



Components of intellectual capital for the research process in higher education institutions

Componentes do capital intelectual para o processo de pesquisa em instituições de ensino superior

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Abstract

The intellectual support variables used within the investigative process in Higher Education Institutions were characterized. Research with a quantitative, positivist, analytical approach, field designs, in a non-experimental, transversal or transactional way, descriptive type. The study population group is made up of vice-rectories of the research area, coordinations, headquarters or leaders of the research area, who are in charge of the management and viability of the research processes in 7 universities of Cartagena de Indias, survey, an instrument was used with alternatives of closed Likert-type answers, the Statistics of the data was Descriptive systematized in Microsoft Excel, SPSS and R.3.2.3. It is allowed to show that

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there is not a sufficient amount of economic resources available to carry out research, Relationships with both companies and other government institutions must be strengthened to develop investigative processes that entail producing intellectual material. As well as implementing methodologies to increase and strengthen knowledge networks; as well as virtual repositories.

Keywords: Intellectual Capital. Development. Education. Research. University.

Resumo

Foram caracterizadas as variáveis de suporte intelectual utilizadas no processo de investigação em Instituições de Ensino Superior. Pesquisa com uma abordagem quantitativa, positivista, analítica, desenhos de campo, de forma não experimental, transversal ou transacional, tipo descritivo. O grupo da população de estudo é composto por vice-reitorias da área de pesquisa, coordenações, sedes ou líderes da área de pesquisa, que são responsáveis pela gestão e viabilidade dos processos de pesquisa em 7 universidades de Cartagena de Índias, pesquisa, um instrumento foi utilizado com alternativas de respostas fechadas do tipo Likert, a estatística dos dados foi sistematizada descritiva no Microsoft Excel, SPSS e R.3.2.3. É permitido mostrar que não há uma quantidade suficiente de recursos econômicos disponíveis para realizar pesquisas, as relações com empresas e outras instituições governamentais devem ser fortalecidas para desenvolver processos de investigação que envolvam a produção de material intelectual. Além de implementar metodologias para aumentar e fortalecer as redes de conhecimento e os repositórios virtuais.

Palavras-chave: Capital Intelectual. Desenvolvimento. Educação. Pesquisa. Universidade.

Introduction

The University cloisters are temples of wisdom and cultural growth, in turn, promoters of the neo-society of knowledge and intellectual knowledge, with constant search for development in technology and science through growth and research promotion, producers of intellectual goods of intangible character, which are easy to identify, measure and submit to measurement, for a specific and concrete use of the entity with idiosyncratic essence for the object of knowledge being studied, this is what is known as intellectual material (Morales et al., 2023; Vidal, 2017).

The models of intellectual capital or material are considered a basic instrument and

foundation that materialize as a competitive advantage possessed by the University or Higher Education center by having as a basis the intellectual products results of the research processes, taking them as a fundamental asset. empowerment and criticism that generates added value in the chain of intangible value elements (Arrieta et al., 2017); This reason produces in Universities the need to have defined intellectual capital models in accordance with the research demand of the environment that generate added and increasing value in these non-tangible results obtained from research processes.

There is great interest in higher education centers in Colombia in generating knowledge and valuing the results of research dynamics as intellectual production, this is of utmost importance for the geographical area where the University is located, seeking continuous improvement of quality. of knowledge construction in the classrooms, to generate greater coverage, advantages, obtain privileges such as inter-institutional exchange, project financing and be recognized nationally and internationally.

In accordance with the above for the city of Cartagena de Indias, geographically located in the Caribbean area in the north of Colombia, where the Higher Education Institutions (IES) of a public and private nature currently operate: University of Cartagena, Universidad San Buenaventura, Technological University of Bolívar, Comfenalco University Foundation, Free University, Rafael Núñez University and Antonio Arévalo Technological Foundation (TECNAR). They have in their organizational hierarchy an area dedicated to research as vice-chancellor or as a subdivision of the academic area, which are in charge of the management and production of intellectual material through research groups, young researchers, research teachers, interns assigned to institutional research hotbeds.

Methodology

The work carried out was with a positivist quantitative approach, analytical type, field design, non-experimental, transectional or transversal in nature, descriptive type. The study population group is made up of vice-chancellors of the research area, coordinations, headquarters or leaders of the research area who are the ones who manage intellectual production in the HEIs. The population was from 7 higher education centers in the City of Cartagena, Table 1 shows the distribution of the population in the different strata.

Stratum	Institution	N_i	p_i	n_i
1	University cartagena	88	0.62	Four. Five

2	Technological University of Bolívar	fifteen	0.11	8
3	University Antonio Narino	7	0.05	4
4	San Buenaventura University-Cartagena	10	0.07	5
5	Comfenalco Technological University Foundation	6	0.04	3
6	Antonio Arévalo-TECNAR Technological Foundation	6	0.04	3
7	Rafael Núñez University Foundation	10	0.07	5
Total		142	1	73

Table 1: Distribution of the sample in the HEIs.

Source: self made.

Regarding the way in which the data was collected, a survey was used, with 5 single and closed response alternatives for the statements, using the Likert scale, in which the person surveyed must denote their acceptance. or rejection of the statement asked, it was applied in a self-administered manner, the scale ranges between 1 and 5 (5= TA: Totally Agree, 4= PA: Partially Agree, 3= N: Neutral, 2= DA: Partially Disagree , 1= TDA: Totally disagree), showing that, with a lower score, the influence of the variable is more latent in the problem, that is, the lower the score, a latent need to strengthen the intellectual material through strategies for growth is evident. of the research area at the IES of the City of Cartagena de Indias.

To process the data, a double-entry matrix approach was carried out, where the data provided by the surveyed subjects of the research were presented for systematized attention, the results obtained and their respective analysis were then shown. Descriptive statistics were used for the distribution of frequencies, percentages and calculation of arithmetic measurements, with the help of the Microsoft Excel program. In addition, the data obtained were used and compared with the results obtained through the SPSS and R.3.2 software. .3.

Results and Discussion

The components of the intellectual material resulting from the research processes in the HEIs considered in the study are characterized according to the capitals: human, structural, relational and digital. Table 2 shows the statistics for the indicators associated with the human capital of the HEIs related to the research process.

Alternativas	Interacción entre investigadores		Formación de investigadores	
	fa	%	fa	%
(1) Totalmente en desacuerdo (TDA)	90	42,9%	41	19,5%
(2) Parcialmente en desacuerdo (PDA)	36	17,1%	58	27,6%
(3) Neutral (N)	3	1,4%	18	8,6%
(4) Parcialmente de acuerdo (PA)	43	20,5%	40	19,0%
(5) Totalmente de acuerdo (TA)	38	18,1%	53	25,2%
Total	210	100,0%	210	100,0%
\bar{X} del indicador	2,54		3,03	
Categoría del indicador	Bajo Dominio		Moderado Dominio	
σ del indicador	1,61		1,51	
Dispersión	Moderada		Baja	
\bar{X} de la Dimesión	2,78			
Categoría de la Dimesión	Bajo Dominio			
σ de la Dimensión	1,58			
Dispersión	Baja			

Table 2: Characterization of the human capital component of HEIs.

Source: self made

It is observed that for human capital in the research process of HEIs there is a low dominance with respect to the average agreement that researchers express (2.78); While it presents a low variability (1.58), the above indicates that the respondents generally disagree that interaction and training is being presented for researchers in the different institutions considered in the study. For the interaction indicator between researchers, it is observed that 42.9% indicate that they do not agree that said interaction occurs, for this indicator the average is 2.54, which classifies it as having low mastery; Regarding training, there is an average of 3.03; although it is a little older and is determined as moderate dominance,

It is evident in the Interaction between researchers indicator, that 42.9% of the research leaders state that they do not fully agree, plus 17.1% who state that they partially disagree with regard to the existential validity of the space for the relationship of researchers. For debates and definition of projects that can be carried out by multidisciplinary teams and with the reality that there are spaces where research results are made known, an unfavorable presence is shown at 60%. On the other hand, 18.1% stated that they totally agreed, 20.5% partially agreed and 1.4% remained neutral, this shows a favorable trend of 38.6%.

The interaction between employees in organizations such as HEIs must promote the sharing of knowledge, resources and capabilities among employees, in this case between researchers; As Escorcía & Barros (2020) propose, the exchange of researchers with different structures of intellectual knowledge increases not only the level of association and relationship

but also ensures that the capacity for innovation goes beyond what an individual subject can achieve; This also maximizes the generation of new knowledge from other sources and the competitive advantages of the organization, since, as stated by Miranda & Ocaño (2021),

In accordance with the above, it is said that the procedure to acquire, transfer and integrate knowledge is the most edifying for HEIs and this occurs from the interpersonal relationships of teaching and research employees, that is, the relationships of key employees. , those who are strategic and have extensive knowledge, experiences and skills, are of vital importance to sow a legacy of intellectual creation among other colleagues, marking differences and generating competitive advantage in the medium of intellectual products (Gonzalez & Rodríguez, 2017).

We also observed that 25.2% of the research leaders who were surveyed stated that they totally agreed and 19% partially agreed, which represents 44.2% of favorability regarding the training of researchers in institutions as a pillar for the offering postgraduate studies with a research emphasis, the formulation of updating programs for research leaders should be applied and teachers should be supported to study master's degrees or specialties in research. On the other hand, 27.6% of the research groups stated that they partially disagreed, 19.5% totally disagreed, which is equivalent to a 47.1% unfavorable presence, and only 8.6% remained neutral.

Based on the above, it is necessary to specify that when talking about the training of researchers, emphasis is not only placed on the development of methodological and technical knowledge offered in postgraduate academic programs, it is something that goes further, it implies a culture, a trade, a practice that allows access to new knowledge (López, 2017).

As expressed by Meza & Reyes (2019); Training researchers in the educational sector entails a procedure of a complex nature due to the very nature of research in education as a training entity, due to the countless difficulties that are imposed in this environment and the great variability of social, political and institutional factors that they get involved ; that they pursue in the different institutions and variables of an epistemological and investigative type, because as Rojas (2021) highlights, research is an objective truth that unfolds in the dialectic not in a linear or mechanical way and this is adjusted depending on the reality that requires scientific practice in each specific case.

In that order, Gómez & Domínguez (2018) propose that the training of research personnel is a process that requires, above all, awareness and vocation, dedication and a great capacity to learn, in addition to a powerful appreciation of the social and economic component. of the researcher in the environment where he works. It is a process with its own

objectives and dynamism, in which development policies, tools and sources of financing are necessary.

Carrasco & Di Lorenzo (2016) assure that when analyzing the training of postgraduate research personnel at HEIs in Latin America, it is worryingly evident that the decision-making and policies of the institutions are not catalysts for the generation of character conditions. necessary objectives for training in the research profile and in terms of young researchers there is a negative impact on the coercion of creativity, freedom, autonomy and critical-reflective thinking during the implementation of strategies for the generation of new training knowledge and scientific policies in the creation of new generations of young scientists.

The latter must be addressed urgently so that the training of researchers in the HEIs of Cartagena can impact the transformations that the city needs, and can become a manager of development processes, with a social function, not a simple trainer of knowledge containers.

Now, regarding structural capital, Table 3 shows the statistics for the associated IES indicators related to the investigative processes.

Alternativas	Recursos financieros disponibles		Dotación Tecnológica	
	fa	%	fa	%
(1) Totalmente en desacuerdo (TDA)	58	27,6%	29	13,8%
(2) Parcialmente en desacuerdo (PDA)	56	26,7%	49	23,3%
(3) Neutral (N)	11	5,2%	7	3,3%
(4) Parcialmente de acuerdo (PA)	37	17,6%	64	30,5%
(5) Totalmente de acuerdo (TA)	48	22,9%	61	29,0%
Total	210	100,0%	210	100,0%
\bar{X} del indicador	2,81		3,38	
Categoría del indicador	Moderado Dominio		Moderado Dominio	
σ del indicador	1,56		1,46	
Dispersión	Baja		Baja	
\bar{X} de la Dimesión	2,96			
Categoría de la Dimesión	Moderado Dominio			
σ de la Dimensión	1,54			
Dispersión	Baja			

Table 3: Characterization of the structural capital component of the HEIs.

Source: self made

For the structural capital subdimension, moderate domains are observed within the resource indicators in finance and technological equipment; as well as for the dimension in general (2.81, 3.38 and 296 respectively). For this dimension, the levels of agreement are higher for technological endowment, however, it is observed that the general average is below 3.0. Regarding the available financial resources indicator, it is observed that 27.6% of the

investigative leaders show that they do not totally agree, added with 26.7% who show that they partially disagree with the fact that there is a budget that meets what is necessary, the support of MINCIENCIAS to HEIs with economic resources for research development and provision of resources other than those given by MINCIENCIAS to develop research, denotes an unfavorable presence of 54.3%. On the other hand, 22.9% stated that they totally agreed, 17.6% partially agreed and 5.2% remained neutral, which denotes a favorable presence of 40.5%. The above leads us to show that in some higher education institutions in the city of Cartagena the economic resources available for the research process are not sufficient.

Investment in research is of utmost importance because it establishes human capital, showing that the capabilities of the subjects are acquired, not naturally. These are achieved through investment in educational training and research that promote conservation, innovation and the exponential economic growth of the nation (Garces et al., 2018). With this, as expressed by Yaya (2016), the entrepreneurship of new technologies is strengthened and encouraged, considering that in the medium term there will be qualified human resources, with greater knowledge and values that will be transmitted to business production, in this case to the HEIs. . But it goes without saying that all this requires an active effort on the part of these, other institutions and the government.

Unfortunately, the results presented show a difficult reality that is far from the previously established postulates and in accordance with what was reported by Gazzola & Didriksson (2018), when saying statements that the area of Higher Education in Latin America is characterized by low financing, which does not exceed 5% of total Science and Technology investments that comes from the return of service provision. This is reinforced by Nicaragua (2018), stating that the main mechanism used by HEIs on a regular basis for planning educational activities is economic resources.

Continuing with the second indicator, technological endowment, developed in table 2; We observe that 29% of the research leaders surveyed claim to totally agree and 30.5% partially agree, which is equivalent to 59.5% of positivism for updating research calls that are easy to consult in the information system of the HEIs, the use of institutional email as a mechanism to communicate research activities and the ease of Internet network connectivity in the workplace to carry out research by researchers. On the other hand, 23.3% of research groups claim to partially disagree, 13.8% totally disagree, which is equivalent to 37.1% unfavorability, and only 3.3% remained neutral.

In this sense, Samadiego (2021), highlights that the technological material will be the group of intangibles directly linked to the development of activities and functions of the

technical-operating systems of the organizations, from which the investigative products of attributes are obtained. specifics and the correct performance of productive processes with efficiency, such as advances in databases for the future development of more innovations of intellectual products and investigative processes.

Based on the above, Rovira et al., (2017), emphasizes this, highlighting the importance for organizations of using technological material in procedures and activities with the aim of making them more efficient in time and results, which They are used to process information and communication that facilitates the processing, training, storage, location, exploitation and transition thereof.

For its part, Table 4 shows the characterization of the relational capital component, with respect to the indicators, relationship with other HEIs and relationship with companies, referring to the Research process.

Alternativas	Relaciones con empresa para desarrollar investigación		Relaciones con otras universidades para desarrollar investigación	
	fa	%	fa	%
(1) Totalmente en desacuerdo (TDA)	72	34,3%	81	38,6%
(2) Parcialmente en desacuerdo (PDA)	40	19,0%	31	14,8%
(3) Neutral (N)	42	20,0%	9	4,3%
(4) Parcialmente de acuerdo (PA)	25	11,9%	43	20,5%
(5) Totalmente de acuerdo (TA)	31	14,8%	46	21,9%
Total	210	100,0%	210	100,0%
\bar{X} del indicador	2,54		2,72	
Categoría del indicador	Bajo Dominio		Moderado Dominio	
σ del indicador	1,44		1,65	
Dispersión	Baja		Moderada	
\bar{X} de la Dimesión	2,76			
Categoría de la Dimesión	Bajo dominio			
σ de la Dimensión	1,59			
Dispersión	Baja			

Table 4: Characterization of the relational capital component in HEIs.

Source: self made.

In the subdimension of relational capital, the results are very similar in terms of average and dispersion in relation to relationships with companies and relationships with other universities (2.54 and 2.72 respectively), having an average score of 2.76, this subdimension is classified as low domain, indicating that the institutions considered must strengthen relationships both with companies and with other institutions.

From the first indicator, relations with companies to develop research, developed; It is found that 14.8% of the researchers interviewed affirm that they totally agree and 11.9% partially agree, which represents 26.7% of favorable positivism regarding the fact that HEIs have agreements signed with financial entities for research development. , through the generation of scientific products resulting from research with organizations in the productive

area, serving as support to create new ventures or companies based on projects. For their part, 19% of the research groups stated that they partially disagree, 34.3% totally disagree, which is equivalent to 53.3% somewhat unfavorable. The percentage of researchers surveyed who remained in a neutral position was significant at 20%. This allows us to affirm that, on the part of the HEIs of the city of Cartagena, there is a deficit in establishing relationships with the business sector to develop research plans that lead to the production of intellectual material.

Hernandez et al., (2017) states that between the academic and business areas there have been quite poor relationships, which have been characterized by distrust on both sides and a lack of integration of their qualities and attitudes, which has led to this relationship do not transcend great application innovations in the field of theory. But globalization demands that companies and universities work hand in hand to achieve competitiveness and quality, that they can build a space where researchers and entrepreneurs can interact and collaborate, as Dueñas and Duque (2015) point out, in order to make an exchange, potentialization and generation of knowledge based on relationships of commitment and bilateral trust. This is why Quintero et al. argues (2018) in the 21st century there is a relational trend between the University-Business, seeking that the academic and productive areas have a dynamic complement, which establishes common objectives to fulfill general substantive functions, in creation, development and innovation of knowledge from the professorship. educational so that the business sector continuously and effectively improves all its production processes. that the 21st century trend in the University-Business relationship seeks to

As Nado & Abad (2016) propose, looking at the University of this 21st century from a distance, the need for the development of coherent action between the IES and the organizational entities of the civil state, industry, business and government entities must be promoted. For its part, for this to happen, a comprehensive transformation must be carried out in university daily life in search of institutional culture, social projection processes that stimulate the excellence of education services and the impact they generate on environmental and social environments. social, with priority of the commitment to grow business sectors.

Regarding the inter-university relations indicator for research development, it is evident that 38.6% of researchers say they do not totally agree, added to 14.8% who say they partially disagree with the existence of; research agreements with other HEIs for the development of products of this type, that research professors already develop products in alliance with other HEIs, which shows Non-favorability of 53.4%. For their part, 21.9% claim to totally agree, 20.5% partially agree and 4.3% remained neutral, which shows a favorability

of 42.4%.

In this sense, Casalet (2018) maintains that the complexity of activities in science and technology today is that it requires the articulation of specialists from all areas of knowledge, entities and nations, in order to achieve progress in the challenges that social development confronts us. The process of scientific collaboration involves relationships between several multidisciplinary individuals, companies and nations, in search of enhancing research products through the creation of skills that are impossible to develop remotely and in isolation.

The process of developing economic models must seek its bases in knowledge and be driven by innovation. To reach a goal, fundamental strategic direction through the joint and collaborative work of different HEIs, government entities that demand knowledge and generate innovations (Arocena, 2014).

It should be noted that the private sector acts in a way that complements its work through support from universities. The private company provides important economic contributions that help equip the HEIs for the research process (Lozano, 2020). That is why Alzate (2015) proposes the “HEI-productive sector relationship, which has the main purpose of applying and incorporating added values to the knowledge that is generated in the academy and in the company, to convert it into intellectual products.”

Finally, the digital capital subdimension is characterized by the virtual repositories and knowledge networks indicators, as seen in Table 5.

Alternativas	Repositorios Virtuales		Redes de conocimiento	
	fa	%	fa	%
(1) Totalmente en desacuerdo (TDA)	62	29,5%	59	28,1%
(2) Parcialmente en desacuerdo (PDA)	40	19,0%	31	14,8%
(3) Neutral (N)	17	8,1%	31	14,8%
(4) Parcialmente de acuerdo (PA)	49	23,3%	54	25,7%
(5) Totalmente de acuerdo (TA)	42	20,0%	35	16,7%
Total	210	100,0%	210	100,0%
\bar{X} del indicador	2,85		2,88	
Categoría del indicador	Moderado Dominio		Moderado Dominio	
σ del indicador	1,55		1,48	
Dispersión	Baja		Baja	
\bar{X} de la Dimensión	2,82			
Categoría de la Dimensión	Moderado Dominio			
σ de la Dimensión	1,55			
Dispersión	Baja			

Table 5: Characterization of the digital capital component in HEIs.

Source: self made

Digital capital is classified as a moderate domain (average of 2.82); taking into account the virtual repositories and knowledge networks indicators (2.85 and 2.88 respectively), for which there is a similar behavior with respect to the distribution of the percentages of agreement. Methodologies must be implemented to increase and strengthen knowledge networks; as well as virtual repositories.

Regarding the indicator bases of repositories in a virtual environment in Table 4, the researchers affirm that they do not totally agree in 29.5%, added to 19% who state that they partially disagree that the virtual repositories of their HEIs that facilitate consultation of research results remotely, the HEIs rely on these databases to support the work of their researchers in product development digitally, which can be consulted from anywhere, this shows a Non-favorable trend of 48.5%. For their part, 20% stated that they totally agreed, 23.3% partially agreed and 8.1% remained neutral, this shows favorability of 43.3%. This allows us to infer that in the HEIs of Cartagena there are virtual databases available for research development in favor of the production of intellectual capital. But it must be improved to develop intellectual capital to strengthen the research process.

These results are similar to what is described by Arias & Cholca (2021), who affirm that to scientifically develop approaches today, an increase is generated in the total of intangible products that must be grouped, archived, preserved and distributed in an efficient and timely manner. . This develops instruments necessary for learning, research and teaching, which can be accessed from anywhere in the world. In the same way, these databases allow HEIs to preserve the knowledge they generate, which gives great visibility to the researcher, leading to a broad impact of recognition for both (Moreyra, 2017).

Schettini & Cortazzo (2015) state that educational processes must be thought about the relevance of the information being investigated. When these works, books, analyses, reviews, etc. are shared, the efficiency of this product being used to develop new research, hypotheses or reviews, essential for evaluating study methods, analysis, techniques and software applications, is increased. . The educational quality that new students will receive, if the information is obtained for free, will generate greater innovation and many other advantages, to generate new knowledge, early correction of errors and avoid plagiarism of thesis. It is for this reason that the collection, categorization, accessibility, dissemination,

Although there are also technical, social, political, etc. limitations, such as that some people do not have access to the Internet in some sectors, lack of tangible resources to access a computer, affect the development of research through virtual and office tools. , the poor ability of some people to use virtual repositories, cultural resistance to using information

produced by other researchers from distant areas or from different cultural groups, are also considered barriers to the acquisition of knowledge. They must be overcome in our city, since, as stated previously, repositories contribute to increasing research and academic quality and promoting innovation in a region. (Texier, 2015).

The second indicator, knowledge networks, shows that 16.7% of the researchers interviewed claim to be in total agreement and 25.7% partially agree, which represents 42.4% of favorability. This is used for research development, along with The participation of the knowledge network in the country and outside it, as a means to generate and develop research, also the continuous participation of knowledge networks in Colombia and in other countries are pillars of development. On the other hand, 14.8% of the research groups claim to partially disagree, 28.1% totally disagree, which is equivalent to 42.9%. This is not favorable, because the number of respondents who maintained a neutral margin with is representative. 14.8%.

In this regard, Hodson et al., (2019) ensures that the knowledge network must facilitate collaborative processes, debate and exchange of innovative knowledge to support ideas. These so-called networks have an inter- and multidisciplinary work approach where the investigative teams that comprise them must have reciprocal relationships that generate new maxims of knowledge. According to Araujo (2019), unions must be formed between the personnel that produce knowledge and information, which is reflected through representative productions of the current situation in which we live.

In accordance with the above, the new educational environment must lead professors to take advantage of their experiences, avoid falling into traditional pedagogical dogma, allow students to live their own experiences, share knowledge with their peers and encourage research. By taking advantage of this endless amount of knowledge, experience and satisfaction of educational needs, the process of knowledge transfer through research networks is made possible. The attitude of Higher Education Institutions should be, like the professor, to take advantage of the benefits provided by research networks to obtain new academic research proposals applicable to the current reality Ospina & Montoya (2021).

It is considered necessary and precise to clarify that knowledge networks are not only belonging to academic or research groups in an abstract way or in a sensational fashion for professional growth. It is belonging to groups that seek to satisfy needs in an articulated way to solve problems of a local, regional and global nature (Bustamante, 2019).

Conclusions

It is clear that human capital in research must make proposals for improvement. Regarding structural capital, moderate dominance is observed in the financial resources and technological endowment indicators. It is evident that some HEIs in Cartagena do not have the necessary amount of economic assets to be used for research topics. In HEIs there is a good use of technological equipment that must continue to be strengthened and elevated as support for intellectual capital. Regarding the relational capital component, it is classified as low domain, indicating that the institutions considered must strengthen relationships both with companies and with other institutions. On the part of HEIs there is a deficit in establishing relationships with the business sector to develop research that leads to the production of intellectual capital. We must continue working and strengthening relationships to develop research and produce intellectual capital. Regarding digital capital, methodologies must be implemented to increase and strengthen knowledge networks; as well as virtual repositories.

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