Intangible resources disclosed in the Panama stock market

Recursos intangibles revelados a través del mercado de valores de Panamá

Edila Eudemia Herrera Rodríguez[1] , Iván Andrés Ordóñez Castaño[2*]

[1]Universidad de Panamá, Panamá
[2]Universidad de San Buenaventura, Colombia

Abstract

This paper analyzes factors that could explain the disclosure of information on intangible resources by companies listed on the Panamanian Stock Market. Greater transparency is a growing need for firms listed on the stock market, especially because of market pressures themselves. The research was based on three theories: agency, signage and owner cost. A sample of 61 companies was analyzed, using an index with 145 indicators, distributed in five categories of intellectual capital: human, technological structural, organizational structural, business relational and social relational. Probabilistic models were developed regarding the disclosure of these components of intellectual capital. The results show that companies with higher volumes of assets, operational profitability, level of indebtedness and time in the market, increase the probability of disclosure of their intangibles.

JEL code: G14, M14, M41
Keywords: Disclosure information; Intangible assets; Intellectually capital; Panama stock market

Resumen

Este artículo analiza los factores que pudieran explicar la revelación de información de recursos intangibles por parte de las empresas que cotizan en el mercado de valores de Panamá. La necesidad de mayor transparencia por parte de las empresas cotizadas en el mercado bursátil es creciente, sobre todo por las propias presiones del mercado. Tres teorías son la base para el desarrollo de este estudio: de agencia, la señalización y coste del propietario. Se analizó una muestra de 61 empresas, donde se utilizó un índice con 145 indicadores, distribuidos en cinco categorías de capital intelectual: humano, estructural tecnológico, estructural organizativo, relacional del negocio y relacional social. Se desarrollaron modelos para medir la probabilidad de revelación de estos componentes del capital intelectual. Los resultados muestran que las empresas con mayores volúmenes de activos, rentabilidad operacional, nivel de endeudamiento y tiempo en el mercado, incrementan la probabilidad de revelación de sus intangibles.

Introduction

The interest that the market perceives the addition of value by the organizations could be motivating the latter to reveal additional information, on a voluntary basis, about their intangible resources. Generally speaking, the directives acknowledge that there are benefits to a well-managed disclosure policy (Madhani, 2015). For their part, market regulators set their standards on the minimum amount of information that must be disclosed (Subramanian & Nagi, 2010). However, this information may not be sufficient for the different stakeholders. The goal of this research is based on the fact that the International Accounting Standard No. 38 (IAS 38), which regulates the accounting management of the intangible assets and establishes criteria for their valuation, does not include their value in the stock market. The traditional model of financial statements is based on the historical cost that can vary depending on the conditions of the market and the standards (Franco, Ordóñez-Castaño & Perdomo, 2017). Furthermore, it focuses mainly on the concept of materiality and the effects of transactions, ignoring certain important factors that determine the value of a company. These factors may include intellectual capital, that is, the capability of the company to create a future value (Bhatia & Mehrotra, 2016). In this sense, the conventional evaluation methods are not capable of identifying the value of the business in an intensive manner due to the specificity of the intangible assets (Savickaitė, 2014). Departing from these precepts, financial information transparency is determined, in addition to the compliance of standard requirements, by the pressure of the market (Camfferman & Cooke, 2002; Kang & Gray, 2011).

Transparency is a central aspect concerning the confidence of the investors in the decisions of the agents. The societal demand for more information transparency has led to the need to make the behavior of companies more visible (Rodríguez-Gutiérrez, Fuentes-García & Sánchez-Cañizares, 2013). Departing from the fact that the information is imperfect and that it may be costly, this implies the existence of a higher level of information asymmetry (Stiglitz, 2000). In this sense, Akerlof (1970) proposes that the agents could make decisions, at some point, with their own interests in mind, and forget the interests of the stockholders, who hired them to manage their organizations. This is where the need to establish efficient communication mechanisms between agents and investors arises.

As the Internet has arrived, organizations were able to have at their disposal an innovative and powerful channel of communication with investors (Wesley, Ferraz-Andrade, Famá & Filho, 2009). In this way, Miles and Van Clieaf (2017) conclude that innovation based on communication technologies is a determining factor in the growth of organizational capital, which in turn influences human and physical capital. It is in this manner that information dissemination represents an advantage to companies, such as the reduction in the cost of communication, the increase of speed in the exchange of information, the reduction in the administrative effort, and the versatility in the management of interesting contents for the market, allowing the execution of operations that were, up until that moment, impractical and even impossible to carry out (Wagenhofer, 2003; Schuster & Connell, 2006).

This research is based on three theories, with their premises. Agency Theory (Jensen & Meckling, 1976) proposes that the disclosure of information reduces the problem of information asymmetry, as well as the costs of the agency. Signaling Theory (Spence, 1973) proposes that the agents of a market can use signaling to combat adverse selection. Proprietary Cost Theory (Dye, 1986; Verrecchia, 1983; Wagenhofer, 1990 and Macagnan, 2007) proposes that the voluntary disclosure of information increases costs to the proprietor and generates a possible loss in competitive advantages.

Different authors (Buzby, 1975; Firth, 1979; Chow & Wong-Boren, 1987; Cooke, 1989, 1992; Macagnan 2007, 2009; Herrera & Macagnan, 2016) have reviewed the factors that influence the disclosure of information related to intangible assets in different countries. This is how this study analyzes the intangible resources disclosed by the Panama stock market through the website of listed companies. The characteristics that motivate such companies to disclose such information are studied. For this purpose, binary choice models were constructed in order to determine the probability of disclosure of intellectual capital (comprised of human, relational, and structural capital) according to the conditions of the financial and non-financial information disclosed. In this way, the measurement method is based on the information provided to the public by the companies listed in the Panama Stock Exchange (BVP for its acronym in Spanish). The following is a review of the literature, methodology, analysis of results, conclusions, and references.

Review of the literature and hypothesis formulation

The actual business model in a competitive environment is becoming more and more dependent on the value that the intangible resources offer to companies. Although tangible resources continue to be main elements in the production of goods and services, their relative importance has decreased with time; intangible resources replacing tangible resources (Madhani, 2015; Martins & Alves, 2010). All of this added to the growing wave of foreign investment in recent decades, as well as the transnationalization of local companies has generated conflicts, which is why guidelines have been established to determine a policy of external financial disclosure (Francis, Khurana & Pereira, 2005; Robertson, Al-Angari & Al-Alsheikh, 2012; Bena, Ferreira, Matos & Pires, 2017). This is done in order to increase transparency and, thus, provide additional information to investors that will help them optimize decision-making. Transparency is based on the premise that people respond differently to persuasion tactics when they know that others are trying to influence them (Friestad & Wright 1994; Steffel, Williams & Pogacar, 2016).

In the market context, the tendency of agents would then be to disclose more information in order to attract the capital of investors to finance themselves. This is due to the fact that information and agency problems may limit the ability of companies to access external financing and lead to financial limitations (Gopalan, Udell, & Yerramilli, 2011). The voluntary disclosure of information on intangible resources could help companies mitigate the marked difference between accounting value and market value in organizations. The scope of voluntary disclosure would not only broaden knowledge on the factors explaining the variability of disclosure, but it could also assist policymakers in selecting an appropriate course of action to remedy deficiencies (Cooke, 1989). The 2001 Nobel Laureates: Joseph Stiglitz, George Akerlof, and Michael Spence demonstrated that in order to understand the market phenomenon, it is necessary to understand the problems associated to information asymmetry in the contractual relations that the organizations establish.

The matter of information asymmetry has been addressed by Akerlof (1970) in his study on quality and uncertainty in the automotive market. Under conditions of information asymmetry, the executives of the organizations could make decisions that prioritize their interests, to the detriment of the interests of those they represent (Akerlof, 1970). In this line of thought, Botosan (1997) and Lambert, Leuz, and Berrecchia (2006) consider that asymmetry of information increases uncertainty about the true parameters of an asset, which leads the investor to require compensation for the additional risk and could represent higher interest rates. The problem with information asymmetry comes with other issues, such as: adverse selection and moral risk.

The concept of adverse selection, developed from the model presented by Akerlof (1970), appears before a contract is signed and happens whenever one of the parties has private and/or

confidential information before the exchange. Unlike the adverse selection problem, the moral risk problem appears after the contract is signed. The latter refers to the type of inefficient behavior in a contract, which arises from the different interests of the contracting parties.

Based on the whole context presented, agency theory focuses on the study of the contractual environment. According to this theory, the contracting parties (agent/director and principal/proprietor) will act trying to maximize their own interests, with the possibility of certain conflicts of interest arising between the parties (Ross, 1973; Jensen & Meckling, 1976; Watts & Zimmerman 1978, 1979). These conflicts would generate agency costs. The benefits of greater disclosure from companies with more intangible resources are expected to come from a reduction in agency costs, given the positive relationship between intangible resources (value of growth opportunities) and agency costs (Smith & Watts, 1992; Gaver & Gaver, 1993). From the point of view of Chan and Watson (2011), voluntary disclosure of information is an accounting choice made by management, therefore, agency theory may be adequate to explain these voluntary disclosure decisions in order to provide useful information to shareholders about the results of decisions made by management. In the same vein, Abhayawansa and Guthrie (2016) consider that such voluntary disclosure of information has resulted in a better fulfillment of the needs of investors by understanding corporate decisions.

Signaling Theory (Spence, 1973) demonstrates how agents in a market can use signaling to counteract adverse selection. In this sense, Spence (1973) differentiates between a signal and a simple informational fact. Such is the case of the difference between the gender of an aspiring employee and their education. Gender is information that does not provide significance in terms of its value; however, the level of education does provide a signal of difference between one candidate or another. Signaling theory seeks to solve the problem of asymmetric information in markets. In this sense, a communication strategy of clear and relevant information will allow to improve the knowledge of the organization so that the existing discrepancies between the values are reduced, when investors reduce their uncertainties relative to the company (Lang & Lundholm, 1993). The external communication of a company with the capital markets is crucial to facilitate the efficient allocation of assets and to increase the value of the company (Devalle, Rizzato & Busso, 2016). Regarding the expectations of emerging market companies, they generally voluntarily disclose information, in the absence of any mandatory disclosure requirement, in order to attract potential global stakeholders (Kang & Gray, 2011).

Proprietary Cost theory is based on the principle that the disclosure of information has costs for the owner. Costs for systematizing information and publishing it, in particular those relating to intangible resources, could lead to losses in competitive advantages, as they would be disclosing strategic information to their competitors. Therefore, the voluntary disclosure of information would have costs for the company (Verrecchia, 1983; Dye, 1986; Fishman &

Hagerty, 1989; Darrough & Stoughton, 1990; Wagenhofer, 1990; Lev, 1992; King & Wallin, 1995; Prencipe, 2004; Macagnan, 2007). These are costs such as: the collection of information, management, supervision, auditing, and legal fees (Cooke, 1989, 1992).

In this way, the research aims to define the probability of disclosure of intangible resources in companies. This is how explanatory variables are defined in relation to the financial and operational characteristics of organizations. Empirical studies have shown that the size or volume of assets, operating profitability, indebtedness, age, and growth of companies can explain their degree of disclosure of intangible resources.

Size has been found to be the most explanatory factor in the extent of disclosure of information concerning intangible resources. Carnaghan (1999); Gray, Javad, Power, and Sinclair (2001); Arvidsson (2003); Bozzolan, Favotto, and Ricceri (2003); Rodríguez (2004); García-Meca, Parra, Larrán, and Martínez (2005); Jones (2007); Yi, Davey, and Eggleton (2011); Vikalpa (2012); Fontana and Macagnan (2013); and Herrera and Macagnan (2016) confirmed size as an explanatory factor in the disclosure of information concerning their respective intangible resources. All these researches found a positive relationship between size and disclosure of information on intangible resources, with the exception of Jones (2007), who analyzed size through market value. In turn, Fontana and Macagnan (2013) analyzed the size of assets, finding a negative relationship between these variables. The size was not confirmed in Entwistle (1999); Williams (2001); Bukh, Nielsen, Gormsen, and Mouritsen (2004); and Hidalgo and Meca (2009). The first hypothesis is formulated:

H1. The volume of total assets in the evaluated companies is an explanatory characteristic for the disclosure of information on their respective intangible resources.

The profitability hypothesis, as an explanatory factor for the disclosure of information on intangible resources, was contrasted by the research done by Rodríguez (2004), Macagnan (2009), Vikalpa (2012), and Herrera and Macagnan (2016). The results found in these researches confirm the relationship between profitability and disclosure of information about intangible resources. The research by Rodríguez (2004), which contrasted profitability through return on assets (ROA) and return on equity (ROE), confirmed both variables as explanatory factors for the disclosure of intangibles with a positive relationship. On the other hand, the research by Herrera and Macagnan (2016) confirmed that there is a positive relationship between the return on assets (ROA) and the disclosure of information on intangible resources related to structural capital. The same research confirmed the ROE hypothesis with a negative relationship. Vikalpa (2012) had the same result by contrasting the profitability of the asset as an explanatory factor for the disclosure of information on intangible resources. On the other hand, the research by Macagnan (2009) found a negative relationship between ROA and ROE and the disclosure of intangibles. The following hypothesis is formulated as follows:

H2. The operational profitability of the organization influences the disclosure of information on their respective intangible resources.

The indebtedness hypothesis as an explanatory characteristic of the disclosure of information on intangible resources was contrasted by Williams (2001); Arvidsson (2003); García-Meca, Parra, Larrán, and Martínez (2005); Hidalgo and Meca (2009); Macagnan (2009); Vikalpa (2012); Fontana and Macagnan (2013); and Herrera and Macagnan (2016). For their part, Williams (2001), Macagnan (2009), and Fontana and Macagnan (2013) confirmed the positive relationship between indebtedness and the disclosure of information on intangible resources. While this hypothesis was not confirmed in the studies carried out by Arvidsson (2003), García-Meca *et al*. (2005), Hidalgo and Meca (2009), Vikalpa (2012), and Herrera and Macagnan (2016). Based on the above, the following hypothesis is presented:

H3. The level of indebtedness does not constitute a factor that influences companies to disclose information on their intangible resources.

The age hypothesis was confirmed by the researches carried out by Macagnan (2009) and Herrera and Macagnan (2016). The results of these studies confirmed the positive relationship between the years of incorporation of the company and the disclosure of information on intangible resources. This same hypothesis was not confirmed by the research carried out by Bukh, Nielsen, Gormsen, and Mouritsen (2004). Thus, the fourth hypothesis is:

H4. The age of companies increases the disclosure of information on their intangible resources.

The growth hypothesis was confirmed as an explanatory factor for the disclosure of information on intangible resources in the researches carried out by Rodriguez (2004) and Fontana and Macagnan (2013). Both researches confirmed the existence of a positive relationship between growth and the disclosure of information on intangible resources. For its part, the research by Herrera and Macagnan (2016) confirmed this hypothesis with a negative relationship, with the companies with the lowest growth revealing the most information about their intangible resources. The following hypothesis is put forward:

H5. Growth, measured by the variation in the volume of assets in the companies, increases the disclosure of information on their intangible resources.

Methodology

This study analyzes the level of disclosure of information on the intangible resources of the companies listed in the BVP through its online site. Sixty-one companies were analyzed, as well as the characteristics that motivate these companies to disclose such information. An index with 145 indicators was used to measure the disclosure of intangible resources, which were divided into five categories: Human Capital (HC), Structural Technological Capital (STC), Structural Organizational Capital (SOC), Relational Business Capital

(RBC), and Relational Social Capital (RSC). Thus, each indicator represents an intangible resource of the organization.

These indicators are based on the Macagnan Model (2007, 2009), which was integrated by 123 intangible resource indicators. For this research some of them were eliminated and new ones were included; finally, the model was comprised of 145 indicators. The same were used to calculate the level of disclosure of intangible resources built under a dichotomous perspective (Cooke, 1989, 1992; Camfferman & Cooke, 2002; Macagnan, 2007, 2009). For this research, **Equation 1** presents the Disclosure Index in j companies (ID_j), which is directly related to the sum of value (X) defined for each indicator (i) in each company (j) with each category. On the other hand, the ID_j has an inverse relation for the total indices in the category (l_c).

$$ID_J = \left(\sum_{i=1}^{l_c} X_{ij} \right) / l_c \ ; \ \{ \forall X = [1,0]; \ l_c = [\# \ of \ i \ for \ HC, STC, SOC, RBC, RSC] \} \qquad (1)$$

The data related to the indicators were compiled in a matrix for each one of the companies, which in turn made it possible to measure the disclosure of information in each category. For this purpose, the information published by the companies listed on the BVP on its website was reviewed in the third quarter of 2014. The information of the indicators was collected under the dichotomous approach, thus taking the value of 1 if the indicator was disclosed and 0 if it was not. The total sum of the indicator values for each company was then divided by the maximum number of indicators in each category. In this manner, the percentage of disclosure for each of the indicators was obtained. Figure 1 presents in detail the number of indices of the structure of Intellectual Capital (IC) according to its three components: Human Capital (HC), Structural Capital (SC), and Relational Capital (RC).
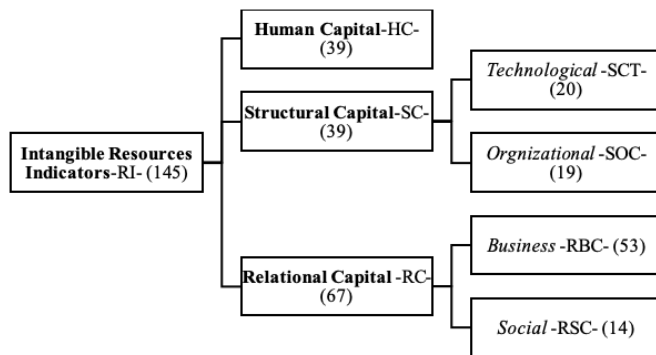

Figure 1.Indicators for each category in the disclosure of intangible resources

Source: Own elaboration.

In order to empirically validate the hypotheses on the disclosure of information of these companies, binary choice models were proposed for the components of Human Capital (HC), Structural Capital (SC), and Relational Capital (RC). Cameron and Trivedi (2005) develop the theoretical approach of the model where the dependent variable can take two values, as follows:

$$y = \begin{cases} \textbf{1} \text{ with probability } p \\ \textbf{0} \text{ with probability } 1 - p \end{cases}$$

In this manner, the regression model seeks to predict the conditional probability of the dependent variable with respect to an independent or regressing variables vector, as shown in **Equation 2.** Depending on the probability function used, the model will be Logit (logistic probability distribution) or Probit (normal probability distribution).

Probability in a binary selection model

$$p_i \equiv Pr[y_i = 1| x] = F(x'_i \beta) \tag{2}$$

In this research, with the quarterly reports presented by the companies listed in the BVP, corresponding to the fourth quarter of 2016, the following variables were explored: 1) regarding assets – their value, range to classify the companies, profitability, and growth rate; 2) regarding equity – its value, range, and profitability; 3) regarding indebtedness – its level and range; 4) the seniority in years of each company; 5) the growth in function of the assets, measured as the exchange rate of these assets.

Results

In this section we present the results obtained in this research. The descriptive statistics and the construction of the explanatory variables are shown. These variables were treated for sixty-one companies that are listed in the BVP. They were constructed with the explored indicators related to Figure 1. After that, the analysis of the binary selection models is shown, which determines the probability of disclosure of the intangible resources.

Descriptive Statistics

The development of the results was carried out with the variables presented in Table 1. It shows that on average the companies listed in the BVP have 1.5 billion in assets, 2.6 billion in equity, and 1.38 billion in pre-tax results, all expressed in dollars. In relation to the indicators

that denote profitability, it is evident that on average companies achieve a profitability of 8.17% for the capital of investors. In the same sense, the capacity of average remuneration of the companies to the sources of financing is 1.92 times in relation to the profit before taxes. On the other hand, the average level of indebtedness is 74.89%. Similarly, on average, companies have a market presence of approximately 28 months.

Table 1

Explanatory variables related to the accounting information of the company and its constitution

Variable	Definition	Descriptive Statistics
Volume of assets	Corresponds to the amount of assets in monetary units that the company has disclosed in its accounting information.	Mean = 1.50e+09 Deviation = 4.29e+09
Volume of equity	Corresponds to the equity in monetary units that the company has disclosed in its accounting information.	Mean = 2.61e+08 Deviation = 1.04e+09
Profit before taxes	Corresponds to the result in monetary units obtained by the company at the end of the period of analysis, before taxes.	Mean = 1.38e+07 Deviation = 3.34e+07
Return on assets	This is the relation between the profit before taxes and the total volume of assets (ROA)	Mean = 1.92 Deviation = 4.34
Return on equity	This is the relation between the profit before taxes and equity (ROE)	Mean = 8.17 Deviation = 15.76
Level of indebtedness	This is the relation between the volume of assets and liabilities.	Mean = 74.89 Deviation = 27.81
Seniority of the organization	References how long (measured in months) the company has been operating in the market.	Mean = 27.82 Deviation = 22.58

Source: financial information of the companies listed in the BVP as of the last quarter of 2016. Own elaboration.

Due to the level of dispersion presented by the financial information data, they were classified by ranks, thus, 75.41% have assets below 1 billion, the equity level in 68.85% of the observations is less than 500 million, with 86.89% of the companies having less than

30 million in profit before taxes. Regarding the level of indebtedness, 62.30% of companies have a level higher than 75.00%. On the other hand, with respect to seniority, 96.72% of observations are less than 80 months old.

Respect to the variables explained, 70.49% of the companies reveal some type of human capital. In relation to structural capital, there is a high level of disclosure, in the case of technological capital, it is 93.80%, and in the case of organizational capital, it is 94.44%. In the case of relational capital, the degree of disclosure is different for that of business capital, with it being 98.36%, while the social capital corresponds to 42.62%. Therefore, the disclosure of structural capital and relational business capital exceeds 90.00%, in the case of human capital the disclosure is of approximately two thirds, while for the relational capital it is less than 50.00%.

Regarding the structure of the data, the dependent variable that indicates the disclosure of structural capital shows that companies have a disclosure above 92.00%. Thus, it follows that these organizations disclose this type of information regardless of their volume or variation in assets, operating profit, level of indebtedness, or seniority in the market. It seems that the mere fact that companies are listed in the BVP is a determining factor to make the disclosure. In this case, it is not conducive to the development of a model that measures the probability of disclosure. In this sense, it is not possible to infer the same from human and relational capital; therefore, the measurement must be made, which for this investigation will be by means of binary choice models that show the probability of disclosure of this information given the information of assets, equity, operational utility, indebtedness, and seniority.

Results of the binary choice models

Once the dependent variables to be explored with the binary choice models have been defined after observing the structure of the data, different combinations of explanatory variables are tested, finding two models where those variables were significant. Thus, the models are defined according to **equation 3 and 4**. The variables dependent on disclosure of Human Capital (DHC) and Relational Capital (DRC) correspond to whether the information disclosed by each company on each of the components of Intangible Resources (IR) exists. From the total of explanatory variables, we selected: range of seniority (R_Ant), range of equity (R_Util), range of indebtedness (R_End), asset growth rate (C_Act), and the value of total assets with a logarithm (Ln_Act). As well as binary variables on human capital (D_RCH) and social relational capital (D_RCRS).

$$RCH = \beta_1 + \beta_2 R_{Ant} + \beta_3 R_{Util} + \beta_4 Ln_{Act} + \beta_5 D_{RCRS} + \mu \qquad (3)$$

$$RCR = \beta_1 + \beta_2 R\_Util + \beta_3 C\_Act + \beta_4 D\_RCH + \mu \qquad (4)$$

Probabilistic and logistic models were simulated, using equations 3 and 4. Although their predictive capability and probability distribution are similar between the two models, according to Tables 2 and 3, using Akaike's information criteria (AIC) and the Bayesian information criterion (BIC) that provides the best goodness of fit of the model, it is possible to ensure that the Probit model has a better predictive capability to determine the probability of disclosure on human capital and relational capital, as determining elements in the disclosure of intellectual capital.

Table 2

Selection Criteria for the type of model for Human Capital

Variables	Logit	Probit
R_Ant	0.44848911*	.83785258*
D_RCRS	1.2110458**	2.1850384**
R_Util	-.29483231	-.49325988
Ln_Act	0.72401071*	1.1471177*
_cons	-5.6681009**	-9.1244106**
n	61	61
AIC	64,424691	64,342214
BIC	74,979061	74,896583

 * p<.1; **p<.05; *** p<.01

Source: own elaboration based on the results obtained from the Stata Software.

Table 3

Selection criteria for the type of model for Relational Capital

Variable	Logit	Probit
D_RCH	1.5159498***	2.6357112**
R_Util	0.54856493***	0.92059495***
C_Act	0.0097309*	0.01690901
_cons	-3.1035698***	-5.3461881***
n	61	61
AIC	57,66851	57,622958
BIC	65,812006	66,066454

* p<.1; **p<.05; *** p<.01

Source: own elaboration based on the results obtained from the Stata Software.

The marginal effects of each model are presented in Table 4, the first part shows the results of the model on the disclosure of human capital, represented in Equation 3 with a predictive capability of the model of 77.69%. The other part of the table shows the results of the relational capital disclosure model, represented by Equation 4 with a predictive capability of 61.02%. For both models, regressing variables that have a statistical significance of less than 0.1 are selected.

In this manner, in the disclosure of human capital, Table 4 shows that a 1.00% increase in the logarithm of total assets represents an increase of 21.60 percentage points (pp) of the probability that the company will disclose information about this type of capital. Likewise, each year of seniority for the company encourages the disclosure of this information by 13.38 pp. Additionally, this provided evidence that companies with more than 20 months of market presence tend to disclose more information than those that have been present for a shorter amount of time. Similarly, companies that have disclosed social relational capital increase the probability of disclosing human capital information by 33.03 pp. Conversely, the range of utility does not affect the disclosure of human capital.

Table 4

Marginal effects of the Probit model in equation 3

Variables	dy/dx		Std. Err.	[95%	C.I.]	X
			Disclosure of Human Capital			
R_Ant	0,1338601	*	0,07626	-0,015599	0,283319	1,88525
D_RCRS*	0,3303909	**	0,2538	0,084659	0,576122	0,42623
R_Util	-0,1879983		0,0685	-0,222256	0,046259	3,08197
Ln_Act	0,2160947	**	0,11644	-0,012118	0,444308	8,25519

Source: own elaboration based on the results obtained from the Stata Software.

On the other hand, the results on the disclosure of relational capital are shown in Table 5 where the companies with a higher level of utility increase the probability of disclosure of this type of capital by 21.32 pp. Thus, entities with a range of utility between 10 and 30 million dollars disclose more information in this regard. Also, those organizations that achieve a higher rate of asset growth increase their probability of disclosing information on relational capital by 0.3 pp. Another factor that affects the disclosure of this capital is the disclosure of human capital, thus disclosing it increases the probability of disclosure of the relational capital by 48.96 pp.

Table 5

Marginal effects of the Probit model in equation 4

Variables	dy/dx		Std. Err.	[95%	C.I.]	X
		Disclosure of Relational Capital				
D_RCH*	0,4896465	***	0,13037	0,234121	0,745172	0,70492
R_Util	0,2132809	***	0,05971	0,096251	0,330311	3,08197
C_Act	0,0037834	*	0,00225	-0,000622	0,008188	1,20567

Source: own elaboration based on the results obtained with the Stata software.

Discussion

Both descriptive and model results were intended to find the relationship between the disclosure of the components of intellectual capital. Regarding human capital, it was confirmed that both the increase in the volume of assets, the years of permanence in the market, and the disclosure of relational capital directly affect the disclosure of human capital. On the other hand, concerning the disclosure of relational capital, the greater operational utility and greater growth in assets indicate that there is a greater probability of disclosure of this capital. With respect to structural capital, it was evidenced that the level of disclosure is high, regardless of the volume of the assets, seniority, or the profit range before taxes.

In this order, it can be deduced that the hypotheses were tested, although not for each of the components of intellectual, structural, or relational capital, if they were confirmed when analyzed together. The first hypothesis (H_1) on the volume of total assets was confirmed, since for each IC component it is shown that the larger the assets, the greater the probability of disclosure of information on that capital. This result is consistent with the results of Carnaghan (1999), Fontana and Macagnan (2013), and Herrera and Macagnan (2016).

In the same sense, hypothesis (H_2) proved that with a greater range of operating profit there is a greater probability of disclosing the IC. This result is consistent with the studies of Vikalpa (2012) and Herrera and Macagnan (2016). It is worth noting that, although for the revelation of human capital the range of utility is not significant, it is for relational and structural capital; the most striking thing is that the companies that disclose the most IC as consequence of the operational level of utility have a medium range of utility. In this way, it is inferred that companies with average results seek to emphasize their IC as a competitive advantage.

In this same vein, hypothesis (H_3), which addresses the level of indebtedness, is confirmed

because it was not statistically significant in any of the models analyzed. Thus, indebtedness is not a factor affecting IC disclosure in companies. This result is in the same line as the studies by Arvidsson (2003), García-Meca *et al*. (2005), Hidalgo and Meca, (2009), Vikalpa (2012), and Herrera and Macagnan (2016), which found no significance for this variable.

On the other hand, the age of the company underlying hypothesis (H_4) is accepted. Companies that have been in the market for longer tend to reveal more information, specifically about their IC. One possible reason is that companies strengthen their position in the market and in mature stages of their life cycle, revealing information allows them to show their management and redirect themselves towards new market niches. This result is consistent with the findings of Macagnan (2009) and Herrera and Macagnan (2016).

Finally, hypothesis (H_5), which addresses the growth of the company by its volume of assets, was confirmed and it is in line with Rodriguez (2004) and Fontana and Macagnan (2013). For growing companies, it is relevant to show information of their IC because they reflect greater insertion in the local, regional, and international market. In this way they manage to generate confidence in the public, especially in financial resource facilitators such as investors, lenders, or suppliers.

Conclusions

The structure of the companies listed in the BVP by their level of assets, equity, profits, indebtedness, and seniority showed that the disclosure of information on intellectual capital is a relevant factor, which coincides with the study by Chan and Watson (2011), who analyzed the disclosure of voluntary information in companies inserted in emerging markets. The disclosure of such information could be motivated by an increase in the number of clients.

When analyzing each component of Intellectual Capital (IC), the greater the volume of assets and the seniority of the company, the greater the probability that there will be disclosure of information about Human Capital (HC). Organizations that achieve higher operating profit and higher asset growth rates increase the probability of disclosing information about Relational Capital (RC). These results prove the assumptions of agency theory (Jensen & Meckling, 1976), which states that the larger the size of the company, the greater the disclosure of information.

The hypothesis on the level of indebtedness showed that this factor is not a determining factor in the disclosure of information on Intellectual Capital (IC). In this sense, it can be deduced that the IC relationship depends on the size of the company and its seniority in the market. Under this perspective, there is no explicit disclosure of information, on the contrary, it is implicit. This seems to indicate that proprietors understand that the voluntary disclosure of information increases the costs to the pro-

prietor and generates possible losses of competitive advantages, thus confirming the assumptions of proprietary cost theory.

Finally, the disclosure of IC is conditioned by the high volume of disclosure of EC. Therefore, the indicators of this type of capital are considered the heart or central part of the company, which is a point of comparison generally accepted by the market, this being: statement of the organizational culture, history and evolution of the company (years of constitution), and the basic strategic line. However, it is pertinent to reveal IC information under the perspective that will serve to improve the position in the market for its transparency, breaking with the approach of proprietary cost theory. To a lesser extent, the disclosure of IC is conditioned by the disclosure of RC and HC, respectively.

This research is limited to the voluntary disclosure of information on intangible resources shown on the website of the companies listed in the BVP. Other means of collecting information such as the annual report, bulletins, and others that might provide more information of this type are not considered. The obligatory information presented by these companies as a means of comparison between the information required by legal regulations and that which is voluntarily offered to the market is also not reviewed. Given that the information presented corresponds to the website of the companies, it is not possible to make a comparative analysis of the information presented in different periods.

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