanish universities.

- PCI Project: Madrid Region
- Knowledge Management Project at the University of Basque Country

A. PCI Project: Madrid Region

This project was carried out by a research group from the Institute for Business Administration (IADE), belonging to the Autonomous University of Madrid, and directed by Prof. Eduardo Bueno. They studied the intellectual capital from the universities and public research centres (PRCs) in Madrid region.

This project aims to know the research capability of universities and PRCs through an efficient management of their intellectual capital, and how to attain the maximum economic and social return of the resources.

The investigation was carried out in two separate parts. One of them developed an Intellectual Capital Indicators Program applied to the research activity; the other part was a proposal of a knowledge management model for the research activities of universities and PRCs.

The board of indicators was based in the Intellect Model [21] added by other proposals, such as the indicators included in the Spanish National Plan for Universities Quality

Evaluation. This board of indicators proposes an inventory and measurement of the potential and quality of the research results in universities and PRCs in Madrid Region.

The indicators selected for the research results measurement were organized in three different levels:

- a) First level indicators. They are expressed in absolute values and offer a global idea of the research effort.
- b) Second level indicators. They are relative values or ratios. They express an idea of the existing potential.
- c) Third level indicators. They are expressed as a percentage.

TABLE I
GENERIC ENUMERATION OF INTELLECTUAL CAPITAL INDICATORS FOR THE MEASUREMENT AND MANAGEMENT OF RESEARCH ACTIVITIES OF UNIVERSITIES

First level of indicators	Related to number of meetings and conferences organized, doctoral programs, research projects, books and articles, invited lectures, communications, research visits, patents, doctoral thesis, awards and fellowships (etc.) N. of books and published articles / Total number of professors
Second level of indicators	N. of communications and lectures / Total number of professors N. of defended doctoral thesis / Number of doctoral students N. of PhDs / Total number of personnel N. of research visits / Number of research personnel
Third level of indicators	% of revenues from Spanish administration % of revenues from the EU institutions % of revenues from private companies

(Source: Adapted from [22])

The three levels of indicators proposed are not organized according to the intellectual capital categories. However, the human, structural and relational components are implicitly included in the indicators.

Afterwards, a Model of Intellectual capital Management is developed considering the universities and PRCs research activity as the source of creations diffusion and reuse of knowledge. This model considers the research activity made by these institutions as the result of using the intellectual capital, aimed to the estimation of the most important intellectual capital variables for the studied organizations. Also, it considers that the research processes are fed by resources (inputs) in order to get results (outputs), and tries to assess the relationships between them (see Fig. 1).

Specifically, the inputs or resources considered would be Fig. 2.

Universities and PRCs use the resources (inputs), to achieve different research processes (with important differences according to scientific traditions in each knowledge area) to obtain the following results (outputs):

- Scientific production:
 - Books published.
 - Articles and book chapters
 - Patent rights and any other type of copyright.
 - Research projects carried out.
 - Lectures and communications at conferences and meetings.
- Social perception of the organization.
- Intellectual capital increase in the organization.
- Research networks established among organizations.

Intellectual capital assessment and evaluation are made by means of the results of the research (dynamic evolution of the indicators), comparative analysis and benchmarking, and analysis of their social consideration.

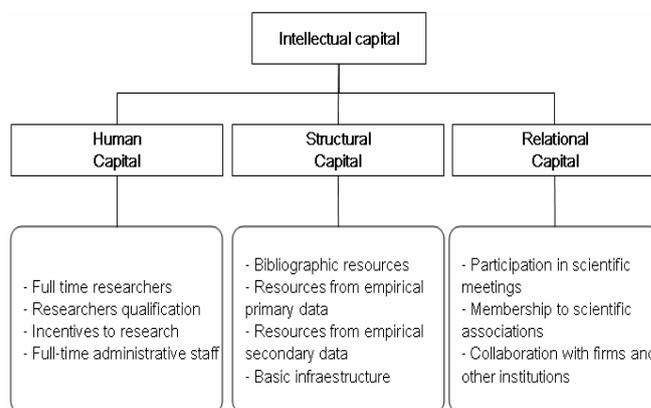


Fig. 2 Intellectual capital structure for research activity in universities and research organizations in the Madrid Region (Source: [23])

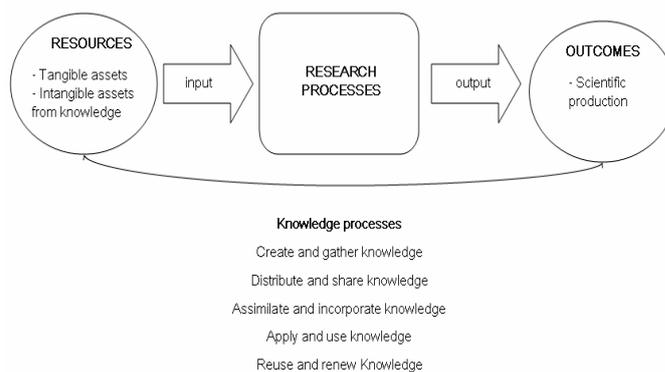


Fig. 1 Knowledge Leadership and Management Model (Source: [23])

In summary, the model attempts to (1) establish the general characteristics of the research processes in these organizations, (2) reinforce the cause-effect relationship between inputs and outputs within the research process, and, finally, (3) propose ways to manage intellectual capital inputs to improve research outputs in universities and research centers.

B. Knowledge Management Project at the University of Basque Country

The University of the Basque Country (Spain) developed a knowledge management case-study project in a key and strategic cross-organizational process “Research-Development-Transfer (R&D&T)” of scientific and technological knowledge within universities. The aim is to show an original methodology for the assessment of that process through the search of critical knowledge. This knowledge, embodied in the process, creates the R&D&T Capital.

The project brought together a multi-disciplinary group of twenty-two researchers with a two-fold purpose: On one hand, to produce an in-depth diagnosis of the current state on the management of the process of research, development and transfer of scientific and technical knowledge, showing its strengths and weaknesses; on the other hand, to use that diagnosis to draw up a new model which will enable to reinforce the strengths of the current process and to eliminate its weaknesses. To reach their goal, Multidisciplinary Groups in the Universities have been created with the specific aim of building closer ties between university research and the real socio-economic context [24].

The idea that underlines this project is that “*knowledge management in universities can be defined as a whole process that increases their intellectual capital, that could be defined as all the administrative, scientific and technical knowledge that generates or will generate benefits in the future*”[24]. An important portion of intellectual capital at universities is the research-development-transfer capital (R&D&T Capital), that is, the intellectual capital due to the process of creation of scientific and technical knowledge and its transference to the social environment (companies, governmental institutions and other social agents).

The starting methodological framework was the Intellectus Model [25]. Intellectual capital is divided into three categories: Human Capital, Structural Capital (made up of Organisational Capital and Technological Capital) and Relational Capital (formed by Business Capital and Social Capital).

The starting point of the project is that management practices do not act directly as drivers of intellectual capital but stimulate and promote some key types of knowledge that are the genuine drivers of intellectual capital[26]. Consequently a basic task concerning knowledge management is to find key knowledge types that act as drivers of intellectual capital in an organization and then discover the management practices that promote them.

Table II shows the types of knowledge that act as drivers of R&D&T Capital at a public university.

Finally, some indicators were proposed to measure the volume and main characteristics of basic and applied research produced by universities, what would increase the efficiency of their research.

As a summary, some of the proposed indicators are shown in Table III.

TABLE II
KEY TYPES OF KNOWLEDGE AS DRIVERS OF R&D&T CAPITAL AT UNIVERSITIES

As drivers of Human Capital

- H1.– Scientific and technical knowledge.
- H2.– Specific skills and knowledge concerning the actual process of research.
- H3.– Knowledge and acceptance of the need for applied and basic research.
- H4.– Knowledge and acceptance of the need to share knowledge with other areas.
- H5.– Knowledge and acceptance by university researchers of the image of the university.

As drivers of Structural Capital

- S1.– Knowledge shared by researchers concerning the experience of knowledge transfer at the university.
- S2.– Knowledge of the creation and maintenance of value chains of scientific and technical knowledge.
- S3.– Knowledge shared and accepted by university researchers concerning quality indicators for applied research and its transfer.
- S4.– Knowledge of the management of the scientific and technical knowledge transference process.
- S5.– Knowledge of the administrative management of projects and contracts.

As drivers of Relational Capital

- R1.– Knowledge of the needs of companies, organizations, institutions and society in general.
- R2.– Knowledge of the ways in which companies and non-university bodies involved in applied research, meet the needs in this area of businesses and institutions, in terms of both methods and prices.
- R3.– Knowledge of ways of dealing with the private sector and with institutions in order to form strategic alliances and co-operate on projects.
- R4.– Knowledge of techniques and methods to improve the image and reputation of the institution as a producer of transferable scientific and technical knowledge.
- R5.– Knowledge by companies, organizations and institutions of the possibilities offered by the university as a supplier of scientific and technical knowledge.

(Source: [26])

TABLE III
 INTELLECTUAL CAPITAL INDICATORS FOR UNIVERSITY RESEARCH

Human Capital	
Average size of research groups	Structure of research groups
Average scientific production of the research group (in number of activities or projects)	
Average scientific production of the research group (in amount of funding)	
Average research years	
Structural Capital	
Rate of contracts promoted by researchers at the university	
Rate of funding by science specialties	
Relational Capital	
Rate of research projects by science specialties	
Rate of funding by companies contracts	
Rate of promotional investment	
Agreements with public and private organization to develop an effective research activity and to improve services	

(Source: Adapted from [27])

IV. RESEARCH METHODOLOGY

The main objective of empirical study is to identify the priorities of Spanish public universities regarding the reporting of certain intangible elements and to group together universities with similar features. In order to achieve this objective, a questionnaire was designed and sent to every member of the Social Councils of Spanish public universities. It was thought that these participants would provide a good example of the attitude of university stakeholders since they represent the different social groups connected with

universities: university governors, students, teaching and research staff, administration and services staff, union organizations, business organizations, and public administrations.

A. Methodology, Data Collection and Definition of Variables

The population to be studied was therefore composed of the 1,904 members of the Social Councils of Spanish public universities. Replies were received from 247 members, 22.57% of the total. The size of the sample was considered sufficient, since in a binomial population the estimation error would be 5.37% for a reliability level of 95%.

The information was collected via an online survey during May-July 2011. The questionnaire consists of 5-point Likert scale questions. Those surveyed were asked to rate on a 5-point Likert scale the importance they gave to the different intangible elements in universities.

Specifically, based on the Intellectus Model [25], we proposed 32 intangible elements according to the higher education institutions' characteristics: twelve relating to human capital (concerning the abilities and skills of the people belonging to the institutions), fourteen relating to structural capital (these referring to how the institution is structured and how it works), and sixteen relating to relational capital (that reflect the institution's relations with students and the outside world) (see Tables IV-VI).

TABLE IV
 PROPOSED INTANGIBLE ELEMENTS (HUMAN CAPITAL)

Intangible elements	
HC1	Typology university staff (historical data on increase and decrease of staffing numbers, staff age structures, type of contract, etc.)
HC2	Academic and professional qualifications of teaching and research staff (% of teachers, % of civil servants, etc.)
HC3	Mobility of teachers and researchers (% of teachers with fellowships, etc.)
HC4	Scientific productivity (books, articles published, etc.)
HC5	Professional qualifications of administration and service staff
HC6	Mobility of graduate students
HC7	Efficiency of human capital
HC8	Teaching capacities and competences (didactic capacity, teaching innovation, teaching quality, languages, etc.)
HC9	Research capacities and competences (research quality, participation in national and international projects, % of doctors, six year terms, etc.)
HC10	Capacity for teamwork
HC11	Leadership capacity
HC12	Training activities

(Source: own information)

TABLE V
 PROPOSED INTANGIBLE ELEMENTS (STRUCTURAL CAPITAL)

Intangible elements	
SC1	Facilities and material resources supporting pedagogical qualification and innovation
SC2	Facilities and material resources supporting research and development
SC3	The institution's assessment and qualification processes
SC4	Organizational structure
SC5	Teaching management and organization (academic networks, periodical exchange with foreign teachers, teaching incentives, etc.)
SC6	Research management and organization (internal communication of results, efficient management of research projects, research incentives, theses read, etc.)
SC7	Organization of scientific, cultural and social events
SC8	Productivity of the administration, academic and support services
SC9	Organization culture and values
SC10	Effort in innovation and improvement (expenditure on innovation, staffing level, etc.)
SC11	Management quality
SC12	Information system (document processes, databases, ITC use, etc.)
SC13	Technological capacity (total expenditure on technology, availability and use of computer programs, intranet/internet use, etc.)
SC14	Intellectual property (patents, licenses, etc.)

(Source: own information)

TABLE VI
 PROPOSED INTANGIBLE ELEMENTS (RELATIONAL CAPITAL)

Intangible elements	
RC1	Efficiency of graduate teaching (average duration of studies, drop-out rate, graduation rate, etc.)
RC2	Student satisfaction
RC3	Graduate employability
RC4	Relations with students (capacity of response to students' needs, permanent relations with graduates, etc.)
RC5	Relations with the business world (spin-offs, R&D contacts and projects, etc.)
RC6	Relations with society in general (institutional representation in external organizations, collaboration in national and international projects, etc.)
RC7	Application and dissemination of research (dissemination of results, social appropriateness of research)
RC8	Results with the media
RC9	University image
RC10	Collaborations and contacts with public and private organizations
RC11	Collaboration with other universities
RC12	Strategic links
RC13	Relations with quality institutions
RC14	The regional, national and international reputation of the university
RC15	Social and cultural commitment
RC16	Environmental responsibility

(Source: own information)

The replies obtained were subjected to a descriptive analysis based on the characteristics of each of the questions.

Then, a cluster analysis was also applied in order to identify the priorities and profiles of Spanish public universities in terms of reporting on intellectual capital.

B. Analysis of the Results

Tables VII-IX show the frequencies obtained in the empirical study (mean, median, standard deviation, and percentile 25 and 75) to the different intangible elements (grouped in three categories of intellectual capital).

Firstly it must be observed that, in general, a high mean value was awarded to the different intangible elements relating to human, structural and relational capital, which shows a strong emphasis on the need for universities to measure and manage their intellectual capital.

In order to classify any of the intangible elements as essential, it was decided that the items in question had to be given a mean value of over above 4.5, a median of 4 or more points, in conjunction with a minimum percentile of 25 scoring 4 points and a minimum percentile of 75 of 5 points.

TABLE VII
 INTANGIBLE VARIABLES USED IN THE STUDY (HUMAN CAPITAL)

Intangible elements	Mean	Median	Standard deviation	Percentile	
				25	75
HC1	3.66	4	0.433	3	4
HC2	4.60	5	0.321	4	5
HC3	4.54	5	0.552	4	5
HC4	4.58	5	0.365	4	5
HC5	3.66	4	0.672	3	4
HC6	4.37	4	0.327	4	5
HC7	4.44	5	0.413	4	5
HC8	4.60	5	0.438	4	5
HC9	4.39	4	0.285	4	5
HC10	4.08	4	0.366	4	5
HC11	3.99	4	0.452	3	5
HC12	4.44	5	0.369	4	5

(Source: own information)

TABLE VIII
 INTANGIBLE VARIABLES USED IN THE STUDY (STRUCTURAL CAPITAL)

Intangible elements	Mean	Median	Standard deviation	Percentile	
				25	75
SC1	4.12	4	0.344	4	5
SC2	4.47	4	0.343	4	5
SC3	4.31	4	0.383	4	5
SC4	4.06	4	0.602	3	5
SC5	4.63	5	0.402	4	5
SC6	4.40	4	0.329	4	5
SC7	4.46	4	0.406	4	5
SC8	4.05	4	0.449	3	5
SC9	4.12	4	0.437	3	5
SC10	4.58	5	0.352	4	5
SC11	4.54	5	0.394	4	5
SC12	4.48	4	0.363	4	5
SC13	4.49	5	0.394	4	5
SC14	4.58	5	0.358	4	5

(Source: own information)

TABLE IX
 INTANGIBLE VARIABLES USED IN THE STUDY (RELATIONAL CAPITAL)
 (CONT.)

Intangible elements	Mean	Median	Standard deviation	Percentile	
				25	75
RC1	4.63	5	0.295	4	5
RC2	4.66	5	0.377	4	5
RC3	4.79	5	0.252	5	5
RC4	4.29	4	0.359	4	5
RC5	4.79	5	0.271	5	5
RC6	4.47	5	0.354	4	5
RC7	4.37	4	0.374	4	5
RC8	4.01	4	0.547	3	5
RC9	4.65	5	0.313	4	5
RC10	4.40	4	0.348	4	5
RC11	4.56	5	0.284	4	5
RC12	4.42	4	0.335	4	5
RC13	4.44	4	0.341	4	5
RC14	4.47	5	0.405	4	5
RC15	4.40	4	0.398	4	5
RC16	4.49	5	0.434	4	5

(Source: own information)

Specifically, the analysis of the data obtained from the various statistics (mean, median, mode, range, typical deviation, 25 and 75 percentiles) led to classifying the

following intangible elements as essential to universities:

- Human capital: academic and professional qualifications of the teaching and research staff, mobility of teachers and researchers, scientific productivity and teaching capacities and competences.
- Structural capital: effort in innovation and improvement, intellectual property and management quality.
- Relational capital: graduate employability, relations with the business world, application and dissemination of research, student satisfaction, the university's image and collaboration with other universities.

Then, in order to test if there are different groups of universities regarding their attitude or behaviour in relation to the emphasis on information about intellectual capital, we applied a two-step cluster analysis [28]. The purpose of this analysis is to detect similarities between the individuals comprising the sample under study, and to seek the maximum homogeneity within the groups and maximum heterogeneity between the groups found. The dendrogram (derived from the application of hierarchical methods) was used to identify the number of groups in each case.

The results show that there are three different groups of universities (see Fig. 3 and Table X).

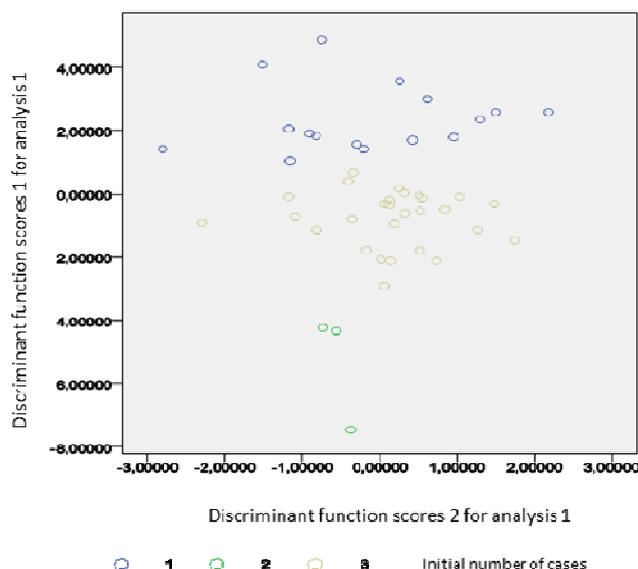


Fig.3 Scatter Plot of the Discriminant Functions. Intellectual capital (Source: own information)

TABLE X
CLUSTER ANALYSIS. INTELLECTUAL CAPITAL

Var.	Standardized coefficients Discriminant analysis		Mean Values			Levene statistic	F
	Dim. 1	Dim. 2	Cluster 1 N=1	Cluster 2 N=3	Cluster 3 N=2		
CH	0.448	0.431	4.54 (0.159)	3.69 (0.314)	4.21 (0.107)	6.106	57.222**
CE	0.546	-1.146	4.65 (0.147)	3.76 (0.185)	4.26 (0.120)	0.358	76.308**
CR	0.244	1.000	4.74 (0.171)	3.93 (0.094)	4.45 (0.136)	0.786	45.691**

(Source: own information)

where: N = number of universities in each group, CH = Human capital, CE = Structural capital, CR= Relational capital, Parenthetically, the standard deviation of the variables.

** Significance p-value<0.01

* Significance p-value<0.05

The first cluster is characterized by a greater emphasis on all the components of intellectual capital, with particular emphasis on human capital. This cluster includes the following universities: Jaume I, Rey Juan Carlos, Complutense of Madrid, Pablo Olavide, La Laguna, Polytechnic of Cartagena, Polytechnic of Madrid, Valencia, Alcalá, La Rioja, Extremadura, Girona, PompeuFabra, Zaragoza, La Coruña and Polytechnic of Cataluña. These universities are defined as "proactive to reporting on intellectual capital", being particularly interested in offering information on the skills and abilities possessed by the university staff (explicit and tacit knowledge of teachers, researchers, managers and administrative staff and services) and in contributing to create value to these institutions.

Meanwhile, cluster 2 consists of those universities (Public of Navarra, Lleida and País Vasco) who attribute greater importance to structural capital versus human and relational capital. So, these universities would be particularly interested

in offering information on all the university activities relating to both social and administrative aspect (internal processes of representation, teaching, research, administration and services) and technological innovation.

The importance given by these universities to structural capital is in line with other studies such as those conducted by [29], [30], where it was shown that structural capital prevails over human and relational capital in higher education institutions.

This greater relative importance given to the structural capital can be due to the fact that it is the element which "materializes" the knowledge, skills and abilities of people, being key in the relations with the outside world. These results are also consistent with those of [31] and [32], who argue that structural capital is the most important component of intellectual capital because it belongs to the organization and serves as a vehicle to convert the personal knowledge of the employees into an asset.

Other empirical studies which highlight the relevance of structural capital are those made by [33] and [34]. For instance, [33] illustrates that the factors and organizational variables and inputs determine the universities performance, showing that the number of conferences and corporate members are positively correlated with publication output. Meanwhile, the study of [34] shows that institutional and organizational factors of research institutions, which are influenced by management (disciplines, administrative, leadership, etc.), are highly relevant to explain the outputs research.

Finally, cluster 3 (Burgos, Rovira i Virgili, Aut3noma of Barcelona, C3rdoba, Aut3noma of Madrid, Carlos III of Madrid, C3diz, Cantabria, Castilla-La Mancha, Granada, Huelva, Murcia, Oviedo, Salamanca, Sevilla, Valladolid, Vigo, Miguel Hern3ndez, Alicante, Polytechnic of Valencia, Almer3a, Las Palmas de Gran Canaria, Le3n, M3laga, Barcelona, Islas Baleares, Santiago de Compostela and Ja3n) attaches medium importance to all components of intellectual capital.

V. CONCLUSION

The reporting of intellectual capital in higher education institutions is becoming more important day by day. This is due to the fact that universities are knowledge producers per se, their most important output is knowledge, incorporated in research results, publications, educated students and productive relationships with their stakeholders. Among their most valuable resources are their researchers, managers and students with their organizational processes and networks of relationships. So, both their inputs and outputs are mainly intangibles.

The main objective of this study was to assess the degree of importance attached by stakeholders of the Spanish universities to the need to carry out a proactive publication of information on intellectual capital. The results obtained show the following 13 intangible elements considered as key in the Spanish universities: 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); as well as the graduate employability, relations with the business world, application and dissemination of research, students' satisfaction, the university's image and collaboration with other universities (Relational Capital).

Second, our research has focused on detecting behavioural profiles of Spanish universities with regard to the importance they attach to the disclosure of intellectual capital. The results revealed three different positions on the subject: 1) universities proactive presentation of all information given on intellectual capital, such as on competencies and skills of university staff; 2) those who attach greater importance to structural capital; and, 3) those who adopt a middle position in this regard.

These findings provide strong support for each Spanish

university to individually identify which information about intellectual capital is the most demanded by its stakeholders, according to its own features and environment.

In our opinion, and based on the results of the empirical study carried out, is absolutely necessary for universities to disclose information on their intangibles through the filing of an intellectual capital report, which will be a healthy exercise of transparency from these institutions to provide users access to a type of relevant information for decision making.

REFERENCES

- [1] C. Goldfinger, "Understanding and measuring the intangible economy: Current status and suggestions for future research", in CIRET seminar, Helsinki, 1997.
- [2] L. Nakamura, "Intangibles: What Put the New in the New Economy", *Federal Reserve Bank of Philadelphia Business Review*, pp.15-30, July-August, 1999.
- [3] L. Cañibano, M. Garc3a-Ayuso, and M. P. S3nchez, "Accounting for Intangibles: A literature review", *The Journal of Accounting Literature*, vol. 19, pp. 102-130, 2000.
- [4] S. Elena, C. Warden, "Visualising the hidden value of higher education institutions: how to manage intangibles in knowledge-intensive organisations", in *Identifying, measuring and valuing knowledge-based intangible assets: new perspectives*, B. Vallejo, A. Rodriguez and G. Arregui, Ed, New York: IGI Global, 2011, pp. 177-207.
- [5] P. S3nchez, and S. Elena, "Managing Intellectual capital in Public Universities. The Autonomous University of Madrid Example", in the 1st Workshop on "Visualising, Measuring, and Managing Intangibles and Intellectual capital", Ferrara, 2005.
- [6] S. Elena, "Knowledge Management and Intellectual capital in European Universities", in Workshop organized by the Graduate Programmed "Entering the Knowledge Society" and the Institute for Science and Technology Studies, Bielefeld University, Germany, 2004.
- [7] European Commission, *The role of the Universities in the Europe of Knowledge*, Brussels, 05/02/2003, COM (2003) 58 Final.
- [8] European Commission, *Mobilising the brainpower of Europe: enabling universities to make their full contribution to the Lisbon Strategy*, Brussels, 20/04/2005, COM (2005) 152 Final.
- [9] Y. Ram3rez, C. Lorduy, and J. A. Rojas, "Intellectual capital management in Spanish Universities", *Journal of Intellectual Capital*, vol. 8, pp. 732-748, 2007.
- [10] P. S3nchez, and S. Elena, "New management in higher education institutions: introducing intellectual capital approaches", *Conradi Research Review*, vol. 4, pp. 71-87, 2007.
- [11] European Commission, *Feasibility study for creating a European University data collection. Final Study Report*. EUMIDA Consortium. 2010.
- [12] A. Silvestri, and S. Veltri, "The intellectual capital report with universities: comparing experiences", *Annals of the University of Oradea, Economic Science Series*, vol. 20, pp. 618-624, 2011.
- [13] C. Warden, "Managing and Reporting Intellectual capital: New Strategic Challenges for HEROs", *IP Helpdesk Bulletin*, vol. 8, 2003.
- [14] European Commission, *Ricardis: Reporting intellectual capital to augment research, development and innovation in SMEs*. Brussels: EC, 2006.
- [15] K. H. Leitner, "Intellectual Capital reporting for universities: conceptual background and application for Austrian Universities", *Research Evaluation*, vol. 13, pp. 129-140, 2004.
- [16] L. Cañibano, and P. S3nchez, "Intellectual Capital Management and Reporting in Universities and Research Institutions", *Estudios de Econom3a Aplicada*, vol. 26, pp. 7-26, 2008.
- [17] I. Bezhani, "Intellectual capital reporting at UK universities", *Journal of Intellectual Capital*, vol. 11, pp. 179-207, 2010.
- [18] G. Secundo, A. Margheritam, G. El3a, and G. Passiante, "Intangible assets in higher education and research: mission, performance or both?", *Journal of Intellectual Capital*, vol. 11, pp. 140-157, 2010.
- [19] M. Raf3ee, M. Mosavi, and R. Amirzadeh, "Formulating and elaborating a model for the recognition of intellectual capital in Iranian Universities", *World Applied Sciences Journal*, vol. 10, pp. 23-28, 2010.

- [20] P. Sánchez, and S. Elena, "Intellectual Capital in Universities. Improving Transparency and Internal Management", *Journal of Intellectual Capital*, vol. 7, pp.529-548, 2006.
- [21] Euroforum, *Medición del Capital Intelectual*. Instituto Universitario Euroforum El Escorial. Madrid, 1998.
- [22] E. Bueno, P. Morcillo, and J. Rodríguez, J., "Intellectual capital and Scientific-Production of the Madrid Research Centres", in the International Conference "The Transparence Enterprise. The Value of Intangibles", Madrid, 2002.
- [23] E. Bueno, E. (Dir.), *Gestión del Conocimiento en Universidades y Organismos públicos de Investigación*. Dirección General de Investigación, Consejería de Educación, Comunidad de Madrid, 2003.
- [24] A. Araujo, "Gestión del Conocimiento, Universidad y Empresa", in the "Jornadas Universitarias sobre la gestión del conocimiento en empresas y organizaciones", Bilbao, Centre for University Knowledge Management, 2000.
- [25] Centro de Investigación sobre la Sociedad del Conocimiento (CIC), *Modelo Intellectus: medición y gestión del capital intelectual. Documentos Intellectus n° 5*, Madrid: CIC, 2003.
- [26] A. Rodríguez, J. Landeta, and S. Rangelov, "University R&D&T Capital: What Types of Knowledge Drive It?", *Journal of Intellectual Capital*, vol. 5, pp. 478-499, 2004.
- [27] J. Landeta, A. Rodríguez, and S. Rangelov, "Knowledge management analysis of the research and development and transference process at HEROs: a public university case!", *J.UCS Journal of universal computer science*, vol. 5, pp. 702-711.
- [28] G. Punj, and D.W. Stewart, "Cluster analysis in marketing research: a review and suggestions for applications", *Journal of Marketing Research*, vol. 20, pp. 134-148, 1983.
- [29] M.R. Martínez, *El capital intelectual en un departamento universitario. Análisis del área socio-jurídico*. PhD research. University of Sevilla (Spain), 2003.
- [30] A. Benkö, *El capital intelectual y la gestión del conocimiento en educación superior: Un estudio de caso de la Universidad Americana*. PhD research. University of Sevilla (Spain), 2006.
- [31] T. Stewart, *Intellectual Capital. The new wealth of organizations*. Nicholas Brealey Publishing, London, 1997.
- [32] L. Edvinsson, "Some perspectives on intangibles and intellectual capital 2000", *Journal of Intellectual Capital*, vol. 1, pp. 12-16, 2000.
- [33] D. Teodorescu, "Correlates of faculty publication productivity: a cross-national analysis", *Higher Education*, vol. 39, pp. 201-222, 2000.
- [34] J.R. Hollingsworth, and E.J. Hollingsworth, "Major Discoveries and Biomedical Research Organizations: Perspectives on Interdisciplinarity, Nurturing Leadership, and Integrated Structure and Cultures", in *Practising interdisciplinarity*, P. Weingart and N. Stehr, Eds., Toronto: University of Toronto Press, 2000, pp. 215-244.

Yolanda Ramírez (BS98-PhD10) is an Assistant Professor in the Department of Accounting at the University of Castilla-La Mancha, Spain. Since 1999, she has taught on the Faculty of Economics and Business Administration. She completed her PhD. in Intellectual Capital Management. Her current research interests include intellectual capital, knowledge management, non-profit management and quality management. Her research work is focused on methods and techniques for building models of measuring and management intellectual capital in the universities.

Ángel Tejada (BS93-PhD98) is a Full Professor of the University of Castilla-La Mancha. He is Dean of the Faculty of Economics and Business Administration (Albacete, Spain). He is currently coordinator of the Master in Consulting and Financial Advisory and Tax. The main research lines developed are framed in the field of cost accounting and management, primarily intellectual capital, as well as accounting analysis, both in the private and the public, specifically, within the latter, management and control cost in Local Government.

Agustín Baidez (BS92) is an Assistant Professor of the Faculty of Economics and Business Administration at the University of Castilla-La Mancha, Spain. His research lines developed are framed in the field of consolidation of financial statements, environmental responsibility, and intellectual capital management in universities. Another significant line of research refers to the establishment of sustainable management systems in organizations, leading all in the preparation and analysis of relevant sustainability reporting.