

Intellectual Capital Disclosure: Profiles of Spanish Public Universities

Yolanda Ramírez, Ángel Tejada, Agustín Baidez

Abstract—In the higher education setting, there is a current trend in society toward greater openness and transparency. The economic, social and political changes that have occurred in recent years in public sector universities (particularly the New Public Management, the Bologna Process and the emergence of the “third mission”) call for a wider disclosure of value created by universities to support fundraising activities, to ensure accountability in the use of public funds and the outcomes of research and teaching, as well as close relationships with industries and territories. The paper has two purposes: 1) to explore the intellectual capital (IC) disclosure in Spanish universities through their websites, and 2) to identify university profiles. This study applies a content analysis to analyze the institutional websites of Spanish public universities and a cluster analysis. The analysis reveals that Spanish universities’ website content usually relates to human capital, while structural and relational capitals are less widely disclosed. Our research identifies three behavioral profiles of Spanish universities with regard to the online disclosure of IC (universities more proactive, universities less proactive and universities adopt a middle position in this regard. The results can serve as encouragement to university managers to enhance online IC disclosure to meet the information needs of university stakeholders.

Keywords—Universities, intellectual capital, disclosure, Internet.

I. INTRODUCTION

In the modern “new knowledge economy”, IC is considered a key driver for value creation both in private and public organizations [1]-[5].

Since universities are knowledge-intensive organizations in which the development of intangible resources is pivotal, these changes require the development of new measurement and reporting models that include IC [5]. There is growing claim for a wider disclosure of value created by universities to support fundraising activities, to ensure accountability in the use of public funds and the outcomes of research and teaching, as well as close relationships with industries and territories [2], [3], [6]-[9].

These information requirements, both those imposed by law and those derived from an increase in demand by stakeholders, justify the need to examine the disclosure of information by Spanish universities, including digital information. Nonetheless, research on IC in universities is still quite limited [10], and what does exist has mostly consisted of analyses of annual reports as the primary data source. In recent years, several scholars [11]-[14] have emphasized the limitations of annual reports as means of IC disclosure, since they are not designed to provide IC information and are essentially

backward looking and subject to manipulations that can make them unreliable [5]. In this vein, some scholars highlight several other advantages of online disclosure in the public sector, such as better accessibility, greater transparency and accountability towards stakeholders, lowered costs and a timelier dissemination of information [15]-[18].

The goal of disclosure is to provide relevant, reliable, and timely information to persons who need to know the information so that they can make decisions concerning their relationship with the organization [19]. Ideally, external reporting of an organization should capture all IC information and this can then be monitored and reviewed by the public [20]. Most prior studies on IC disclosure have focused on knowledge-intensive or services-based industries. However, in spite of its nature as a producer and supplier of knowledge, the university sector appears to have been largely overlooked [4]. In addition, the Internet is used widely on behalf of public bodies as a way to improve their relations with citizens, through greater disclosure of information and the possibility of doing administrative business and paperwork online [21]. However, recently most studies on the disclosure of information in universities have focused on surveys and interviews such as, for instance, [22] for Norwegian universities, [23] for universities in the UK, and [24] for Canadian universities. Furthermore, research conducted so far examining IC disclosure in universities has focused on the traditional reports, namely the annual reports [2], the social reports [25] and the performance plans [3]. In this sense, there is a need for more empirical research to be conducted to shed light on the quality of IC online disclosure in the higher education context. Thus, this paper is a step forward on the path to reducing these gaps in the literature.

Specifically, this research has two objectives: (1) to analyze the extent of online IC disclosure by Spanish universities, considering the importance of the Internet as a communication medium widespread in other contexts of public administration and corporations; and (2) to identify the behaviors of Spanish public universities regarding the reporting of certain intangible elements and to group together universities with similar features.

The research intends to contribute to the accounting literature on IC by providing an assessment of IC disclosure practices in universities.

The paper is structured as follows: Section II presents a review of the literature on IC disclosure in higher education institutions. Section III describes the Spanish university system; in Section IV, we relate the research methods applied. Section V illustrates the results of the analysis. Final

Yolanda Ramírez is with the Department of Accounting at the University of Castilla-La Mancha, Spain (e-mail: Yolanda.Ramirez@uclm.es).

conclusions are drawn in Section VI.

II. IC REPORTING IN HIGHER EDUCATION

The presentation of information about IC has now become of prime importance in institutions of higher education, mainly because knowledge is the main output and input of these institutions. Universities produce knowledge, either through scientific and technical research (the results of investigation, publications etc.) or through teaching (students educated and productive relationships with their stakeholders) [9], [26]-[27]. Hence, it is true to say that universities' input and output are largely intangible [28].

The components of a university's IC have been categorized in diverse ways, although undoubtedly, the tripartite classification is the most widely accepted in specialized literature: human capital, structural capital and relational capital [27]-[32].

In most countries there exists no obligation or recommendation for universities to present information on their IC. The only exception is in Austria, where universities have been obliged to present a report on IC since 2007.

Some prior empirical studies regarding the voluntary IC disclosures by universities are the followings. For example, [4] analyzes the quality of voluntary IC disclosures by universities in New Zealand, Australia, and the UK in the 2011 annual reports. They found that quality of IC disclosures by New Zealand universities was generally higher than their Australian and UK counterparts. Reference [18] focus on the information provided by Spanish universities on their websites, taking into consideration different types of information such as financial information, corporate governance, social responsibility, research, teaching activities, strategic information, timeliness, contact information, technology, interactivity with users, navigability and web structure. The study of [33] examines the extend and quality of IC disclosure at Czech public universities in the annual reports in relation to information need of identified stakeholders – students. They found that in the highest quality is disclosed relational capital, followed by structural and human capital. Finally, [34] analyze the financial reporting published in 2014 by Italian public universities. Their findings highlight that human capital and structural capital are the most disclosed categories of IC. Moreover, the analysis shows that size and board members independence affect IC disclosure in Italian public universities. Finally, the possibility to use different data sources apart from the traditional ones (annual reports, social reports, performance plans) to examine the IC disclosure is an emerging trend among scholars [5], [35]-[36]. Our paper is a first attempt to analyze IC web disclosure in public Spanish universities.

III. THE SPANISH UNIVERSITY SYSTEM

Spanish universities represent an interesting area of investigation because they are considered critical players in the knowledge-based society and are at the core of the policy agenda at national and European Union level. Accordingly,

universities are key actors in the pursuit of the European Agenda (Lisbon Strategy and Europe 2020). The "Europe 2020" Strategy recognized explicitly the central role of universities in helping Europe to become a smarter, greener and more inclusive economy by 2020 [37]. Moreover, universities have a pivotal role in regional development [38]. In this sense, Spanish university institutions are currently immersed in a process of profound change, the intention of which is to enhance the effectiveness, efficiency and transparency of these institutions with the eventual aim of contributing to the development and improvement of the competitiveness of the Spanish economy.

Since the late 1980s, the Spanish university system has undergone a profound change, led by the structural transformations driven by the Bologna Process aimed at increasing the quality of the research system and to make university more comparable, competitive, dynamic, and transparent. The Spanish Organic Law on Universities and in its partial modification in 2007 (called LOMLOU), establishes that "*there exists a need to improve the quality of university systems, through a culture of evaluation of universities services*", within the context of a full integration of the Spanish higher education system into the European Education Area [39]. Two main reasons for this are [39]: (i) the increase in competition among universities in order to recruit students; and (ii) the new dynamism in the financing of these institutions. On the other hand, Spanish universities are under constant pressure from society to increase their effectiveness and quality with fewer resources, while simultaneously being expected to show greater accountability and transparency in processes.

In Spain, public universities had been controlled and financed by the Central Government until the 90s, when there was a process of decentralization of higher education to Regional Governments, which are now responsible for this public service. They are also financially responsible for higher education and participate in the financing of public universities: their transfers are the main financial resource for the universities. At the moment, there are 50 public universities and 32 private universities, and there are important differences regarding their size and characteristics - even among the public ones. In public universities, the main financial resources came from Regional Governments and the fees from students, but there is also a heterogeneous map about the structure of financing [36].

Traditionally, Spanish universities have been mainly supported on public funding [40]. The reduction in public funding, as a consequence of the economic crisis of recent years, has affected the university both in their educational role and its role as a generator of knowledge and transformation of cultural, social and economic values [41]. In this scenario, new financing schemes has been discussed, particularly those related to the intensification of university services for the private sector. Also, as a consequence of the limitation of public budgets and corruption scandals related to public organizations, society and public administrations have more concern about the efficient use of resources. An important

reference is that of the document on university funding presented by the Ministry of Education at the Council of Universities on 20 January 2010, which calls for university management teams to be more rigorous when they are presenting accounts. Spanish universities need to provide more transparent information by way of an integrated system facilitating immediate information to each agent according to their needs, thus allowing them to make the best possible decisions [43]. Furthermore, public Spanish universities must apply the Law of Transparency, Wing Public Information Access and Good Governance [44], according which transparency and objectivity should prevail in proceedings the determination and allocation of public resources. This Law requires the publication of institutional, organizational and planning information, juridical information and economic, budgetary and statistical information.

Finally, note that the increasing autonomy and competition among universities will obligate these institutions to position themselves strategically, raise new financial resources and find new ways of accounting for their investments and expenditures.

Accordingly, Spanish universities have to be more transparent and, thus, to disseminate more information to stakeholders (researchers and teaching, students, funding bodies, governmental agencies, labor market, and society as a whole). In our opinion, the IC approaches seem to be a potential answer for Spanish universities to deal not only the new managerial needs but also with the transparency and accountability requirements. This actual scenario requires changes in the information published by the universities on

their website. Thus, although there is no IC report obligation, universities have become aware of the relevance of managing intangibles and publishing information about intangibles and academics have developed a model for IC measurement and reporting [45].

IV. RESEARCHING IC DISCLOSURE IN SPANISH UNIVERSITIES

A. Research Questions

The current study investigates IC practices by Spanish universities in order to insights that can advance the dissemination of IC reporting. Particularly, in adapting an IC framework developed previously to measure IC reporting in the university sector [42], this paper answers the following research questions (RQ):

- RQ1. What is the extent of IC disclosure in the Spanish universities' websites?
- RQ2. What are the groups of Spanish universities more proactive to the disclosure of IC?

B. Research Methodology

During the data analysis process of the present study, an IC measurement framework was developed to quantify the websites data. In order to reduce the level of abstraction, IC was first operationalized into three categories, namely: relational capital, structural capital and human capital. The three categories were further broken down to facilitate coding and measurement.

The final framework of IC components and descriptions is detailed in Table I.

TABLE I
IC CATEGORY, COMPONENTS AND DESCRIPTION

Category	IC Components	Descriptions
Structural capital	Intellectual property	All copyright (in relation to phonograms and broadcasts), patents rights, plant varieties, registered and unregistered trademarks, and publications (journal, books, e-journals, chapters, etc.) held by sample university
	University culture	Comprising the vision, attitudes, experiences, beliefs, and values of a university
	Management philosophy	Information referred to in mission statement
	Management processes	Information relating to the process in the university
	Information system/networking system	Information on the development, use application, and influence of systems
	Research projects	Research projects conducted by a university
	Financial relations	Information referring to the relationships between the university and its financial supporters
Relational capital	Brands	Information on brands associated with the university
	Students/student satisfaction	Information relating to the students and their satisfaction about learning
	Business/university partnership	All the activities and collaboration between universities and other organizations (firms, non-profit organizations, public authorities, local government, and society as a whole)
	Student database	Database of all students
Human capital	Quality standards	Information referring to teaching quality or learning quality
	Work-related knowledge/know-how	Individual competencies of researchers, knowledge or skill obtained from the job or training
	Employees	Information regarding staff, researchers, lectures, PhD students, and administrative personnel
	Employee's experience in profession	Information referring to employees' international or national experiences in their profession
	Employee qualification	Information referring to employees' qualifications
	Employee compensation/benefit	Information referring to welfare or other benefits for employees and PhD students provided by a university
	Cultural diversity	Demographic information of employees
Training program	Education or training programs for employees provided by a university	

Adapted from [4], [30], [42] and [53]

The sample analyzed for this study comprised 50 public Spanish universities.

The paper applies qualitative and quantitative research methods. Particularly, by using content analysis, the paper provides abductive inferences related to the specific context investigated. Finally, a cluster analysis was also applied in order to identify the profiles of Spanish public universities in terms of reporting on IC.

1. Content Analysis: The Disclosure Index and the Coding Process

The primary data source for this study was the website of public Spanish universities in 2017. After selecting the sample, we carried out a content analysis of universities' websites. A content analysis of all 50 websites of public Spanish universities was conducted. As a data analyzing technique, content analysis involves codifying qualitative and quantifying information into various categories based on selected criteria [46]. Content analysis aims to analyze collected information systematically, objectively, and reliably [47], [20]. The content analysis typically leads to a disclosure index, a numerical indicator that reflects the quantity of information disclosed, with the purpose of showing the level of disclosure on the communication channel analyzed [18]. Reference [48] defines the disclosure index as "*qualitative tool created for the purpose of measuring a variety of items, the aggregation of scores of sub items gives substitute score indicating disclosure in the specific context for which the index was created*". In this case, the context is the IC at universities. In this research, it can be regarded as an appropriate methodology for analyzing the information disclosed, as it has been applied in previous research in the corporate field [49]-[52].

The process of IC disclosure index creation is listed below. First, components and variables of IC index were set, followed by the formulation of IC disclosure quality criteria. Based on our proposal of a model for the disclosure of information on IC for public universities in Spain, three components and 19 variables were chosen to create disclosure index (see Table I). Then, the coding process used in this study to allocate quality measures to specific IC information was based on [42]. A five-point scale was employed to assist the coding process (see Table II).

TABLE II
QUALITY MEASURING SYSTEM

Quality measure	Explanation
Quantitative/monetary and descriptive – 4 points	IC component is clearly defined and quantified with a detailed descriptive statement
Quantitative/monetary – 3 points	IC component is clearly quantified
Descriptive – 2 points	IC component disclosure appeared and showed a significant impact on the organization
Obscure – 1 point	IC component disclosure appeared with limited reference
Non-disclosure – 0 point	IC does not appear in the website

After defining the items of information to be included in the disclosure index and studying their quantification and weighing, we performed a thorough analysis of the contents of

public Spanish university websites. The data were gathered by the authors directly from the websites after a thorough navigation in search of the specific items included in the disclosure index. When there were conflicting interpretations on a specific finding, deliberations took place among the authors in order to research a consensus. The aim of content analysis was to determine the extent and quality of IC disclosure. Nineteen variables have been searched purposely and their quality was then assessed by formulated quality criteria mentioned above. In the universities' websites, the selected variables were searched, if not found, the variable were assigned 0; if so, it was followed by its inclusion in the appropriate IC category and then the quality of reporting was assessed (1, 2, 3, 4). The output of the content analysis was the extent and quality of reporting of each IC variable. The quality of reporting was interpreted using the weighted quality score. This is a normalized score reaching values in the interval 0–1.

2. Cluster Analysis

In order to test if groups of different universities exist in regard to their attitude to report on IC, we applied a two-step cluster analysis [53]. 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.

We analyzed the IC disclosure indexes of Spanish universities, identifying strategic groups of universities. The dendrogram (derived from the application of hierarchical methods) was used to identify the number of groups in each case. Subsequently, and in order to facilitate the interpretation of the results, the behavior of groups was shown graphically through the application of discriminant analysis. So, we have defined two discriminant functions (function 1 and function 2), in each case using cluster membership as a classification variable.

V. RESULTS AND DISCUSSION

This section presents the results generated from analyzing of public Spanish universities' websites. These results are displayed below and commented on according to the different groups of items analyzed.

A. Findings of the Content Analysis of University Websites

Table III summarizes the findings for the voluntary IC information disclosed by public Spanish universities in their websites.

First, the general performance of IC disclosure by Spanish universities in the year of 2017 is viewed as being limited.

1. Structural Capital

First, it is worth emphasizing that Spanish universities disclose a high volume of information related to research project (84%). Since universities are institutions with a specific focus on research, most of them are expected to use the internet in order to reveal their aims and achievement. Although research reports are scarcely disclosed (38% in a

summarized report), most universities reveal information on R&D projects (84%), research groups (86%) and conferences (88%). In addition, many of them describe public subventions for research (62%). Also, the disclosure of university culture and management philosophy is made by just half of public Spanish universities. Some 54% disclose the mission statement, while 46% reveal specific aspects concerning the vision, values and general strategic objectives. Nevertheless, only eight universities disclose information referring to the relationships between the university and its financial supporters.

TABLE III
IC INFORMATION ONLINE DISCLOSED BY PUBLIC SPANISH UNIVERSITIES

Category	IC components	Frequency	Percentage
Structural capital	Intellectual property	40	80
	University culture	23	46
	Management philosophy	27	54
	Management processes	21	42
	Information system/networking system	36	72
	Research projects	42	84
	Financial relations	8	16
Relational capital	Brands	17	34
	Students/student satisfaction	8	16
	Business/university partnership	7	14
	Student database	41	82
	Quality standards	11	22
Human capital	Work-related knowledge/know-how	3	6
	Employees	45	90
	Employee's experience in profession	40	80
	Employee qualification	42	84
	Employee compensation/benefit	30	60
	Cultural diversity	41	82
	Training program	36	72

2. Relational Capital

The revelation of information about quality standards – information referring to teaching quality or learning quality- is expected to attain high scores as teaching activities are the main purpose of universities. However, the universities seem to be reluctant to reveal aspects of teaching quality. Only 22% disclose some aspects of quality standards. The items related to students are widely disclosed by Spanish universities, specifically those concerning the database of all students. However, most universities disclose very little information about the students' satisfaction about learning (16%). Finally, other relevant item which can facilitate information about activities and collaboration between universities and other organizations (firms, non-profit organizations, public authorities, local government, and society as a whole) is disclosed in a minor way. Only, seven universities disclose this information (14%).

3. Human Capital

The least disclosed component is work-related knowledge/ know-how (individual competencies of researchers, knowledge or skill obtained from the job or training). The items related to employees are more widely disclosed by public Spanish universities. So, 90% reveal some information regarding staff, researchers, lectures, PhD students, and administrative personnel. In addition, many universities describe employee's experience in profession (80%), employee qualification (84%), demographic information of employees (82%) and training programs for employees provided by the university (72%).

B. Cluster Analysis: Behavior of the Spanish Universities with Regard to IC Disclosure

We analyzed the behavior of the Spanish universities with regard to the IC disclosure. So, as it can be observed in Table IV and Fig. 1, there are three different groups of universities.

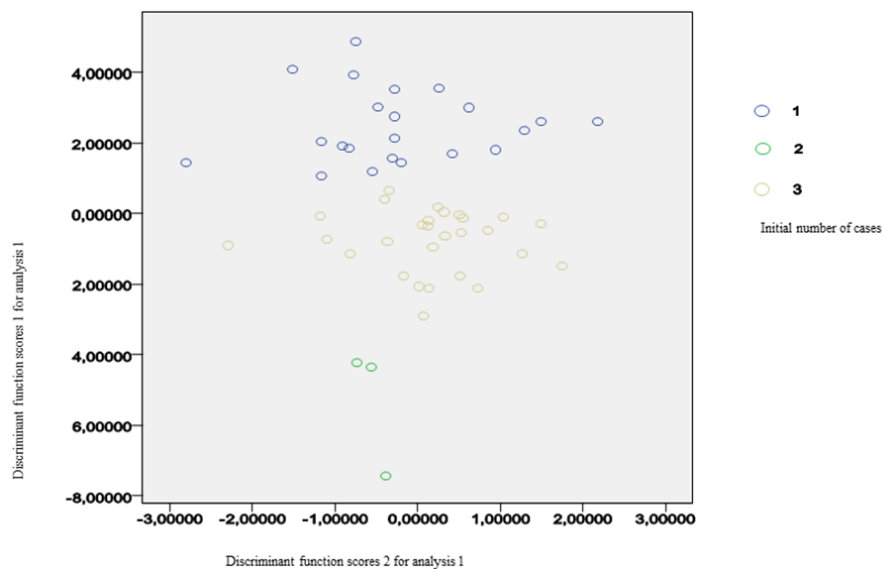


Fig. 1 Scatter Plot of the Discriminant Functions. IC

TABLE IV
CLUSTER ANALYSIS. IC

Variable	Standardized coefficients Discriminant analysis		Mean Values			Levene statistic	F
	Dimension 1	Dimension 2	Cluster 1 (N=21)	Cluster 2 (N=3)	Cluster 3 (N=26)		
SC	0.448	0.431	0.54 (0.159)	0.21 (0.107)	0.26 (0.314)	6.106	57.222**
RC	0.546	-1.146	0.45 (0.147)	0.06 (0.120)	0.04 (0.185)	0.358	76.308**
HC	0.244	1.000	0.64 (0.171)	0.35 (0.136)	0.13 (0.094)	0.786	45.691**

Where: N = number of universities in each group; SC = Structural capital; RC= Relational capital; HC = Human capital
Parenthetically, the standard deviation of the variables ** Significance p-value<0.01 * Significance p-value<0.05

Next, Figs. 2-4 show the mean values for each IC element for the three clusters.

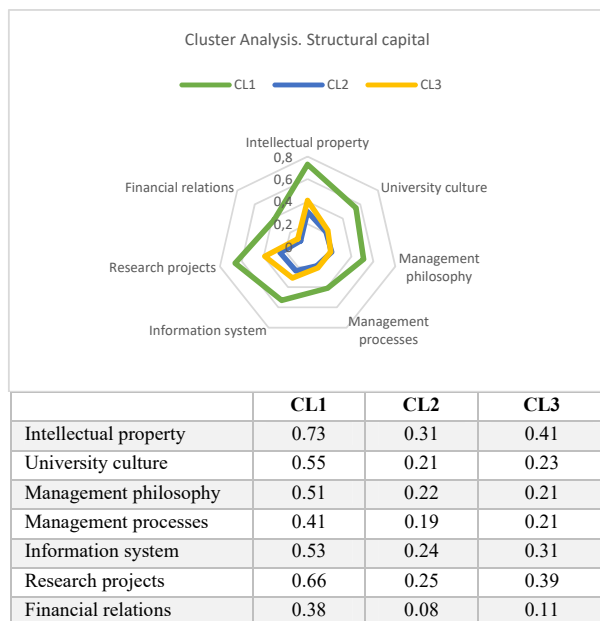


Fig. 2 Mean values for Structural Capital elements for the clusters

The first cluster is characterized by a greater emphasis on the disclosure of all the components of IC, with particular emphasis on human capital. This cluster includes the following universities: Cantabria, Castilla-La Mancha, Córdoba, Jaén, La Rioja, Pompeu Fabra, Jaume I, Alicante, Complutense of Madrid, Autónoma of Madrid, Pablo Olavide, Málaga, Vigo, Autónoma of Barcelona, Carlos III of Madrid, Polytechnic of Cartagena, Valencia, Alcalá, Girona, Zaragoza and Polytechnic of Cataluña. These universities are defined as "*transparent universities in the dissemination of information on IC*", 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 (Polytechnic of Valencia, Oviedo, Valladolid) who are less proactive to disclosure information on IC. These universities are defined as "*opaque universities in the dissemination of information on IC*".

Finally, cluster 3 (Burgos, Rovira i Virgili, La Laguna, Cádiz, Granada, Huelva, Murcia, Salamanca, Sevilla, Rey Juan Carlos, Polytechnic of Madrid, Miguel Hernández, Almería, Las Palmas de Gran Canaria, León, Navarra, Universidad Nacional de Educación a Distancia, Lleida, Barcelona, Islas Baleares, Extremadura, País Vasco, Universidad Internacional de Andalucía, La Coruña and Santiago de Compostela) attaches medium importance to the disclosure of all components of IC. Specifically, these universities attribute a mean importance to human and relational capital disclosure, while they are particularly interested in offering information on structural capital such as all the university activities relating to both social and administrative aspect (internal processes of representation, teaching, research, administration and services) and technological innovation. These universities are defined as "*translucent universities in the dissemination of information on IC*".

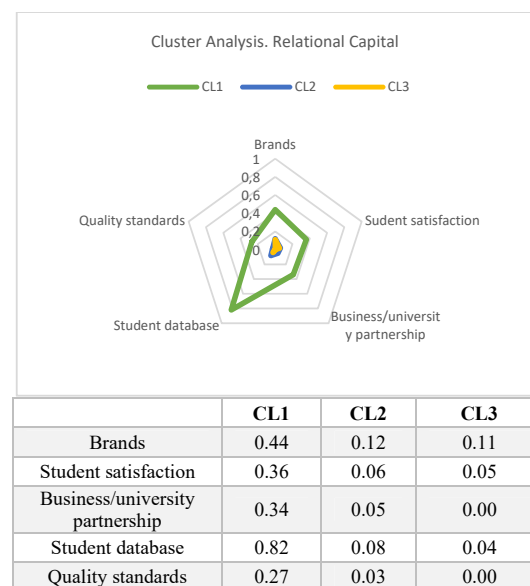


Fig. 3 Mean values for relational Capital elements for the clusters

VI. CONCLUSIONS

This study has paid attention to IC reporting in the context of higher education, offering a new perspective on a distinct tool that is nowadays broadly adopted by organizations to communicate with stakeholders and to enhance their

engagement – the website.

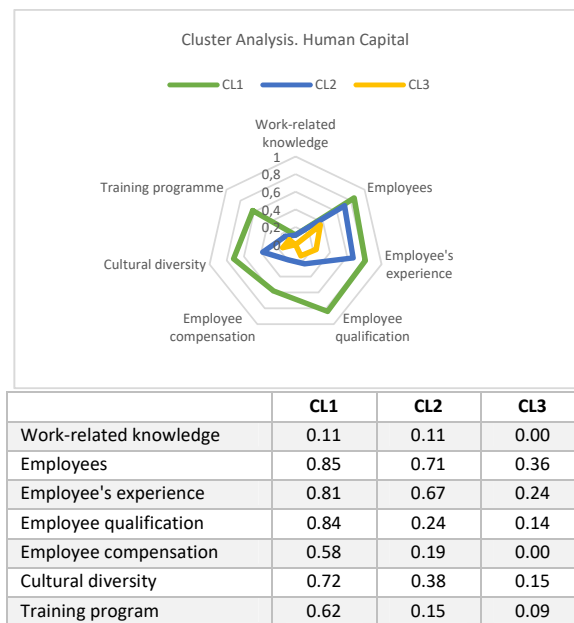


Fig. 4 Mean values for human Capital elements for the clusters

Our findings emphasize that their website content usually relates to human capital, while structural and relational capital are less widely disclosed. These results are consistent with the fact that universities are knowledge-intensive organizations and are thus more prone to disclose information about human resources and research activities. Also, other reason for universities placing more importance on structural and human capital could be the major changes happening in universities, resulting in frequent engagement in conducting research projects, training employees, and improving management process. In particular, the top five IC components disclosed by Spanish universities were: employees; research project; employee qualification; cultural diversity; and student database. This work has evidenced a low volume of disclosure about relational capital on universities' websites. It highlights the still emerging third mission and its results. Assuming that relational capital is pivotal in the development of the third mission, these results could be of interest to government bodies in universities.

Finally, our research has focused on detecting behavioral profiles of Spanish universities with regard to the online disclosure of IC. The results revealed three different positions on the subject: 1) universities more proactive to disclosure information on IC (21 Spanish universities); 2) those who are less proactive to IC disclosure (3 Spanish universities); and, 3) those who adopt a middle position in this regard (26 Spanish universities).

This study contributes to an understanding of the current voluntary reporting of IC by addressing the gap in empirical research regarding IC reporting in universities. Second, an IC framework was used to specifically measure the quality of IC disclosure in universities. This framework could be utilized

and further modified by future researchers who examine universities in order jurisdictions or study other educational institutions. A key feature of this framework is that it examined both the level of disclosures and compared the quality of IC disclosure practice. In this aspect, it differs from many prior studies that assessed mainly the extent of the IC disclosure. Third, the results generated from this study provide insights into the nature of voluntary reporting in universities. These findings could be used by management of the universities, regulators, and standard-setting bodies as they seek to improve the reporting of IC in universities. Additionally, the results generated from this study could be utilized by future researchers as a basis to facilitate comparative research in identifying possible trends, similarities, and distinctions of IC disclosure practice in universities and/or other knowledge-based industries across different jurisdictions. Finally, this research provide strong support for each Spanish university to individually identify which information about IC is online reported, according to its own features and environment.

Despite the contributions outlined, this study is subject to a number of limitations. First, this study examined data of one year only (2017). It is, therefore, difficult to draw conclusive trends that could show IC disclosure change over time. Second, the framework used was viewed as being able to reflect the IC disclosure trends in universities. However, this study recognizes that some of the components incorporated here may be irrelevant, depending on different researchers' perspectives of IC. Third, similar to other IC disclosure studies of this nature, content analysis utilization may involve the application of judgment in determining whether an IC component should be assigned to a given IC category. Although every effort was made to ensure reliability of the coding process and to minimize error, possible subjectivity may still have occurred during the coding process.

Several avenues are suggested for future research in this field. First, future research could examine IC disclosure on universities' websites differentiating universities in terms of whether they were public or private; small or large; and even by their organizational structure (centralized or decentralized). It might provide further insights into the extent and quality of IC disclosures by these universities. Second, considering the lack of a generally acceptable framework, developing such a framework to assist organizations' voluntary reporting of IC could be a focus of future research.

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Yolanda Ramirez (BS98-PhD10) is an Assistant Professor in the Department of Accounting at the University of Castilla-La Mancha, Spain. She has taught on the Faculty of Economics and Business Administration since 1999. She completed her PhD. in Intellectual Capital Management at the University of Castilla-La Mancha, Spain. 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. Her work has been published in several international academic journals and conference proceedings.

Ángel Tejada (BS93-PhD98) is a Full Professor of the University of Castilla-La Mancha. Director 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. An important line of work is focused on the analysis of strategic industrial sectors and locations, aimed at establishing guidelines for the development of these sectors or locations.

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.