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ORIGINAL

Analysis of intellectual capital and sustainability information in listed companies in Argentina

Análisis del capital intelectual e información de sostenibilidad en empresas cotizadas de Argentina

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ABSTRACT

Introduction: under the sustainability paradigm, the elements that make up companies' intellectual capital (IC) are considered key resources, given the central role that IC plays in the creation of economic, social, and environmental value. However, there is an informational problem surrounding IC, as reports prepared to comply with current regulatory requirements contain limited information, which has led to its disclosure being largely voluntary.
Objective: this paper aims to analyze the IC information disclosed by companies in the BYMA Sustainability Index in reports prepared under GRI standards, and to explore the relationship between IC and sustainability.
Method: an exploratory, descriptive, and interpretive research study was conducted, based on content analysis and the calculation of IC disclosure indices.
Results: when disclosing sustainability-related information, companies revealed information on the three classic dimensions of IC, with a high level of disclosure. The importance of information on the relational dimension of IC was highlighted, in terms of commitment to the environment and society and the importance assigned to relationships with customers, suppliers, and other stakeholders.
Conclusions: a significant relationship was found between IC and corporate sustainability. These findings demonstrate the growing connection between the two concepts, which is highlighted by the most recent literature and has recently been recognized at the regulatory level in IFRS S1 of the International Sustainability Standards Board.

Keywords: Intellectual Capital; Sustainability; Disclosure; Global Reporting Initiative (GRI); Listed Companies; Argentina.

RESUMEN

Introducción: bajo el paradigma de sostenibilidad, los elementos que conforman el capital intelectual (CI) de las empresas se constituyen como recursos clave, debido al papel central que desempeña el CI en la creación de valor económico, social y ambiental. Sin embargo, existe un problema informativo en torno al CI, ya que los informes elaborados para cumplir con los requerimientos normativos vigentes contienen escasa información sobre el mismo, lo que ha llevado a que su divulgación se realice, en gran medida, de forma voluntaria.
Objetivo: este trabajo tiene como objetivos analizar la información sobre CI que revelan las empresas del

Índice de Sustentabilidad BYMA en las memorias elaboradas bajo estándares GRI, y explorar la relación entre CI y sostenibilidad.
Método: se realizó una investigación exploratoria, con carácter descriptivo e interpretativo, sustentada en el análisis de contenido y en el cálculo de índices de divulgación del CI.
Resultados: al divulgar información vinculada a la sostenibilidad, las empresas revelaron información sobre las tres dimensiones clásicas del CI, siendo el nivel de divulgación elevado. Se destacó la importancia de la información sobre la dimensión relacional del CI, en términos del compromiso con el medioambiente y la sociedad y la relevancia asignada a la relación con clientes, proveedores y otros *stakeholders*.
Conclusiones: se constató una importante relación entre CI y sostenibilidad empresarial. Estos hallazgos evidencian la creciente articulación entre ambos conceptos, la cual es destacada por la literatura más actual y ha sido recientemente reconocida, a nivel normativo, en la NIIF S1 del International Sustainability Standards Board.

Palabras clave: Capital intelectual; Sostenibilidad; Divulgación; Global Reporting Iniciative (GRI); Empresas Cotizadas; Argentina.

INTRODUCTION

Nowadays, sustainability is an unavoidable imperative for companies operating in a global context characterized by growing pressure from financial markets to comply with ESG (*Environmental, Social, and Governance*) criteria, social demand for responsible business models, and the consolidation of international standards for reporting sustainability-related information. These factors not only redefine expectations about the role of business in society but also intensify the need to generate sustainable competitive advantages, especially in economic environments marked by volatility and uncertainty.

Thus, a new paradigm is emerging at the business level: that of corporate sustainability[1] which involves balancing the creation of economic value with the generation of social and environmental value.[2,3] This has driven business innovation processes focused on the *triple bottom line*,[4] which involves transcending the idea that the purpose of a company is centered on profits, to jointly consider its social, economic, and environmental impacts and the interests of all its *stakeholders,* including society and the environment.[5,6]

Under these conditions, intellectual capital (IC) stands as a fundamental strategic resource,[7,8] as it comprises various intangible elements that, having individual and organizational knowledge as their fundamental substrate,[9,10] are essential for promoting innovation, strengthening adaptive capacity, and ensuring the creation of value in multiple dimensions.[11,12] In this sense, IC is defined as "intellectual material, knowledge, experience, intellectual property, and information that can be used to create value."

The variety of components of IC has led to its classification into three broad dimensions, known in most of the literature[9,12,13,14,15] as: human capital (HC), structural capital (SC), and relational capital (RC). HC refers to the tacit knowledge possessed by members of the organization, SC is the knowledge incorporated into its routines and processes, and RC is the knowledge incorporated into the relationships established with the external environment.[16]

However, there is an information problem surrounding IC, as the reports prepared by companies to meet current regulatory requirements contain little information about it. In Argentina, these reports are limited to financial statements, which include only a few components of IC under the heading of intangible assets. Other types of reports, such as the Integrated Report of *the International Integrated Reporting Council* (IIRC) or the Sustainability Reports (SR) of the *Global Reporting Initiative* (GRI), which incorporate various elements of IC, are not mandatory in this country.

It should be noted that, in June 2023, the *International Sustainability Standards Board* (ISSB) issued IFRS-S1 on "Financial Reporting Related to Sustainability",[17] which marks a milestone by making sustainability disclosure mandatory, including key information on IC. However, Argentina has not yet adopted this standard, and the Technical Resolution that would implement it in this country is currently in the process of being approved.

In this context, CI disclosure has developed voluntarily. However, it has taken on an essential role (18) as it can be considered part of the necessary dialogue between the company and its *stakeholders*, contributing to the meeting of the information needs of the broad range of parties interested in its activities.[11]

To achieve this, companies have used the various types of reports mentioned above, as well as corporate websites. However, CI disclosure has been mainly associated with sustainability-related information and, fundamentally, with that presented in the MS prepared under GRI standards (MS-GRI), as this is the dominant global standard for social and environmental information disclosure.[19]

About the study of CI disclosure practices, most empirical studies have focused on the amount of information disclosed,[20,21] showing, in general, that voluntary CI disclosure is relatively low, but with a growing trend

over time.[22,23,24] In these studies, annual reports are the most frequently reviewed document.[22,25,26] However, integrated reports and sustainability reports have also been considered as sources of CI disclosure,[27,28,29,30] as CI has been identified as part of integrated information and corporate social responsibility information.[31]

Studies focusing on integrated reporting demonstrate that this approach has enabled the expansion of CI disclosure, particularly CH and CR, by integrating financial and non-financial information. They also show that it has been a channel for promoting management involvement in KI management.[27,30,32,33,34,35,36] For their part, studies that have examined KI disclosure in the GRI Standards show the relationship between KI, knowledge management, and sustainability, revealing links between KI components and different socially responsible behaviors.[28,37] They also demonstrate that GRI SMs allow for an increase in the level of CI disclosure compared to annual reports, mainly in relation to CH and some specific CE and CR indicators.[23,38]

Previous empirical work has focused on analyzing the quantity of information disclosed on CI, paying less attention to the quality, depth, and link between this information and corporate sustainability. This situation reveals a gap in the literature. In particular, this gap relates to the study of how the different elements of CI are integrated into sustainability reports and how these elements are linked to corporate sustainability policies and practices. Furthermore, most of this research has been conducted in developed economies, with limited evidence available for Latin America, particularly Argentina.

This research was conducted to help fill this gap and increase the limited evidence available for underdeveloped markets and volatile contexts such as Argentina. It is contextualized in the Argentine capital market. It focuses on the companies that make up the "Argentine Stock Exchange Sustainability Index (IS-BYMA)," which includes leading companies in terms of sustainability practices, making it an ideal setting for addressing the issue at hand.

Specifically, this study aims to analyze the CI information disclosed by Argentine companies listed on the IS-BYMA in their MS-GRI reports and to advance the analysis of the relationship between CI and corporate sustainability.

The purpose is to contribute to the construction of answers to the following questions:

- What CI information do IS-BYMA companies disclose when they present sustainability-related information?
- What human, structural, and relational elements of CI are disclosed in this information?
- What is the level of disclosure regarding these elements?
- Which elements of CI are most closely related to the sustainability policies and practices disclosed?

To meet the proposed objectives, exploratory research was conducted, which was descriptive and interpretive in nature, based on a content analysis of the MS-GRI reports that companies prepare under the GRI standards. The sustainability information disclosed by companies in their MS-GRI was considered, and categories associated with the different dimensions of CI within it were identified. The data was then interpreted in light of the research questions.

It is expected to show that companies committed to sustainability have high levels of CI disclosure, with a predominance of information on CR. Likewise, the research is expected to demonstrate the close link between CI and sustainability, highlighting the elements of CI that are most relevant to this link.

Following this introduction, the literature review is presented, the methodology used is described, and the results obtained and their discussion are presented. Finally, the conclusions of the work are offered.

METHOD

Research design

To meet the proposed objectives, exploratory research was conducted, which was descriptive and interpretative in nature.

The study is based on the content analysis of the MS-GRI, which has a high presence of textual data. Content analysis is a technique that allows this type of data to be analyzed, combining elements of qualitative and quantitative research.

Specifically, it allows qualitative textual data to be converted into quantitative data, enabling the objective and systematic description of the textual content analyzed and the formulation of reproducible and valid inferences that explain that content.[39,40] This explanation is made from an interpretive perspective, which implies that content analysis goes beyond the mere description of numerical data to advance the understanding of its meaning and give it meaning in relation to the questions and context of the research.

Population, sample, and analysis period

The population consists of the 20 companies that make up the IS-BYMA, with the sample comprising the 19 companies that have prepared their MS-GRI reports in the analysis period: 2018-2022.

Five years was chosen to obtain evidence over a broad range that has been little studied in works of this

nature to date, given that content analysis is mainly used to ascertain the disclosure of IR by companies over periods that generally do not exceed three years.[23,24,41] The period begins in 2018, as this is the year in which IS-BYMA was launched, and ends in 2022, as this is the most recent year for which MS-GRI is available for the companies in the sample at the time of data collection.

Process developed for the application of content analysis

The content analysis technique involves rigorously following a series of different stages in its application process. In this study, the steps proposed by Andréu[42] were followed, namely: 1) determining the units to be analyzed; 2) defining the category system; 3) determining the coding rule; 4) checking the reliability of the coding-categorization system; 5) making inferences.

In this way, the process seeks to extract inferences from the analyzed texts. Then it proceeds to the explanatory interpretation of these data based on the objectives and questions of the research. However, to arrive at these inferences, it is necessary to transform the raw textual data into numerical values, which is achieved through the definition of a system of categories of analysis and a coding rule.

The definitions adopted in the execution of the above steps are detailed below.

Determination of the units to be analyzed

The definition of the unit of analysis involves distinguishing three types of units: the sampling unit, the recording unit, and the context unit. Based on the objectives set for this research, these units are defined as follows:

- Sampling unit: MS-GRI of the companies under study
- Recording unit: phrases, understood as a set of words
- Context unit: sections of the MS-GRI

Definition of the category system

The category system used is based on the different dimensions of the CI: CH, CE, and CR, as well as the elements that comprise them.

To define it, the components of each dimension were first identified, considering those commonly recognized in the literature (table 1).

Table 1. Components of the three dimensions of CI

Dimension	Components
CH	- is the tacit knowledge that resides in employees[16] - includes: employee knowledge, skills, experience, abilities, and level of training[14] - also encompasses: employee satisfaction, well-being, and work environment[25] - and the practices that companies develop to manage and protect their employees' knowledge, such as training and skills development, health and safety policies, among others[43]
CE	- is institutionalized knowledge[9] that includes: databases, routines, patents, procedure manuals, communication and internal control systems, among others(44) - It also encompasses elements linked to innovation and its results, such as: investment in R&D, information and communication technologies, digitization processes,[45] and intellectual or industrial property rights.[46] - It also integrates the corporate mission and strategies.[47]
CR	- Refers to the company's network of relationships with different *stakeholders* (customers, suppliers, companies participating in alliances, and other groups) with whom the company has long-term relationships.[48] - It also includes the perceptions that these *stakeholders* have of the firm, such as: image, loyalty, and customer satisfaction.[14]

Based on the above conceptual framework, the most representative words for the components of each dimension of the CI were defined (table 2). It should be noted that, in many cases, words were taken with their synonyms (e.g., collaborator, employee, staff, as they are all in everyday use); in addition, their use in both the plural and singular forms, as well as in the feminine and masculine forms, was considered. Thus, each dimension of the CI represents a category, and the word(s) associated with each component represent a subcategory.

Table 2. Category system

Categories	Subcategories
CH	collaborator(s) - employee(s) - staff - team
	director - board of directors
	experience
	skills - competence
	training - education
	compensation - remuneration - salary
	benefit(s) - incentive(s)
	health
	safety
	work environment
	diversity
	equity
CE	strategy/ies
	structure/s
	code - standards
	certification/certifications
	system/s
	control
	process/es – procedure/s
	culture
	routine/s
	innovation
	intellectual property
	research and development - R&D
	image - reputation
	award(s) - recognition(s)
	client(s)
	investor(s)
	supplier(s)
CR	stakeholders
	network/s - alliance/s - agreement/s
	social responsibility
	sustainability
	community/ies - society/ies
	program/s
	environment – environmental - environmental - environment

Determination of coding rules

To classify the textual elements (from the MS-GRI) into the above categories and subcategories, coding rules were defined, allowing the raw data from the text to be represented in numerical values.

Two of the various rules proposed by Bardin[49] were chosen: presence/absence and frequency; in both cases, of the information elements (words) presented in table 2. The first rule allows the presence or absence of the elements under consideration (words) to be identified. Based on this rule, a value of "1" was assigned when the word was present in the MS-GRI text and "0" when it was absent. Frequency allows us to capture the number of times words appear or are evoked. Underlying this rule is the idea that the importance of a recording unit (in this case, the word) increases with its frequency of appearance.

These rules were chosen because they were the most appropriate for achieving the objectives proposed for this research. Presence/absence allows the information to be represented in a structured way in a numerical format, simplifying the information for further analysis. Frequency, on the other hand, is beneficial for detecting the presence of dominant themes, identifying patterns and trends in the analyzed textual corpus, and assessing the relevance or intensity of different elements of information.[39,49]

Verification of the reliability of the coding-categorization system

Atlas. TI software was used for coding and categorization, and two coders worked independently to perform the same procedure. An agreement coefficient of 83 % was achieved, which is acceptable, as it exceeds the minimum required of 70 % in this type of study.[23] This process made it possible to present the words in the textual corpus according to their presence/absence and frequency of mention in the information published for each company.

However, given that any content analysis must be carried out in relation to the context of the data and justified based on that context,[42] the words were searched for and interpreted in their context, i.e., considering the part of the text (sentence and paragraph) in which they appear. This made it possible to discriminate their meaning and verify that the words were used in relation to the subject matter under analysis.

Inferences

Based on the coded information, inferences were drawn that made it possible to explain the content of the MS-GRI in terms of the questions posed for the research. Inferences can take various forms.[40] In this study, indices of both frequency and scope or extent were used.

The former are the relative frequencies of the components of each dimension of the IR presented in table 2. The latter are information disclosure indices, which measure the level of disclosure (or amount of information disclosed).

To construct these CI information disclosure indices (IDCI), the information coded by applying the presence/absence rule for the words presented in table 2 was used. This involves adopting a dichotomous approach to constructing the IDCI. Specifically, these indices were calculated by dividing the number of words actually disclosed by the total number of words that would be expected to be disclosed (if all the words in table 2 were present in the MS-GRI). Formula (1) reflects the methodology used to calculate the IDCI for each company for the period under analysis:

$$IDCI_{it} = \frac{\sum_{i=1}^{n} PCI_{it}}{n} \qquad (1)$$

where:

$IDCI_{it}$= CI information disclosure index of company *i* for period *t*

$\sum^{n}_{i}=PCI_{it}$ = number of words representative of the components of the CI (*PCI)* actually disclosed by company i in period t; where PCI_{it}=1 if the company discloses information on the *PCI* and PCI_{it}=0 if the company does not disclose information on the *PCI*

n = total number of words representing the components of the IR contained in the category system (in this case, *n* = 36)

RESULTS

This section presents the results of the content analysis. Specifically, it presents the numerical indices obtained from the transformation of the textual data from the MS-GRI analyzed. Both frequency indices (tables 3 and 4) and those measuring the level of CI disclosure (Tables 5 and 6) are presented. The explanatory interpretation of these inferences, based on the research objectives and questions posed, is developed in the results discussion section.

Table 3 shows the frequency of mention of words representative of the different dimensions of CI in the MS-GRI of the set of companies that make up the sample.

It can be seen that, about CH, the terms most frequently mentioned are "director-board" and "collaborator(s)-employee(s)-staff-team." When analyzing the context in which these words appear, it is evident that "director-board of directors" is mainly used to refer to the form of appointment, its composition, the remuneration they receive, the training they receive, and the evaluation and monitoring of their tasks. The terms "collaborator(s)-employee(s)-staff-team" are used to describe the number of employees and their distribution by gender, region, and age, their performance and potential, and how human capital management is carried out, explaining how integration and loyalty are achieved for the well-being of collaborators and various issues related to their "health," "safety," "training," "experience," and "benefits-incentives" they receive, so these terms are used in relation to other words representative of HC. For this dimension, the low frequency of the terms "work environment," "equity," "skills-competencies," and "benefits-incentives" is striking, as these are key aspects of employee well-being and comprehensive development and, consequently, of efficient human resource management.

For the CE, the most frequently used words are: "strategy/ies," "system/s," and "process/es - procedure/s." The first is used to refer to key aspects related to business, impact on society, and the achievement of sustainable growth, as well as in relation to policies on security, cultural change, and risk control. The term "system/s"

is used to describe different processes and components of the organization: risk management, information, financial incentives for staff, sanctions, evaluation, health and safety, and environmental protection systems. When referring to "processes/procedures," companies mainly refer to the way in which they develop their production processes to avoid or reduce negative impacts on the environment. In this dimension, there is a notably low frequency of terms directly related to companies' capacity for renewal, such as "innovation" and "research and development (R&D)," which are essential elements for boosting their competitiveness, survival, and growth over time.

Table 3. Frequency of words (subcategories) by CI dimension (categories)

Categories	Subcategories	Absolute frequency	Relative frequency
	collaborator(s) - employee(s) - staff - team	1050	0,176
	director – board of directors	1273	0,213
	Experience	262	0,044
	Skill(s) – Competence	123	0,021
	training/s – education	593	0,099
	remuneration - salary	292	0,049
CH	benefit(s) - incentive(s)	131	0,022
	Health	919	0,154
	Security	816	0,137
	work environment	23	0,004
	Diversity	384	0,064
	Equity	105	0,018
	CH dimension	5,971	1,000
	Strategy/ies	699	0,172
	structure/s	257	0,063
	code – standards	482	0,118
	certification/s	183	0,045
	system/s	657	0,161
	Control	462	0,114
CE	process/es - procedure/s	624	0,153
	Culture	423	0,104
	routine/s	4	0,001
	Innovation	267	0,066
	Intellectual property	3	0,001
	research and development - R&D	8	0,002
	EC dimension	4,069	1,000
	image – reputation	60	0,007
	award(s) - recognition(s)	113	0,014
	client(s)	1669	0,203
	investor(s)	200	0,024
	supplier(s)	889	0,108
	stakeholders	311	0,038
CR	network/alliance/agreement	233	0,028
	social responsibility	46	0,006
	sustainability	1721	0,209
	community/ies - society/ies	1045	0,127
	program/s	1182	0,144
	environment - environmental - environmental - environment	754	0,092
	CR dimension	8,223	1,000

In relation to CR, the most commonly used terms are "sustainability" and "customer(s)." The term "sustainability" is used to emphasize companies' commitment to responsible production, climate action, and people's well-being. The word "customer/customers" is used to indicate who they are and to highlight the attention they receive. Also noteworthy, due to their frequency of mention, are the terms "community/communities-society/societies" and "supplier/suppliers," as part of their most important *stakeholders*. Noteworthy in this dimension is the low frequency of the terms "social responsibility" and "stakeholders," which are central categories when referring to sustainability performance.

Table 3 also shows the frequency with which the words are mentioned, overall, for each of the three dimensions of the CI. It can be seen that the highest frequency corresponds to CR (absolute frequency = 8,223). This shows that this is the dimension that is most relevant in information related to sustainability, which can be understood in terms of the significance of the company's image and reputation in this area, its relationship with its *stakeholders*, and, in particular, its social and environmental contributions.

Table 4. Importance of each dimension (category) of the IC

IC dimensions	Absolute frequency of words by category	Relative frequency of words by category
Human Capital	5,971	0,327
Structural Capital	4,069	0,223
Relational Capital	8,223	0,450

Finally, the CI information disclosure indices (IDCI) are presented. Table 5 shows the IDCI for each of the companies studied, as an aggregate measure of the amount of CI information disclosed by each company in its MS-GRI. It can be seen that all of them have high disclosure indices (almost all above 0,70).

Table 5. IDCI by company in the Byma Sustainability Index

Companies	IDCI by company
BANCO HIPOTECARIO S.A.	0,861
BANCO MACRO S.A.	0,806
BBVA ARGENTINA BANK S.A.	0,889
ARGENTINE STOCK EXCHANGES AND MARKETS S.A.	0,944
CENTRAL PUERTO, INC.	0,833
ENEL GENERACIÓN COSTANERA S.A.	0,833
CLARÍN GROUP S.A.	0,806
GALICIA FINANCIAL GROUP S.A.	0,917
SUPERVIELLE GROUP S.A.	0,833
HOLCIM ARGENTINA S.A.	0,750
IRSA INVERSIONES Y REPRESENTACIONES S.A.	0,750
NATURGY BAN S.A.	0,833
LOMA NEGRA CÍA. INDUSTRIAL ARGENTINA S.A	0,694
MOLINOS AGRO S.A.	0,722
MILLS RIO DE LA PLATA S.A.	0,722
LEDESMA S.A.	0,806
TELECOM ARGENTINA S.A.	0,750
SOUTHERN GAS TRANSPORTATION COMPANY S.A.	0,694
YPF S.A.	0,861

Table 6 shows the disclosure indices for the CI at the global level (IDCI) and for each of its dimensions (IDCH, IDCE, and IDCR). The first shows the level of disclosure of the CI by the group of companies studied, that is, the "average" IDCI for the group of companies that make up the IS-BYMA. The other three indices provide a measure of the amount of information disclosed by the group of companies for each dimension of CI.

Thus, the results show a high level of CI disclosure, with a predominance of CR, followed by CH and CE. They also show the presence of various elements of each of these three dimensions, albeit with varying frequency. This makes it clear that specific components are of greater relative importance, revealing a particular configuration of CI linked to sustainability performance.

Table 6. Disclosure index for IR at the global level and for each dimension	
IDCH	0,842
IDCE	0,724
IDCR	0,851
IDCI	0,806

DISCUSSION

The results obtained show a high level of CI disclosure in the MS-GRI prepared by the companies that make up the IS-BYMA, with an overall CI disclosure index of 0,806. This significant value can be explained by the relevance of the MS-GRI as a tool for innovatively communicating CI and showing its link to performance in social and environmental aspects,[50] which is particularly relevant in the companies analyzed, which need to demonstrate their leadership in sustainability to remain in the IS-BYMA. In turn, this behavior can be understood from *stakeholder* theory,[51] since the disclosure of CI, which refers to assets essential for the creation of sustainable value,[12] is a strategy for legitimizing and strengthening reputation,[52,53] reducing information asymmetry and enhancing confidence in management,[54] thus enabling the expectations of various stakeholders to be met. The results obtained are also consistent with previous studies that have identified GRI SM as the primary means of disclosing CI, far surpassing annual reports [23] and also expanding the disclosure of CI by incorporating aspects not covered in those reports.[29]

However, the high value of the overall disclosure index also reveals some tensions that cannot be ignored. In this regard, it is essential to mention that, in a way, companies that submit MS-GRI reports seek strategies to publicize actions related to sustainability, which may be more pronounced in the companies analyzed, as they qualify for inclusion in the "Sustainability Index" of the stock market on which they are listed. Therefore, the value obtained for the IDCI may be due more to a strategy aimed at improving the corporate image than to a sensible way of showing added value in social and environmental terms. Another aspect to highlight is that the information disclosed by these listed companies is not necessarily aimed at all *stakeholders,* as their disclosure strategies may be primarily directed at investors (*stockholders)*, with a view to responding to the market rather than focusing on the long term. This would imply a reductionist approach to sustainability, prioritizing the economic interests of investors over those of other stakeholders.[55,56]

In terms of the dimensions of IC, the study shows that CR is the most widely disclosed category, followed by CH and, in third place, CE. The relevance of CR is in line with the findings of previous studies, which highlight the greater disclosure of CR in integrated and sustainability reports.[27,30,34] In this context, the high frequency of the terms "sustainability" (to emphasize commitment to responsible production, climate action, and people), "customers," "community-society," "suppliers," and "environment-environmental" in the MS analyzed, shows that companies communicate how they integrate social and environmental expectations into their value creation processes [3,57] to satisfy the interests of different *stakeholders*.[6]

This finding could be explained by the strategic orientation that the companies analyzed have toward building sustainable relationships with their *stakeholders*, given their classification as organizations committed to sustainability due to their membership in IS-BYMA. However, it could also be interpreted from another perspective, considering that it could be due to the stance above, more linked to the search for improving the company's image and responding to the market, without necessarily having sustainability objectives. Thus, these narratives could fall into forms of "symbolic greenwashing," where the discourse exceeds the actual actions in terms of commitment.[56]

Likewise, the predominance of CR could be associated with the emphasis placed by GRI standards on aspects such as social responsibility, community relations, the supply chain, and environmental impact, which are categories closely related to the relational dimension of CI. However, the contrast between the low frequency of the term "stakeholders" and the high frequency of "customers" is striking, which could highlight the need for companies to improve their positioning in terms of demand. Likewise, the low level of use of the term "social responsibility" could be linked to the need to emphasize a broader approach to the business model, rather than limiting it to specific or philanthropic actions.

In terms of CH, the high frequency of terms such as "director-board," "collaborators-employees," "health," "safety," and "training" reflects the importance attributed to employee well-being, in terms of occupational health and safety, as well as to the training and development of their skills.[25,43] These findings confirm the usefulness of the GRI guidelines as a framework for highlighting specific policies and practices related to human knowledge management within organizations, which is key in the context of sustainability.[35,37] Furthermore, they coincide with previous studies that highlight a particular increase in the disclosure of HC in integrated and sustainability reports.[27,28,30,34]

In contrast, there is a low frequency of the terms "work climate," "equity," "skills-competencies," and "benefits-incentives," which involve aspects related to efficient employee management, one of the pillars of

internal corporate social responsibility, which is the initial driving force behind sustainable companies.[58] This also shows that the disclosure of information in GRI SMs is more geared towards highlighting issues that are of greater interest and impact outside companies than within them.

On the other hand, CE, although less disclosed than CR and CH, shows a significant presence in the MS analyzed, closely connected to relevant sustainability issues. Thus, the frequency of use of the terms "strategy," "system," and "process" is aligned with the definition of CE as the organizational support that enables the development of knowledge.[9,44,45] Furthermore, it reflects disclosure that is oriented toward describing organizational structural aspects related to internal functioning, risk control, and operational sustainability, ranging from strategic approaches in commercial and social areas to management systems linked to health, the environment, and performance evaluation, as well as production procedures aimed at mitigating negative environmental impacts. This coincides with the views of Chiucchi and Giuliani[50], who argue that the GRI guidelines enable the systemic integration of IR with other non-financial indicators, allowing for the disclosure of relationships between organizational capabilities and social and environmental objectives.

However, the low frequency of the terms "innovation" and "R&D" is striking, as they refer to central aspects of the EC, being the driving force behind companies' sustainable growth and success in dynamic environments such as the current one. This situation may be due to two circumstances: either innovation, research, and development processes do not exist, or companies decide not to disclose these internal value-added processes. However, it would be necessary to seek strategies for disclosing this type of information, as there can be no sustainability without internal mechanisms that serve as a driving force and projection in the long term. In this regard, López et al.[59] emphasize that the generation of value and the creation of a competitive advantage for organizations depend on the proper management of EC.

Beyond the aspects questioned, it is essential to note that the high disclosure rates found in this study contrast with what is indicated in much of the empirical literature, which, focusing on the analysis of traditional annual reports, has revealed low levels of IC disclosure.[20,22,24] This contrast reinforces the idea that SMs—and in particular those that follow GRI standards—are a suitable format for the disclosure of intangibles, as reflected in studies that highlight that growing sustainability requirements are driving more robust practices in non-financial reporting.[27,29]

Likewise, the disclosure patterns identified also show the interrelationship between CI and sustainability, highlighted in the most recent literature[60] and reflected normatively in IFRS S1[17], which explicitly integrates CI elements as internal and external factors that can give rise to sustainability-related risks and opportunities that could affect the company's prospects. Specifically, the results obtained show that the sustainability performance of the companies analyzed is based on a CI configuration that places CR at the center, as a channel of legitimization vis-à-vis different *stakeholders*, among which customers stand out. In this configuration, CH and CE also have a significant presence: the former is mainly focused on employee training and well-being in terms of occupational health and safety, and the latter on organizational aspects related to strategy, production, and management systems and processes. This combination helps to project a solid image of sustainable commitment and strengthens the company's reputation among stakeholders. However, it reveals certain limitations. On the one hand, there is less attention to aspects related to the well-being and comprehensive development of employees, which are of greater interest internally within companies, such as the work environment, equity, and incentives. On the other hand, there is little disclosure of key aspects for the long-term projection of companies, such as those related to innovation, research, and development processes.

These findings have implications at different levels. On a practical level, they highlight the need for companies to move towards more balanced information disclosure strategies that not only prioritize CR aimed at external legitimization, but also make internal processes of great interest, such as innovation and the comprehensive development of their employees, more transparent. At the regulatory level, it would be appropriate for the agencies and standards-setting bodies to promote guidelines that encourage the disclosure of these less visible aspects of IC, which could be achieved by expanding the scope of existing policies. Finally, on a theoretical level, the findings invite further research on the IC-sustainability binomial, delving deeper into the study of their interrelationship and, in particular, the real capacity of IC to generate sustainable social, environmental, and economic value.

CONCLUSIONS

The objectives of this study were to analyze the CI information disclosed by Argentine companies listed on the IS-BYMA in their MS-GRI reports and to advance the analysis of the relationship between CI and corporate sustainability based on the study of the information disclosed.

The results obtained show that when these companies disclose information related to sustainability, they reveal information on the three classic dimensions of CI, with a high level of disclosure. About CH, the importance of information related to employees and managers and how it is managed stands out, in matters relating to training, occupational well-being, health and safety, benefits, and incentives. In relation to CE, the information

disclosed relates to strategy, internal systems, and the responsible development of production processes. The importance of information on CR is highlighted in terms of commitment to the environment and society, and the importance that companies place on relationships with customers, suppliers, and other stakeholders.

The significant presence of the various components of CI in the MS-GRI, whose main objective is to communicate sustainability performance, is solid evidence of the close relationship between CI and sustainability, which is highlighted in the most recent literature and has recently been recognized at the regulatory level in IFRS S1 of the ISSB. Regarding the elements of CI that are most closely related to the sustainability policies and practices disclosed by companies, it is evident that CR occupies a central place as a channel of legitimization vis-à-vis stakeholders—particularly customers—accompanied by CH focused on employee training and well-being, mainly in health and safety issues, and CE linked to strategy and management and production systems. This configuration reveals limitations that reflect a lack of attention to the well-being and comprehensive development of employees, including the work environment, equity, and incentives, as well as innovation, research, and development processes, which are fundamental to driving long-term growth and sustainability.

These results are the outcome of exploratory research, which requires further studies to deepen our understanding of the phenomenon under study. In this regard, to advance the research, the study of MS-GRI could be deepened through a qualitative content analysis, which is not limited to the interpretation of the manifest content of the analyzed text, but seeks to delve into its latent content and the social context in which the phenomenon develops. In addition, data from other sources could be used. These could include interviews with company executives and officials to learn how IC is mobilized in practice in the development of policies and actions related to sustainability. Likewise, news published in the press and reports or complaints submitted to official bodies and NGOs could be reviewed, which could reveal information about social and/or environmental conflicts that are not evident in the SMs but could involve the CI of companies and have an impact on it.

However, the results obtained so far constitute an essential contribution to the field of research on IC and sustainability, as very few studies have considered the analysis of this link. Specifically, the work contributes to the literature by providing evidence of high levels of CI disclosure in MS-GRI, identifying different patterns in the disclosure of the various dimensions of CI, and confirming the interrelationship between CI and sustainability, shedding light on the configuration of CI that underpins sustainability performance. The research also makes practical contributions, insofar as it highlights the value of GRI MS as a framework for communicating CI and socio-environmental commitments, shows that companies' membership in a Sustainability Index (such as IS-BYMA) drives CI disclosure practices, and offers guidelines for strengthening CH, CE, and CR communication by highlighting aspects that receive less attention. In this way, it provides a knowledge base which, added to the evidence emerging from other studies, has the potential to contribute to regulatory bodies modifying existing rules and standards to improve the presentation of sustainability information. This could be achieved by incorporating missing elements and generating the right incentives for companies to adopt disclosure strategies that show their current performance and prospects.

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CONFLICT OF INTEREST

None.

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