The Explanatory Value of the Elements of Intellectual Capital on Wellbeing
A Study on Employees of a Central City in Mexico

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Abstract

Wellbeing is a topic that has been addressed from different perspectives for their contribution to the development of a harmonious environment. Meanwhile, intellectual capital has become important because it has been envisioned as a source of competitive advantages in organizations and nations. This study aims to explain the contribution of the elements of intellectual capital on wellbeing perceived by employees of a city in central Mexico. For this, a data collection instrument with 49 questions about the dimensions of the two study variables, was developed and applied to 1256 employees. Human, relational and structural capital, were analyzed as explanatory values on wellbeing through analysis. It was found that the three elements have a significant explanatory value on wellbeing, but structural capital is the element with most weight, even though several studies indicate that human capital should be.

Keywords: intellectual capital, wellbeing, multiple linear regressions

1. Introduction

In the emerging knowledge economy, intellectual capital arises as a competitive advantage in organizations and nations. Its main source is the knowledge of people, but also the lasting relationships and intangible infrastructure that enable the dissemination of knowledge and the development of the individual and the organization. Intellectual capital has become important because it has been envisioned as a key factor in the development of innovations, technological capabilities and value creation (Mercado & Cernas, 2013) for the organization and its environment. Recognizing that people develop professionally and personally in organizations, we can visualize their role in the wellbeing of its collaborators.

Some international organizations have taken on the task of explaining what wellbeing is and its importance. The New Economic Foundation (Jeffrey, Abdallah, & Michaelson, 2008) explanation outstands, indicating that wellbeing is a dynamic state where a person can be potentiated by building strong, positive relationships and contributing to their community. From this, individuals and societies can achieve their goals with a social sense. Wellbeing can give us an environment of greater peace and potentiality. Following the definition of the New Economic Foundation, wellbeing is generated personally and somewhat subjectively. It may be enhanced and spread if there is an environment of security, justice and trust that largely corresponds to governments.

Recently the Organization for Economic Cooperation and Development (OECD, 2013) published a number of documents referring to wellbeing. One of them explains that to generate sustainable wellbeing over time, there must be a base of natural capital, economic capital, human capital and social capital. On the relationship of relational capital with wellbeing, Sveiby (1997) states, that the values of the relations of the organization influence the members of the organization and its sense of belonging to it.

As for the relationship of structural capital with wellbeing, Vigoya (2002) shows working conditions and wellbeing are related. Its main contribution is to demonstrate the importance of joint programs and benefits that are structured in the organization for the professional growth of the individual, because it constitutes a key element in a company and therefore, the social environment. Although there are some studies that show the link between the elements of intellectual capital or the dimensions of wellbeing, no studies linking intellectual capital to wellbeing were found. Therefore, this study aims to explain the contribution of the elements of intellectual capital on wellbeing perceived by employees of a city in central Mexico.

To achieve this, each variable and its dimensions are analyzed, as well as the relations exposed in some studies, before continuing with the explanation of the research methodology, analysis of results and a final discussion.

2. Theoretical review

2.1 Intellectual capital

For this study, the intellectual capital is defined as the set of knowledge, experience, professional skills (human capital), organizational technology (structural capital) and relationships (relational capital) (Edvison and Malone, 1997) that originate due to use of intellect and can help to generate benefits for society, becoming the key to building the new business and work culture within the knowledge economy (ECLAC, 2007).Intellectual capital can be a source of competitive advantage in any organization and society itself, as long as it is known and taken advantage of it (Sveiby, 1997). To achieve this, it is necessary to recognize value, promote and manage it, identifying its elements and indicators (Rivero, et al., 2005).

However, one of the problems to recognize intellectual capital is that much of this cannot be quantified (Edvinsson & Malone, 1997), there forein some studies there have been made proposals to recognize the benefits of this intangible. Among the most influential are the Brooking (1997) models, the Monitor Intangible Assets (Sveiby, 1997), the Skandia Navigator (Edvinsson &Malone, 1998), the Intellect Model (Euroforum, 1998), the Balanced Scorecard (Kaplan and Norton, 2000) and the Intellectual Capital Index (Pike, Ross &Marr, 2005).These studies consider the interaction and influence of intellectual capital with all or some of the strategic areas of the organization, which entails a synergy from its three basic elements: human capital, structural capital and relational capital. Edvinsson and Malone (1997) recommend that to measure the intellectual capital, the purpose to do so must be clarified. In the case of this research it is to analyze its relationship with the perceived wellbeing. The elements of intellectual capital and its dimensions are specified in the following table.

Table 1: Elements and dimensions of intellectual capital

Element	Definition	Dimensions
Human capital	"... The knowledge, skills and other attributes possessed by individuals and that are relevant to economic activity ...."(OECD: 1998).	Abilities
		Competencies
		Skills
		Values
		Knowledge
Relational capital	Links that allow the permanence and growth of the organization (Ordoñez de Pablos, 2003). Value generated by the relationships of a company (Edvinsson & Malone, 1997).	Relationship with community
		Prestige
		Relationships within the organization
Structuralca pital	Organizational structure that supports the productivity of employees (Edvinsson & Malone, 1997).	Leadership
		Working environment
		Organization chart
		Systems and manuals

Source: Self-prepared based on analyzed studies

2.2 Wellbeing

Wellbeing is a subject that has interested different areas of knowledge for its importance in maintaining a harmonious environment with greater opportunities for growth. Therefore, there is a constant rise of new models that pretend to give certain parameters (and measure them) to achieve the general wellbeing of the population. One of the first proposed measures is the index of sustainable economic wellbeing, which comes with the intention of replacing GDP as a purely economic indicator that only measures a given space.

This proposal considers the personal consumption, but also integrates economic, social and environmental variables (Atkinson, 1995).Another proposal derived from the paradigm of economic development is the proposed by the OECD through the Commission on Sustainable Economic Development that suggests measuring the economic development in terms of sustainable development achieved in a region or country, considering the effects and damage to the environment (Schuschny & Soto, 2009).The most valuable contribution of these projects is the recognition of the interaction of economic, social and environmental factors, under an integral and systemic vision, that can assure a present and a future in the medium term with the same or better conditions.

One of the latest indicators that have been made with an integral approach to the performance of the factors involved on general wellbeing in the regions and nations, is the index of social progress (Stern, Wares, Orzell & O'Sullivan, 2014), which unlike others, it recognizes that the factors involved are generated in a holistic manner, focusing on non-economic aspects of the regions. For the authors, social progress is the ability of a society to establish structures to enable their citizens and communities improve their quality of life to their full potential, and they establish three large blocks that include similar concepts to economic, social and personal wellbeing.

The last of the indicators analyzed in this work is the index for a better life, which is an initiative of the OECD (2011). It collects international indicators on 11 specific aspects of wellbeing: housing, income, employment, community, education, environment, civic engagement, health, life satisfaction, safety and work-life balance and two transversal aspects (sustainability and inequalities).

So wellbeing is achieved by the interaction of a set of factors that a person or group of people need to achieve quality in all the roles of life. This contributes necessarily to create an environment of tranquility and satisfaction. According to the studies reviewed, wellbeing is comprised as follows:

Table 2: Elements and dimensions of wellbeing

Elements	Definition	Dimensions
Economic factors	Factors that allow the individual to satisfy basic needs	Housing
		Income/Savings
		Expense
Social factors	Factors that can generate in the community an environment (immediate and local) of certainty and support	Immediate environment
		Civicengagement
		Local environment: education, health, safety
		Environmental education
Personal factors	Rather intrinsic factors that deal with personal perception of life, including interrelations	Personal relations
		Introspection
		Work-life balance

Source: Self-prepared based on analyzed studies

2.3 Intellectual capital and wellbeing

In 2013, the OECD published a series of documents that refer to wellbeing. One of them explains that to generate sustainable wellbeing over time, there must be a base of natural capital, economic capital, human capital and social capital (OECD, 2013).The OECD recognizes human capital as the platform from which it can generate a sustainable and lasting wellbeing. However, within organizations, relational capital and structural capital are necessary so that human capital can be developed and enhanced. In this regard, the OECD (2013) conducted a survey within member countries in which it determined that Mexico was one of the countries with slower growth on wellbeing, obtaining the lowest scores of the OECD on four indicators that have to do with people and performance in organizations: education and competencies; work and wages; income and wealth and work-life balance. The effects of the crisis have been present especially on labor issues: the decline in employment and the deterioration in labor market conditions have affected practically all the elements of wellbeing.

For Becker (1983), a higher educational level is the starting point of a process of accumulation of skills, abilities and other knowledge that support the increase in productivity and of course, more likely the possibility to improve the perception of wellness. For the International Labor Organization (Ibarrola, 2007), education is an essential good for the individual and for society as a whole; as it broadens the possibilities of action and choice of individuals on issues that support them to obtain better living conditions leading to greater individual and collective wellbeing.

The educational level may influence the perception of wellbeing. But there are other studies that explain that there are other dimensions of human capital that have also a major impact. In Mexico, informal education and a sense of belonging have an important influence on subjective wellbeing (Carballeira Gonzalez & Marrero, 2015) since they belong to a collectivist culture where the good of the group is more important than the individual good. Sveiby (1997) states that the value of the relations of the organization influences the members of the organization, and its sense of belonging to it.

Other studies support this view, as the one made by De Santis and Villagra (2014), who found that the economic wellbeing and relationships of individuals, can determine the health and subjective wellbeing. As for the relationship of structural capital with wellness, Vigoya (2002) shows the relationship between working conditions and wellbeing. Its main contribution lies in discovering the importance of joint programs and benefits that are structured in the organization for the professional growth of the individual, because it constitutes a key element in a company and therefore, the social environment.

Another key element of structural capital is the functioning of the organizational structure. When this allows a more fluid communication between the boss and the employee, wellbeing can be increased. The topics that are related to intellectual capital and wellbeing are vast and varied. In the studies analyzed in this research the link of one or more of the elements of intellectual capital or any of its dimensions with wellbeing is demonstrated, but being such a broad topic, there are no studies linking capital.

3. Methodology

The knowledge economy demands that people are more prepared and qualified. In this vein, the OECD (2011) has demonstrated in several studies that human capital is a key factor not only to achieve higher levels of competitiveness, but also for a better quality of life and wellbeing. Additionally, other studies have examined the relationship of the dimensions of social capital and wellbeing, as well as the relation of social capital to wellbeing, and leadership with the wellbeing of employees. Taking the ideas above, to reach intellectual capital as a real advantage in organizations and a lever to wellbeing, this study aims to explain the contribution of the elements of intellectual capital on wellbeing perceived by employees of a city in central Mexico, through a multiple linear regression analysis.

Based on the studies reviewed, the following research model was established:

Figure 1: Hypothetical research model
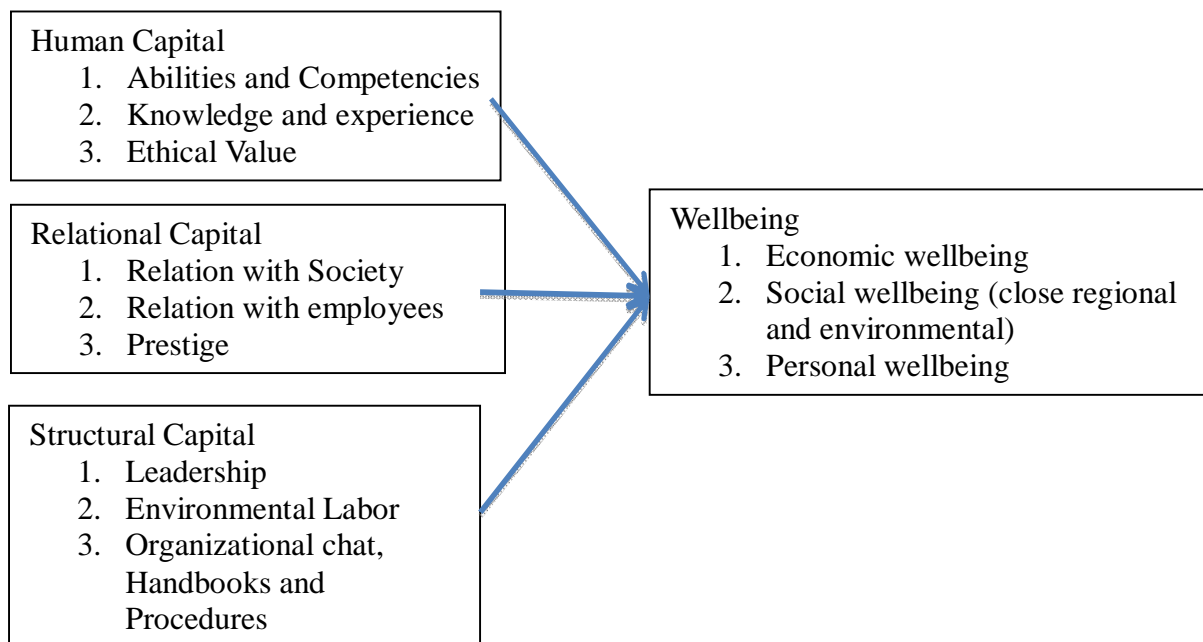
Source: Self-prepared based on analyzed studies

The following research hypotheses were deduced from the hypothetical model:

H1: The human, relational and structural capitals have a significant explanatory value on the wellbeing perceived by employees of a city in central Mexico.

H2: Human capital has a higher explanatory value than the relational and structural capitals on the perceived wellbeing.

To achieve the goal and demonstrate the hypothesis, a field research was made with a data collection instrument based on intellectual capital questionnaires of Bontis (1998) and Ferreira (2010) as well as with wellbeing indicators proposed by the OECD (2011).The data collection instrument was developed based on the constructs of operational definitions of human, relational and structural capital (independent variables) and wellbeing (dependent variable). All questions were measured with a Likert scale of five points. The instrument was validated by a panel of three experts. To verify the internal validity of the instrument a pilot test to 25 people was applied. From Cronbach's alpha reliability analysis, some questions were removed and several others re-structured. With this, the final instrument was composed of 49 items. A quantitative research was conducted using statistical analysis. The research is correlational and applied: from research on the topic, the hypotheses were developed and statistical calculations served as the basis of the results discussion.

The research is transactional, making the collection of data in May 2015. A non-experimental design was used without performing any manipulation of variables, merely observing phenomena, for further description and analysis of the findings (Kerlinger & Lee, 2002).The economically active occupied personnel of the city of Toluca were considered as study population. According to the latest data of the Mexican National Institute of Statistics and Geography (INEGI, 2010),it amounted to 338.753 people. The calculated sample size was 788 people, with a confidence level of 99.5% and a maximum acceptable error of 5%. The sample was not random, because respondents were volunteers who agreed to answer; therefore 1600 questionnaires were collected, from which 344 were eliminated because they had inconsistencies in their answers or not all the questions were answered. With this, a base of 1256 questionnaires was considered, which represents more than 56% of the sample calculation.

For the data analysis and calculation of linear regression, statistical calculations were performed using SPSS Statics 20.0 software.

4. Results

In order to test for the normal distribution of response data, a Kolmogorov-Smirnov (K-S) test for all dependent and independent variables was conducted. All of the items were confirmed to be normally distributed. Cronbach's alpha was used to test the reliability of the measures. The Cronbach's alpha results for this study ranged between 0.68 and 0.88. The table 3 shows the Cronbach's alpha results.

Table 3: Cronbach's alpha results

Element	Items	Cronbach'salpha
Human Capital	8	0.82
Relational Capital	8	0.83
Structural Capital	7	0.85
Economicwellbeing	3	0.69
Social wellbeing (close)	7	0.75
Social wellbeing (regional)	7	0.88
Social wellbeing (environment)	4	0.78
Personal wellbeing	5	0.68

Source: Self-prepared with SPSS 20.0 results

For the validity of the instrument an exploratory factor analysis (EFA) was conducted with varimax rotation with Kaiser Normalization. All variable and sub-variable items were confirmed valid since their factor loading values were more than 0.4.The results reflected the existence of some questions that explain better other elements of intellectual capital and wellbeing.

Table 4: The exploratory factor analysis results

	Structural Capital	Human Capital	Social wellbeing (Civic commit-ment)	Social wellbeing (regional)	Personal Wellbeing	Social wellbeing (close)	Economic Wellbeing	Relational Capital Exogenus	Relational Capital Endogenus
Abilities	.102	.638			-.104			.153	-.114
Creativity	.123	.662	.114						
Home education	.164	.666			.126		-.115	.111	-.114
Attitudes	.147	.650							.152
Learning	.134	.626							.261
Expertise	.121	.720							.157
Moral standard	.159	.691				.151			
Knowledge	.225	.297	.118				.125	.704	
Society relation	.274	.271	.121	.123				.649	
Reliability	.199	.381				.244		.386	.303
Prestige	.253	.335		.109		.220		.299	.264
Relation	.315	.393			.133			.142	.456
Communication	.290	.414				.145	-.100		.475
Coexistence	.476	.329		.103		.112		.139	.321
Responsibility	.437	.309				.212		.212	.286
Socio-emotive support	.468	.284				.241	.102		.261
Leadership	.702	.178	.120		.110				
Satisfaction	.646	.218				.154	.189		
Chiefrelation	.634	.273				.167	.110		
EvaluationSystem	.723		.106	.117			.110	.134	
Teamwork	.702	.103			.155				
Hierarchy	.722	.116		.142				.119	
Handbooks&Procedures	.646		.159	.112				.178	
Expenditure	.200	.122			.141		.812		
Saving	.234		.191	.132	.213		.720	.173	
Credit			.359	.224	.150		.466		-.108
Friendssupport	.117				.149	.615	.136		.143
Economicsupport	.176		.230	.108	.105	.608	.115		-.105
Emotionalsupport	.134	.248			.116	.683			.134
NGOpersonalsupport	.106		.661	.210		.329			-.303
NGOenvironmental support			.675	.211	.168	.282		.173	-.256
Voluntaryworker	.149		.656	.226	.145	.273			-.180
Governmentsupport			.206	.698		.129			-.116
Education				.776		.186			
Worksupport	.141		.138	.807					
Patrimonysupport	.135		.190	.775	.122		.105		
Services	.110			.752					.148
Environment			.332	.613		-.110	.219		
Security		-.195	.439	.514	.201	-.130	.231	.217	
Recyclable culture	.127		.544	.141		.145	.138	.119	.279
Naturecare			.671						.371
Watercare			.771	.151	.132				
Cleaner	.110		.785	.199	.105	-.103	.135		
Friendstime		-.164	.257	.127	.573	.170	.186		
Familytime	.147		.265	.139	.553		.153	.147	
Socialmediatime			.110		.602	.202	-.138	.220	
Spare time				.156	.696		.121	-.120	
Hobbiestime	.131				.574	.185	.227	-.115	.215
Extraction Method: Principal component analysis. Rotation Method: Varimax with Kaiser Normalization. The rotation converged in 8 iterations									

Cronbach's alpha was recalculated to ensure the validity and reliability of the instrument. The results showed satisfactory levels of reliability (between 0.68 and 0.88) as shown below.

Table 5: Cronbach's alpha results with EFA modifications

Element	Original Model		EFAModifications		Modifications
	ITEMS	Cronbach's Alpha	ITEMS	Cronbach's Alpha	
Human Capital	8	0.819	8	0.821	CH8 is eliminated and CR11 added
Relational Capital	8	0.825	5	0.742	CH8 is added, CR11 and from CR14 to 16are eliminated
Structural Capital	7	0.852	10	0.875	From CR14 to CR16 are added
Economic wellbeing	3	0.689	3	0.689	Without change
Social wellbeing (close)	7	0.753	3	0.632	Moved to social wellbeing(civic commitment) from BS35 to BS37
Social wellbeing (regional)	7	0.875	7	0.875	Without change
Social wellbeing (Civic commitment)	4	0.783	8	0.863	From social wellbeing (close) BS35 to BS37 are added to social wellbeing (civic commitment)
Personal wellbeing	5	0.677	5	0.677	Without change

Source: Self-prepared with SPSS 20.0 results

From these modifications, human capital, relational capital, structural capital and wellbeing variables were calculated.To observe the possible relationships between variables, Pearson's bi-variate correlation coefficient was used. It tested the relationship between independent and dependent variables. The result showed that the human capital, relational capital and structural capital have relation with the wellbeing.

Table 6: Pearson's bi-variate correlation

	Human Capital	Relational Capital	Structural Capital	Wellbeing
Human Capital	1	.648[**]	.510[**]	.142[**]
Relational Capital		1	.630[**]	.243[**]
Structural Capital			1	.332[**]
Wellbeing				1

** The correlation is significative to the level 0,01 (bilateral).

Source: Self-prepared with SPSS 20.0 results

The correlation matrix also indicates significant correlations between elements of intellectual capital. One of the basic principles to analyze a multiple linear regression is that predictive values cannot be strongly correlated among them, since the results can be inflated by the effect between these values. Therefore, it was necessary to verify that the selected indicators did not present collinearity problems (Levy et al., 2003), to avoid being redundant.

Partial correlations between human, relational and structural capital were analyzed assessing the explanatory level of the scores of each of the variables, measuring the relationship between the two variables and eliminating the influence of the other.

Table 7: Partialcorrelation

	Pearson correlation	Eliminating the effect of			Partial correlation
		Human Capital	Relational Capital	Structural Capital	
Human Capital and Relational Capital	0.648			X	0.490
Human Capital and Structural Capital	0.510		X		0.171
Relational Capital and Structural Capital	0.630	X			0.457

Source: Self-prepared with SPSS 20.0 results

The partial correlation between human capital and relational capital continued with a large absolute value, for it only decreased by 24% in percentage terms. Similarly, the partial correlation between structural capital and relational capital retained a large absolute value, decreasing only by 27%. As for the partial correlation between human capital and structural capital it considerably decreased its value against the bivariate Pearson correlation. This may indicate a problem of collinearity between these elements.

Therefore, collinearity indicators were analyzed in the calculation of the multiple linear regressions.

The multiple linear regression equation was determined as follows:

Wellbeing= β_0 + β_{HumanC} Human Capital + $\beta_{RelationalC}$ Relational Capital + $\beta_{StructuralC}$ Structural Capital + U
Where U= variation for strange variables to the model

The multiple linear regression analysis with stepwise method was performed to determine which variables have more explanatory value on wellbeing. Human capital, structural capital and relational capital were considered as independent variables. The model with greater explanatory value involves the three elements of intellectual capital, as shown below.

Table 8: Multiple linear regression indicators considering wellbeing as dependent variable

Predictive variables	R	R^2	F	Sig	K	Non-standardized coefficients β			Std Coef	Collinearity statistics	
						Human Capital	Relational Capital	Structural Capital		Tolerance	IVF
Structural Capital	0.45	0.202	317.3	0.000	1.507			0.236	0.45	1.000	1.000
Structural Capital and Human Capital	0.46	0.210	166.8	0.000	1.790	-0.114		0.488	0.50	0.740	1.351
									-0.11	0.740	1.351
Structural, Human and Relational Capital	0.48	0.228	123.3	0.000	1.669	-0.207	0.204	0.411	0.42	0.586	1.707
									-0.19	0.563	1.778
									0.20	0.458	2.181

Source: Self-prepared based on the calculation of step wise multiple linear regression SPSS Statics 20.0

Collinearity indicators were acceptable, considering that the IVF (Inflation Variance Factor) is less than 10 in all cases and the tolerance index was less than 1,000 in all cases (García, Chagolla & Noriega, 2006).As for the significance levels, in all cases were also acceptable, as the level of significance F shows great values and the indicators of significance (SIG) were very small. Involving all elements of intellectual capital, calculated multiple linear regression showed an R^2 of 0.228, that is 22.8% of the variability of wellbeing is explained by human capital, structural capital and relational capital. The multiple linear regression equation that has greater explanatory value is Wellbeing =1.669 -0.207 Human Capital+ 0.204 Relational Capital + 0.411 Structural Capital +U.

With this finding the Hypothesis 1 is accepted. The standardized coefficients of the equation show the relative importance of each independent variable. For structural capital, the standardized coefficient is 0.42, for human capital is -0.19 and for relational capital is 0.20. From these it is determined that the structural capital is more important in the regression equation and therefore has a greater explanatory value. With this, Hypothesis 2 is rejected, because the structural capital has a greater explanatory value than human capital.

5. Discussion

Intellectual capital has been envisioned as a source of competitive advantage in organizations. However, with the findings of this study, it should also be seen as a source of widespread wellbeing in organizations and its immediate environment. Most wellbeing studies consulted indicate that human capital is a key element for its generation, since it makes reference that a higher degree of preparation helps raising awareness on wellbeing. However, this study showed that although it has a significant explanatory value, it is not essential in the Mexican context. This may be due to the living conditions in Mexico, for many people with a university degree do not find a job that allows them to develop their potential, either because the daily activities do not match their studies or the job has a lower than expected remuneration. The sign of the linear regression equation supports this affirmation: the more human capital (knowledge, skills, abilities, etc.) the lower perception of wellbeing in Mexico. The element of intellectual capital that most explains wellbeing is the structural capital.

If it is considered that this is the element that provides a platform of certainty about the rules that the individual must follow to grow and remain in the organization, it can be understood its significant relationship with wellbeing. This agrees with the study of Vigoya (2002) which demonstrated that the organizational structures that allow individual growth can be a source of personal wellbeing and can generate synergy in the social environment.

From this study, new questions that can lead to new lines of research arise: How do educational levels affect the perception of wellbeing? If there is a difference between educational levels, how does human capital acts on wellbeing? Would it have a curvilinear effect? What is the relationship between the elements of intellectual capital and the elements of wellbeing? Is there a different behavior in other regions of Mexico?

6. Conclusion

Wellbeing is a multidimensional phenomenon that begins with the individual and his immediate environment, that is, his family and his work. If governments and citizens get together to develop better conditions, wellbeing can be generalized and developed ina medium and long term. The study of intellectual capital must take other routes. It has already been shown to be a source of competitive advantage in organizations, but it is essential to observe its role as a source of wellbeing to develop it and promote it. The structural capital has a key role as an influential and creator of conditions that support the individual development in a certain environment that can support the generation of a more optimistic perception of what he is and what he has.

With the new currents that drive the development of sustainable organizations, organizations should be encouraged to be conscious of their role in the wellbeing of their employees and their immediate surroundings. This effort should not be developed as a bonus, it should be integrated with the development of intellectual capital, with the idea that everyone wins: individuals, businesses and environment.

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