Novel Liberalism Coefficient to Improve Human Freedom Development in the World

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Abstract*— The new concept to measure human freedom examines the relationship of the Coefficient of Liberalism (L); and, the variables grouped in three dimensions: the forces of modern markets, private property; and, Institutionality. The analyzed population corresponded to 116 countries. 158 variables were collected per country for 10 years. For the analysis, information from The Global Competitiveness Index Historical Dataset © 2008-2018 of the World Economic Forum was used, with which an X_{nxl} Database was used with index and coefficient values, country codes, global id, identified series and treatments (Income groups, Regions and Forum classification). The hypothesis test, linear regression analysis, ANOVA, PCA, univariate variance and eta-square were used as statistics. The L Coefficient has a statistically significant positive correlation with the Global Competitiveness Index (R^2=0,82; F(1,114) = 516,61; Sig.=,000)); and, it served to evaluate the three treatments analyzed. The means of the income groups differ significantly, F(1,112) = 5,68, p < ,001, η2 = 0,14 for the dependent variable of the Coefficient of Liberalism (L). In addition, the means of the Regions differ significantly, F(1,109) = 2,77, p < 001, η2 = 0,14. The squared Eta value indicated a large effect of income groups and Regions on the L Coefficient. The five countries with the highest L Coefficient were United States (14,56), Hong Kong SAR (12,63), Singapore (12,60), Canada (12,28); and Germany (12,23). This analysis confirmed the power of the L Coefficient to identify the countries that maximize human freedom.

***Keywords*— Human freedom, markets, property rights, efficiency enhancers, basic requirements, innovation and sophistication factors, ethical behavior, product sophistication.**

I. INTRODUCTION

The concept of Coefficient of Liberalism (*L*) establishes a new method to identify which Nations-States approach the concept of freedom from modern elements to interact in the current world market. The hypothesis is that there is a relationship between the elements of modern markets, the protection of property, and Institutionality; with, the coefficient *L*. The need arises to apply the identification and selection of nations that are closer to the concept of freedom in the value chains of modern world markets.

This research considers the nature of the freedom that property rights and market bring to the institutional framework, regardless of the types of government and political structures. Also, seeks to incorporate elements of the strength of markets with property rights, which are the two elements that liberals in all their forms determine as structural [1-3].

The foundations of the market as the engine of economies are reinforced by a interference of governments to favor the protection of property rights and promote economic well-being with the growing role of the market in the process of income distribution [4]. Property rights favor the generation of wealth and are essential for the performance of the market and the economy [5,6]. In addition, safeguarding and defending property rights generates equal opportunities and increasingly perfected markets, which allow incorporation into international markets [7,8]. Moreover, the real degrees of growth of GDP per capita are related to the economic freedoms granted by the States, among these freedoms, the property rights, intellectual and personal, are the first attention [9-11]. The higher the level of economic freedom, the greater the economic activity in the markets; property rights being related to income inequality, thus generating ambiguity in free market institutions [12,13]. The Institutionality of governments and their judicial systems can measure property rights and the rule of law through indices such as the Index of Economic Freedom. Said measurement tool denotes a liberal orientation in which economies function with institutions influenced by demand and the offer. Researchers find a positive importance between States with free markets and the protection of property rights as engines of growth [14,15]. In fact, the concept of economic freedom tries to know how close a given economy is to becoming a market economy as a fundamental right [16,17].

In other matters, economic freedom makes markets more competitive by efficiently allocating resources, supporting its foundations in the protection of private property, competition, and personal freedom [18,19]. Market performance is positively related to efficiency factors, training, and higher education. Mentioned points are necessary to visualize the levels of basic requirements, efficiency enhancers and the level of technology and innovation, this last point being transcendental in a globalized economy like the current one [20,21]. To increase the growth of Nations, policies must promote efficiency enhancers, efficiency of goods market, and the sophistication of market and companies. To increase the efficiency of companies in the factor-driven economy, policymakers must improve the basic requirements [22,23]. For most economists, improving and promoting efficiency enhancers creates a positive effect of economic growth, thereby improving global competitiveness [24]. That is why companies must compete in a much more globalized market that requires more sophisticated products to remain competitive in global value chains. The understanding of the complexity of modern economies allows information necessary to produce more sophisticated products that lead to technologies with less environmental pressure, playing the sophistication of the products a transcendental role in the conservation of the environment [25,26].

Both sophisticated products and buyers require organizations to introduce sophisticated competitive innovations to market so that they benefit consumers in free markets. This increase in products would require sophisticated businesses that comply with production processes to improve their added value. This would also generate business sophistication to increase competitiveness in the world [27-

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29]. Likewise, the increase in the degrees of sophistication of products modifies the growth rates of nations, being important for economic growth. This encourages the competitiveness of nations in the international market [30]. It is also important to study the participation of local suppliers in value chains in the analysis to visualize their importance as an attribute of economic integration in global value chains [31-33]. Thus, business sophistication has been found to be more important in high-income nations than in middle-income ones. Also, the relationship between education and research are essential for technological recovery [34].

At the same time, supply chains aided by innovation, entrepreneurship, and sophistication help companies to better manage moments of crisis by developing strong supplier-employee relationships [35]. Local suppliers, being integrated into global supply chains, improve their technology and their innovation requires sustainability over time to obtain economic value [36-40]. In addition, it is unclear how non-market factors generate confidence so that companies have preferential treatment towards the protection of their intellectual property. For example, the weakness of a country in terms of investments in R&D restricts investments to a small group of companies, distorting the technological availability in the nation [41, 59]. Companies created under intellectual property regimes have a higher rate of innovation based on product and process innovations [42]. Likewise, countries that maintain guarantees on the protection of intellectual property rights have higher productivity. Therefore, policymakers should give importance to intellectual property rights to increase total factor productivity and promote active economic convergence between regions, regardless of their heterogeneity [43,44]. This is how the positive relationship of the quality of institutions that help mitigate underdevelopment, inciting economic complexity and that are contrary to traditional practices without adequate governance has been studied [45-47]. The performance of institutions in economic development depends on their ability to enforce property rights and offer opportunities to large sectors of society [48].

The novelty of this research is found in the incorporation of variables such as product sophistication, enhancers of efficiency and quality of the local supplier that have not been integrated into any other indicator of freedoms to date.

Hence the importance of linking economic activity with the development of human freedoms. This research aims to incorporate the elements of to identify which countries maximize human freedoms from the point of view of liberalism as a concept. The research questions are: Is it possible to find a coefficient to identify the Nations that provide the maximum human freedom in their markets, in their property rights and in their Institutions, regardless of their political structure? Is the Liberalism Coefficient related to the Global Competitiveness Index? And, is the Liberalism Coefficient affected by the income group, the Region or the Forum classification in the World?

II. Methods and Materials

A. Factors, Dimentions and Variables Aspects

To find significance between the variables under study, SPSS v.25 was used. The population that was used corresponds to 116 countries. The hypothesis test, linear regression analysis, ANOVA, PCA and univariate analysis of variance and eta-square were used as statistics. Three repetitions were made during the years 2016 to 2018.

Three dimensions were designed for variable X "*Freedom factors in Nation-States*": (i) Modern market forces, (ii) Property rights; and, (iii) Institutionality environment; and one, for the variable Y "*Utilitarian index for development of human freedom*": (i) Liberalism Coefficient (*L*). Through the Coefficient *L*, a new model is proposed for the selection of countries that promote the development of human freedom regardless of the government structure they have. The conceptual framework of the research is explained in Fig. 1. Table I shows the variables involved the dimensions analyzed.

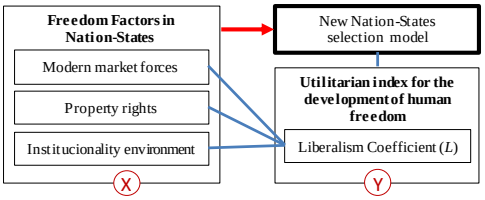

Fig. 1. Data analysis between variables. Source: Authors

TABLE I
DEFINITION OF VARIABLES, ACRONYM AND SOURCE.

Dimension/Variable	**Acronym**	**Source**	**Unit Measure**
Modern Market Forces			
Goods market efficiency	GCIB06	WEF, 2022	Index
Efficiency enhancers	GCI.B	WEF, 2022	Index
Local supplier quality	EOSQ102	WEF, 2022	Index
Production sophistication	EOSQ120	WEF, 2022	Index
Value chain breadth	EOSQ115	WEF, 2022	Index
Business sophistication	GCIC11	WEF, 2022	Index
Gross Domestic Product	GDPPPP	WEF, 2022	Billions$
Global Competitiveness Index	GCI	WEF, 2022	Index
Efficiency boost coefficient	EBC_SS	Authors	α
Free economy coefficient	CLE_SS	Authors	β
Property Rights			
Intellectual property protection	EOSQ052	WEF, 2022	Index
Property rights	GCIA010101	WEF, 2022	Index
Basic requirements	GCIA	WEF, 2022	Index
Innovation and sophistication	GCIC	WEF, 2022	Index
Intellectual coefficient	IPP_SS	Authors	Θ
Property rights coefficient	PR_SS	Authors	δ
Institutionality environment			
Public institutions	GCIA0101	WEF, 2022	Index
Ethical behavior of firms	EOSQ153	WEF, 2022	Index
Private institutions	GCIA0102	WEF, 2022	Index
Institutionality ecosystem	GCIA01	WEF, 2022	Index
Public institutions	GCIA0101	WEF, 2022	Index
Ethical behavior of firms	EOSQ153	WEF, 2022	Index
Dependent variable			
Liberalism Coefficient	CL15_SS	Authors	*L*

Source Authors

B. Liberalism Coefficient (L)

The Liberalism Coefficient (*L*) incorporates the components of modern market forces, property rights, and the institutional environment. It is designed to identify the countries that provide the necessary elements for the development of human freedoms that allow them to be competitive in a world with increasingly complex markets. The Coefficient *L* was calculated using (1):

$$L = \left(\frac{\alpha^3 + \delta^2 + 1}{z + \beta + \theta} \right) \qquad (1)$$

α*: Efficiency enhancers index (GCI.B)*
δ*: Basic requirements index (GCI.A)*
z*: Innovation and sophistication factors index (GCI.C)*
β*: Intellectual Property Coefficient. It's calculated with using equation (2)*

θ*: Property rights Coefficient. It's calculated with using equation (3)*

Intellectual property rights coefficient (δ_1) data was normalized calculated with a linear regression respect the private institutions index - GCI.A.01.02 and public institutions index - GCI.A.01.01 (R^2=0,88; $F(2,345)$ = 1.233,96; Sig= ,000). It was calculated using (2):

$$\delta_1 = -0{,}668 + 0{,}722x_1 + 0{,}450x_2 \quad (2)$$

x_1: Private institutions index (GCI.A.01.02)
x_2: Public institutions index (GCI.A.01.01)

Property rights coefficient (Θ_1) data was normalized calculated with a linear regression respect the public institutions index -GCI.A.01.01 and ethical behavior of firms index - EOSQ153 (R^2 = 0,89; $F(2,345)$ = 1.456,85; Sig. = ,000). It was calculated using equation (3):

$$\theta_1 = 0{,}410 + 0{,}843x_1 + 0{,}145x_2 \quad (3)$$

x_1: Public institutions index (GCI.A.01.01)
x_2: Ethical behaviour of firms index (EOSQ153)

C. Calculation of World Economic Forum indicators

The indicators of the variables analyzed in the World Economic Forum report were taken through a survey that consisted of 150 questions divided into 15 sections. The survey was carried out among company executives from each country, whose responses ranged from 1 (worst) to 7 (best); The objective was to measure critical concepts of the situation of each country. Surveys with response rates of less than 80 percent of total responses were excluded. Surveys with less than 50 percent compliance were also excluded. Then, the Mahalanobis distance method was applied; and a country-level univariate outlier test for each question in each survey. Subsequently, linear regression was performed and used to predict the mean score. Surveys outside the 95% confidence interval were excluded to then calculate the interquartile range that allowed us to separate ranges of outliers outside the difference between 25 and 75 (percentiles) [49]. Formally, the national average of an indicator was calculated using (4):

$$q_{i,c} = \frac{\sum_j^{N_{i,c}} q_{i,c,j}}{N_{i,c}} \quad (4)$$

$q_{i,c,j}$: Answer to question i in country c of respondent j
$N_{i,c}$: Number of respondents to question i in country c

D. Measured variables

The collected data included all the quantitative variables that The Global Competitiveness Index Historical Dataset © 2007-2017 World Economic Forum published between the years indicated in the "*Metadata*" tab that includes the specific license (CC BY-NC-40) published with the freedom issued by the Forum to redistribute the data. The historical data contained in this dataset © has not been modified, that is, it corresponds to the unique data of each year. The dataset © for this research comprises 158 variables collected in 116 countries in 10 years. The variables were grouped into 12 pillars. All these indices include the critical concepts to measure the situation of each country [49]. Also, the data was grouped into three treatments: (i) Income group (with the World Bank classification, as of July 2016); (ii) Region (classified by the IMF as of April 2016); and, (iii) Forum classification. With these data, 22 different coefficients were also calculated, which were contrasted with the indicators calculated by the World Economic Forum.

E. Statistical design

Ten years states were obtained for each of the 116 countries. The data obtained were ordered in an X_{nxl} data matrix, , where *n* is the number of rows (samples) and *l* is the number of variables in this investigation (index and coefficients), resulting in a total of 1,160 states and 158 measured variables and 22 coefficients (both , predictors). With these predictors, years, countries, income group, Region, and Forum classification, this matrix totaled 2,749,446 data cells.

The statistical model Y = Xß + ε was used to analyze the linear regression [50, 58]. The observations were independent; and that the relationship between the DV and each of the IVs was linear [51]. With these prescriptions, the goodness of fit statistics, the standard error of the calculation and the analysis of variance table were calculated. ANOVA was calculated with 95.0% confidence interval. Two regression models were explored to determine the confirmation of the relationship between variable X: "*Freedom Factors in Nation-States*" and variable Y: "*Utilitarian index for the development of human freedom*".

With this validation, the *L* coefficient was calculated for each of 116 countries by years. Finally, for the determination of the statistical differences between the treatments, a univariate analysis of variance was carried out, finding the inter-subject factors, the descriptive statistics and the inter-subject effects tests for the dependent and independent variable; with this, the variability between groups explained by the one-way model was calculated [52]. Once the means of each group were estimated, the standard error of the estimated model was calculated, coinciding with the square root of the averaged residual sum of squares; also, the confidence interval for the global mean constructed with this standard error was calculated [53]. With this information, Principal Component Analysis (PCA) was carried out, since it is a useful and quick tool that serves as a guide to group countries according the variables selected [54,55]. The mean value of the components was set at 1. Eigenvalues greater than unity were selected. The problem to be solved is to find a space with a smaller dimension that adequately represents the data. To clarify the true value, the PCA, its complemented using the method of Ward's linkage (with squared Euclidean distance and z-score standardization, KMO) [56]. Eta-squared (η2) was calculated by determining the effect size measure as a unique and standardized number that expressed how different the means of the samples evaluated were and how far apart they were calculated [57]. The rules accepted for eta-squared in this investigation were as follows: (i) η2 = 0.01 corresponds to a small effect; (ii) η2 = 0.06 corresponds to a medium effect; and, (iii) η2 = 0.14 corresponds to a large effect.

The hypothesis where it is possible to establish the Coefficient of Liberalism as a new form of selection of Nation-States that establish modern market policies with respect to private property; and, solid public and private institutions. Also, the Liberalism Coefficient can determine the influence of Income group, Regions; and, Forums classification.

F. Instruments

For the variable X, "*Freedom Factors in Nation-States"*, the following sources were used:

1. World Economic Forum. The Global Competitiveness Index Historical Dataset © 2008-2018.
2. Database X_{nxl} data matrix with index and coefficient values, countries code, global id, identified series, income groups, Regions and Forum classification.

Equation (1) was used for analyze the variable Y, "Utilitarian index for the development of human freedom"; it is also, a dimension of the analyzed problem.

III. Results

The 116 countries assessed were compiled from the Global Competitiveness Index historical dataset © 2007-2017 World Economic Forum. The analysis process lasted 73 days. For each country, 10 samples were collected (repetitions, one per year) and 158 variables were considered for each country. The Matrixnxl was created and 22 coefficients were calculated and the treatments were assigned (Income groups, Region; and, Forum classification). The collected data was entered into the $Matrix_{nxl}$ and analyzed. Hypothesis tests, linear regression analysis, ANOVA and quadratic Eta were performed to find the statistical significance between variable X "*Freedom Factors in Nation-States*" and the variable Y "*Utilitarian index for the development of human freedom*".

In Table II, the summaries of Model (1) and (2) for the dependent variable *L* (Liberalism Coefficient) were calculated. In Table III, the ANOVA of *L* was calculated with respect to the selected predictors for both models. In Table IV, the coefficients of the predictors of the model with respect to the dependent variable *L* were calculated.

TABLE II
SUMMARY[c] OF THE MODELS FOR THE LIBERALISM COEFFICIENT - *L*

Model	R	R square	R square adjusted	Standard error of the estimate
1	,91[a]	0,82	0,82	0,10
2	,99[b]	0,97	0,97	0,40

a. Predictors: (Constant), GCI.
b. Predictors: (Constant), GCI, GDPPPP, GCI.B, EOSQ120, PPS_SS, IPP_SS; and, CLE_SS.
c. Dependent variable: Liberalism Coefficient - *L* (CL15_SS). Source: Authors

TABLE III
ANOVA[a] BETWEEN LIBERALISM COEFFICIENT AND FREEDOM FACTORS IN NATION-STATES

Model		Sum of squares	Gl	Quadratic mean	F	Sig.
1	Regression	509,04	1	509,04	516,61	,000[b]
	Residue	112,36	114	0,99		
	Total	621,40	115			
2	Regression	604,19	7	86,31	541,59	,000[c]
	Residue	17,21	108	0,16		
	Total	621,40	115			

a. Dependent variable: Liberalism Coefficient – *L* (CL15_SS).
b. Predictors: (Constant), GCI.
c. Predictors: (Constant), EOSQ052, GCI.A010101, GDPPPP, GCI.B, EOSQ102, EOSQ120; GCI and, CLE_SS
Source: Authors.

TABLE IV
COEFFICIENTS[a] BETWEEN LIBERALISM COEFFICIENT AND GLOBAL COMPETITIVENESS COEFFICIENT

Model		Non-standardized coefficients		T	Sig.	95% confidence interval for B	
		B	Dev. Error			Lower limit	Upper limit
1	(Constant)	2,14	0,10	20,80	0,00	1,93	2,34
	CL15_SS	0,27	0,01	22,73	0,00	0,25	0,29

a. Dependent variable: Liberalism Coefficient - *L* (CL15_SS).
Source: Authors.

The Multiple Linear Regression of Model (1) is capable of reducing the prediction error by almost 82% (square R value) and Model (2) by almost 97% when information from the predictors of each model is taken. As the value of F, in both cases, they are statistically significant positive correlation (R^2=0,91; $F(1,114)$=516,61; Sig=,000; and, R^2=0,99 $F(7,108)$ = 541,59; Sig=,000 respectively). With these results, exist a relationship between the Liberalism Coefficient - *L*. and the predictors of both models. In Figure 2, the histogram for Model (1) was calculated. In Figure 3, the standardized P-P normal regression residual was calculated for Model (1).

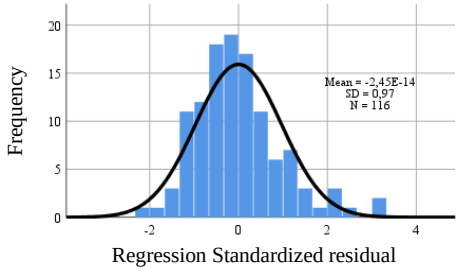

Fig. 2. Histograms of the dependent variable: Liberalism Coefficient - L (CL15_SS) of Model (1). Source: Authors

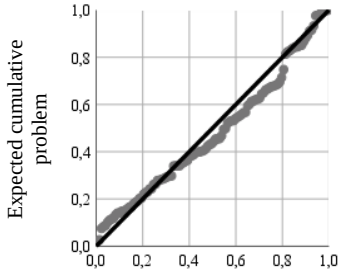

Fig. 3. Regression normal P-P plot standardized residual of Model (1). Source: Authors

To calculate the Global Competitiveness Index from the Liberal Coefficient – *L* data, the respective coefficients were calculated; and, it is expressed in (5).

$$y = 2{,}14 + 0{,}27\,L \qquad (5)$$

With equation (5), value of the Global Competitiveness Index was calculated. It is statistically significant (R^2=0,82; $F(1,114)$ = 516,61; Sig.=,000) that, for each unit of Coefficient *L*, the Global Competitiveness Index changes 0,27 times; and, is equal to 2,14 when Coefficient *L* is equal to zero. In Figure 4, the statically positive significance relationship between Global Competitiveness Index and Liberalism Coefficient - *L* was calculated.

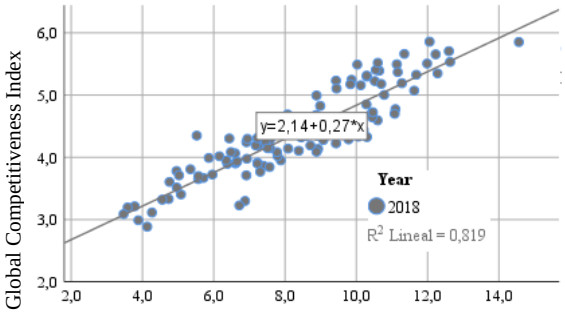

Fig. 4. Statically positive significance relationship between Global Competitiveness Index and Liberalism Coefficient - L. Source: Authors

For the PCA, the correlation matrix was calculated with the predictors of Model (2). The variables were standardized before calculating the components. The mean value of the components was set at 1. Eigenvalues greater than unity were selected. It was possible to establish a statistically significant relationship (R^2 = ,97) between the values of *L* and the values of the predictors. When *L* values increase, the probability of increasing the human freedom aspects are higher.

According to the results, the PC 1 explains 72% of the variability calculated on the data; and, PC 2, explains it in 14%. The cumulative proportion to evaluate the total amount of variance explained by the consecutive principal components was calculated at 86%. The countries whose *L* values > 9.57 were selected with eigenvalues greater than unity in the PCA. In Figure 5, the clustered dispersion of PC 2 (21%) by PC 1 (78%) was calculated according to country selection by value of the *L* Coefficient. Of the 116 countries analyzed, 15 were selected using the *L* Coefficient. The five countries with the highest *L* Coefficient were United States (111: 14.56), Hong Kong SAR (40: 12,63), Singapore (96: 12,60), Canada (16: 12,28); and Germany (24: 12,23).

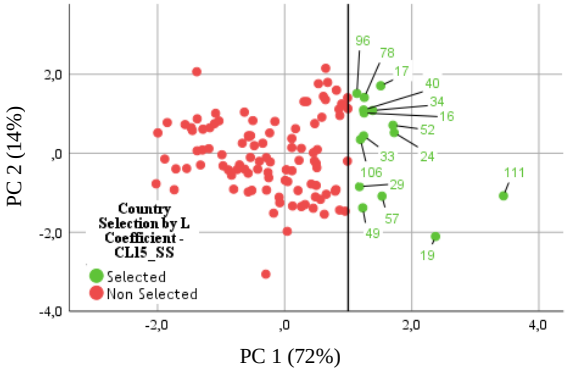

Fig. 5. Clustered dispersion of PC 2 (14%) by PC 1 (72%) according to Selection by Coefficient L. Source: Authors

Mean and standard deviation for Liberalism Coefficient - *L* for study treatments (income group classification, Region, and Forum) were calculated. Table V shows the results. In Table VI, the ANOVA analysis and identifies the null hypothesis that all population means are equal was calculated.

TABLE V
MEANS AND STANDARD DEVIATION FOR COEFFICIENT L PER TREATMENT

Treatment	Description	Mean	St. Dev.	95% confidence interval	
				Lower limit	Upper limit.
Income Group	High income	9,64	0,42	8,82	10,46
	Upper middle income	8,48	0,38	7,72	9,24
	Lower middle income	8,08	0,69	6,70	9,45
	Low income	7,48	0,33	6,83	8,13
Region	AE	9,89	0,50	8,91	10,88
	CIS	8,08	0,70	6,69	9,48
	EDA	7,34	0,52	6,30	8,38
	EDE	9,15	0,74	7,68	10,62
	LAC	8,44	0,56	7,34	9,54
	MENaP	7,92	0,52	6,88	8,95
	SSA	7,85	0,45	6,97	8,73

AE: Advanced economies; CIS: Commonwealth of Independent States; EDA: Emerging and Developing Asia; EDE: Emerging and Developing Europe; LAC: Latin America and the Caribbean; MENaP : Middle East, North Africa, & Pakistan; SSA: Sub-Saharan Africa.
Source: Authors.

TABLE VI
ANOVA AND ETA SQUARE TEST

Origin	Sum Square	df	Mean Square	F	Sig.	Eta square
Corr. Model	82,10[a]	3	27,36	5,68	0,00	0,14
Intersection	6.023,10	1	6.023,10	1.250,82	0,00	0,92
Income	82,10	3	27,36	5,68	0,00	0,14
Error	539,31	112	4,82			
Total	8.681,80	116				
Total corr.	621,40	115				
Corr. Model	82,18[b]	6	13,70	2,77	0,00	0,14
Intersection	7.252,02	1	7.252,02	1.465,94	0,00	0,93
Region	82,17	6	13,70	2,77	0,00	0,14
Error	539,22	109	4,95			
Total	8.681,80	116				
Total corr.	621,40	115				
Corr. Model	38,23[c]	6	6,38	1,19	0,32	0,06
Intersection	5.495,48	1	5.495,48	1.027,27	0,00	0,90
Forum	38,29	6	6,38	1,19	0,32	0,06
Error	583,11	109	5,35			
Total	8.681,80	116				
Total corr.	621,40	115				

a. R squared = ,14; b. R squared = ,14; c. R squared = ,06
Source: Authors.

Income groups means differ significantly, $F(1,112) = 5,68$, $p < 001$, $\eta^2 = 0,14$ for the Liberalism Coefficient (*L*) dependent variable. Regions means differ significantly, $F(1,109 = 2,77$, $p < 001$, $\eta^2 = 0,14$; Forum classification means non differ significantly, $F(1,109) =$, $p < 0,32$ $\eta^2 = 0,06$ for *L* Coefficient. The squared Eta value indicated a large effect of income groups and regions on the Liberalism Coefficient; also, Eta squared indicated a medium effect of the Forum classification.

IV. DISCUSSION

The coefficient L arises with the purpose of expressing the countries that offer the maximum human freedom [5-8], thus contributing to the promotion of the freedom of human beings. Thus, the L coefficient is related to the market, private property and institutionality [1-13, 14-19, 48]. In addition, the L Coefficient incorporates the basic requirements, the efficiency enhancers, and the level of technology and innovation like never before, since there is no indicator of economic freedom that has done so in this way. Mentioned points are transcendental in a globalized economy like the current one and must be improved by policy makers to generate a positive effect on the economy and growth of nations [20-24, 41-47]. On the other hand, the L coefficient identifies the willingness of countries in reference to competition in the markets by introducing increasingly sophisticated products to remain competitive in global value chains [25- 3. 4]. In this way, the combined use of statistical tools provides the ability to identify the countries that manifest the greatest human freedom [53-57]. This is how the results manage to point out the importance of science, technology, and innovation in the growth of competitive markets. In addition, this research will be useful for policy makers, companies, and the population in general, since, if the L Coefficient is considered, objectives can be generated that combat social, economic, institutional, and even political problems.

From another perspective, the data supports the hypotheses. From the analysis of the 1,160 samples, it is shown that there is a statistically significant relationship between the Coefficient of Liberalism - L and the predictors. The models analyzed can reduce the prediction error by almost 97%. The L Coefficient was calculated for the 116 countries. In this case, 15 countries were selected whose values of L > 9.57 are those that offer maximum human freedom, contributing to improve the opportunities that allow their companies to compete in increasingly sophisticated markets.

This is how it is also validated that the coefficient L has a statistically significant positive correlation with the Global Competitiveness Index. On the other hand, using the L coefficient and the statistical tools proposed in this study, the 5 countries with the greatest capacity to provide freedom to their societies were identified and selected as superior Nation-States within a given population. It is in this way that the importance of this research can be pointed out from both the private and public perspective, covering the economic, social, and institutional spheres. Another strong point of this work is the number of analyzes carried out that allowed us to identify the effect of the treatments. It was found that the L Coefficient is strongly influenced by the income group and the Region to which the countries belong. With these characteristics, it is possible to understand and cover the problems in a more exact and precise way, since a territory and a population group can be selected according to region and income, respectively. The limitations found are related to the heterogeneity of the values in the World Economic Forum indices over the years. Consider the values used in case you want to follow a line of research like the one in this paper.

The next logical step is to establish data banks to measure the variation of the Coefficient L in the future to identify the evolution of the policies applied by the countries. This is how the possibilities of the value chains of companies in each of the countries analyzed could be expanded. The importance of the application of the Coefficient L as a measurement tool for the benefit of the political, economic, social, and institutional sphere is highlighted.

V. Conclusion

From the results, the new concept of Coefficient of Liberalism - *L* arises and a method has been generated to incorporate grouped variables in the Factors of Freedom in the Nation-States, identifying with their values, the most appropriate way to select countries at the same time. incorporate variables that no other indicator has. According to the results, it is concluded that the L Coefficient fits the data, since it can reduce the prediction error by almost 97% when the information of the selected predictors is considered.

The data supports our hypothesis, by identifying that there is a relationship between the Coefficient L and the maximization of human freedoms in relation to market forces, private property, and Institutions. It has been explained that, with an increase in the values of L, the probability of human freedom options also increases. This means that the Coefficient L allows the measurement on a transcendental point for the human being, freedom. This is how through this measurement tool, new responses can be generated to current problems from various perspectives such as economic, political, social, and institutional. Likewise, the L Coefficient has a statistically significant positive correlation with the Global Competitiveness Index. This highlights that nations can be evaluated from both a private and a public perspective.

On the other hand, the values with means in the Coefficient L equivalent to 9.64 correspond to High Income countries and the values with means equivalent to 7.48 correspond to Low Income countries. In addition, the income group has a great impact on the L Coefficient. The Region in which the countries are located also has a great impact on the L Coefficient. Thus, it can be seen that it is not only a tool to overcome problems of various kinds, but also allows a precise evaluation according to population groups and specific territories.

As a synthesis, the versatility of the L Coefficient is highlighted, since with said tool, it is possible to observe from a different and novel perspective problems that all nations are currently experiencing. Also, it is possible to question the degrees of freedom that institutions, markets and the right to property allow us. Finally, the specificity in terms of population group and territory is highlighted.

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