RELATIONSHIP OF INNOVATION, INTERNET USE AND OPEN DATA WITH THE EFFECTIVENESS OF OPEN GOVERNMENT IN IBERO-AMERICAN COUNTRIES

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ABSTRACT

Adaptation to changes to improve the efficiency of the relationship between citizens and government administration finds in innovation, the use of information technology and the availability of open data three factors that contribute to this relationship. The objective is to explore and describe the relationship between these factors applied to data from 24 Ibero-American countries through the use of clustering, based on global public indicators. It is found that there is a high association between Government Effectiveness and the Global Innovation Index, however with the other indicators the associations are moderate or not significant.

Keywords: Internet, Innovation, Government, Open Data, Ibero-America.

INTRODUCTION

Among the world development indicators is that of government effectiveness, which according to the World Bank, reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Banco, n.d). In this sense, the opportunities for improving the quality of services and products in the public sector have been proposed from various perspectives, including open innovation in which the citizen participates as a partner in these new forms of care (Arroyo, 2017).

The Ibero-American Charter for Innovation in Public Management, approved in October 2020, states that innovation in public management refers to the need to anticipate and adapt to changes and transform itself with optimized mechanisms to meet the needs of citizens (CLAD, 2020). Among these mechanisms are the incorporation of the use of Information and Communications Technology (ICT) and the use of open data, which significantly improve the relationship between the citizen and the government administration, as observed in several Latin American and Caribbean countries that have reported significant government efforts to take advantage of the opportunities offered by information technologies to manage data and make them available to citizens (Naser, 2017; Naser, 2016; Guaycha, 2020).

On the other hand, the open government paradigm constitutes a fundamental axis to meet the 2030 Agenda for Sustainable Development Goals declared by the United Nations (United Nations, 2020). Sustainable Development Goal 16 proposes to shape a new public governance framework and a renewed state architecture to promote peaceful and inclusive

societies for sustainable development, facilitate access to justice for all, and build effective, responsible, accountable and inclusive institutions at all levels (CEPAL, 2020; CEPAL, 2019).

The impulse given by the Information Technologies, especially the connection to the Internet, allows the transformation of the States towards this Open Government approach, contributing with transparency, participation and collaboration, key to promote the opening of governmental data from a multidimensional vision (Quintanilla, 2016), In this sense, access to the Internet by citizens is of crucial importance for the success of open government, it is then appropriate to reflect on the data reported by the International Telecommunication Union (ITU), which indicates that 54% of people in the world use the Internet (year 2019), being this value for the American continent of 77%, placing it in second place worldwide, below Europe (UIT, n.d).

The aforementioned factors, associated with innovation in the public sector, in terms of access to the Internet by citizens, and the opening of public data, together with its quality, quantity and democratic access is subject to the political will of each country, for which the States have legal instruments such as the Law on Transparency and Access to Public Information, as legislative mechanisms at the governmental level to ensure access to data, however its application presents significant variations from country to country (Guaycha, 2020).

The importance of studying these factors and their relationship with the performance of the Open State, is related to the right of access to public information and open data as a tool to improve the quality of life of people, and on the other hand, that these are considered within the declaration of the Sustainable Development Goals, established by the United Nations (UN), highlight the importance of open data to promote social and economic progress, by the favorable effect on growth programs, their monitoring, prevention of corruption and improved access to public information (Naser, 2017).

The purpose of this research is to describe the relationship of the three factors mentioned above: innovation, internet use and open data with government effectiveness, for the case of Ibero-American countries that present updated data in the global indicators associated with these factors, which will be useful to identify regional gaps that contribute to the establishment of new challenges and goals.

METHODOLOGY

The global indicators associated with innovation, internet access, open data and government effectiveness are described in Table 1. For the analysis of the data, correlation and clustering is performed between the indicators mentioned, using data from databases published by international entities such as the World Bank, World Intellectual Property Organization, Open Knowledge Foundation and International Telecommunication Union. Data were collected from 24 countries, noting that seven (7) of them did not publish data for the four indicators of the study, so some of the analyses presented were performed with fewer countries. Table 2 lists the countries and their data.

Table 1
STUDY INDICATORS

Label	Description	Year	Source
GovEf	***Government Effectiveness*** Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, ranging from -2.5 to 2.5. Total of 214 countries evaluated.	2019	World Bank. Governance Indicators [1].

GII	***Global Innovation Index*** It provides detailed indicators of innovation performance in 126 countries and world economies. Through 80 indicators it explores innovation, which includes the political environment, education, infrastructure and business development, distributed in 7 dimensions: Institutions, Human capital & research, Infrastructure, Market sophistication, Business sophistication, Knowledge & technology outputs, Creative outputs. Score range 0 to 100.	2019	World Intellectual Property Organization (WIPO) [12].
GODI	***Global Open Data Index*** Assessment of open government data publication from a civic perspective. The Index provides a baseline for the analysis of a country's open data ecosystem. It is a comparative indicator that follows a standardized procedure, measuring the availability of clearly defined categories of open government data that have proven to be useful to the public. 94 countries evaluated. Score range: 0% to 100%.	2017	Open Knowledge Foundation [13].
InternetPP	***Internet users (%)*** Proportion of people using the Internet; based on the results of national household surveys. 236 countries assessed. Range: 0% to 100%.	2017-2019	ITU, International Telecommunication Union [11].

Table 2
DATA FROM THE COUNTRIES TO BE ANALYZED

Country Name	Country Code	aGovEf 2019	bGII 2019	cGODI 2017	dInternet PP 2018
Argentina	ARG	-0,09	31,95	60	74,29
Bolivia	BOL	-0,70	24,76	30	43,83
Brazil	BRA	-0,19	33,82	68	67,47
Chile	CHL	1,06	33,64	52	82,33
Colombia	COL	0,07	33	64	65,01
Costa Rica	LRC	0,42	36,13	23	81,20
Cuba	CUB	-0,17			61,84
Dominican Republic	DOM	-0,36	28,56	27	74,82
Ecuador	ECU	-0,40	26,56		57,27
El Salvador	SLV	-0,47	24,89	35	33,82
Guatemala	GTM	-0,68	25,07	28	65,00
Honduras	HND	-0,61	25,48		31,70
Jamaica	JAM	0,50	30,8	26	55,07
Mexico	MEX	-0,16	36,06	65	70,07
Nicaragua	NIC	-0,77	22,55		27,86
Panama	PAN	0,07	31,51	25	63,83
Paraguay	PRY	-0,53	27,09	44	68,52
Peru	PER	-0,07	32,93	29	59,95
Portugal	PRT	1,15	44,65	37	72,35
Puerto Rico	PRI	-0,16		43	70,87
Spain	ESP	1,00	47,85		90,72
Trinidad and Tobago	TTO	0,10	28,08	21	77,33
Uruguay	URY	0,70	34,32	55	76,95
Venezuela	VEN	-1,66		14	72,00

Blank space: represents that no data was found for that country in that indicator.

Sources:

[a] World Bank. Governance Indicators: Government Effectiveness, year 2019 [1].
[b] WIPO. Global Innovation Index (GII), year 2019 [2].
[c] Open KnowledgeFoundation, Global Open Data Index (GODI) year 2017 [13].
[d] International Telecommunication Union (ITU). Individuals using the Internet, year 2018 [11].

RESULTS

The Pearson correlation between the indicators shows a very high association between Government Effectiveness (GovEf) and the Global Innovation Index (GII). Regarding the indicator associated with Internet Use per Person (InternetPP), a moderate to high association was found with GovEf and GII. With respect to the Global Open Data Index (GODI), a low association with the aforementioned indicators was observed (Table 3). Figure 1 shows the main associations found between the indicators, highlighting that Internet Use (InternetPP) is associated with the GII and GovEf, without being relevant, as is the association between the GovEf and GII indicators.

Table 3
PEARSON'S CORRELATION BETWEEN INDICATORS

Pearson Correlation	GovEf	GII	GODI	InternetPP
GovEf	1	,836	,282	,516
N	24	21	19	24
GII	,836	1	,321	,698
N	21	21	17	21
GODI	,282	,321	1	,154
N	19	17	19	19
InternetPP	,516	,698	,154	1
N	24	21	19	24

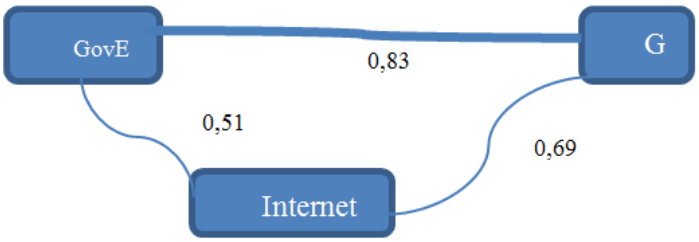

FIGURE 1
RELATIONSHIP BETWEEN INDICATORS

Figure 2 illustrates the comparative performance of the 24 countries with respect to the Effectiveness of their governments. It can be seen that only six countries show significant positive values, considering its range, which is between -2.5 and +2.5. Of these six, Spain, Chile and Portugal have values equal to or greater than one (1). On the other hand, the country with a value below -1 is Venezuela.

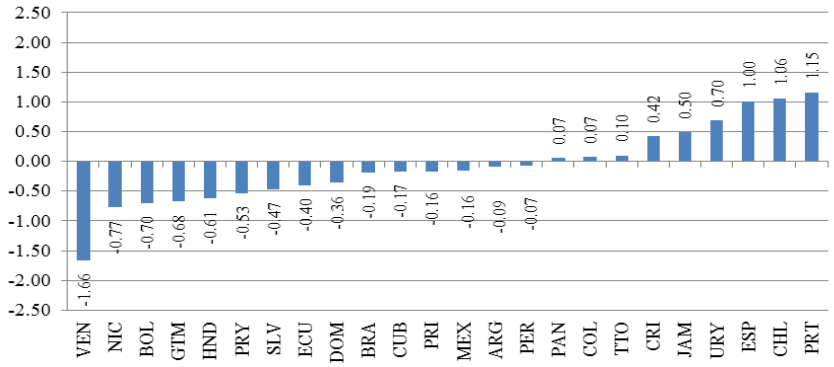

FIGURE 2
GOVERNMENT EFFECTIVENESS, RANGING FROM APPROXIMATELY -2.5 TO 2.5

Regarding the clustering analysis of the indicators, considering the countries with published values, Figure 3 and Table 4 show the number of countries that meet the grouping criteria indicated, and the results obtained from the clustering are described below:

a. The 24 countries studied presented values for the indicators on Government Effectiveness (GovEf) and Percentage of the population using the Internet (InternetPP), however, three (3) countries did not present values for the Global Innovation Index (GII), and five countries did not present values for the Global Open Data Index (GODI).
b. The 21 countries with published data in the Innovation Index (GII) score below 50.
c. 20 countries (83%) show that 50% of their inhabitants use the Internet.
d. The four (4) countries (representing 17%) that have less than 50% of their inhabitants with Internet use, and whose GE (Government Effectiveness) is less than 0.25 are Bolivia, El Salvador, Nicaragua and Honduras.
e. The countries whose Government Effectiveness is greater than 0.25 and whose proportion of the population using the Internet is greater than 50% are Costa Rica, Uruguay, Chile, Portugal, Spain and Jamaica. Of these, Uruguay and Chile achieved GODI greater than 50, the latter coincides with the findings of Guaycha and Ordóñez (2020) [6] who point out that among the countries that have excelled in open data metrics are Chile and Uruguay.

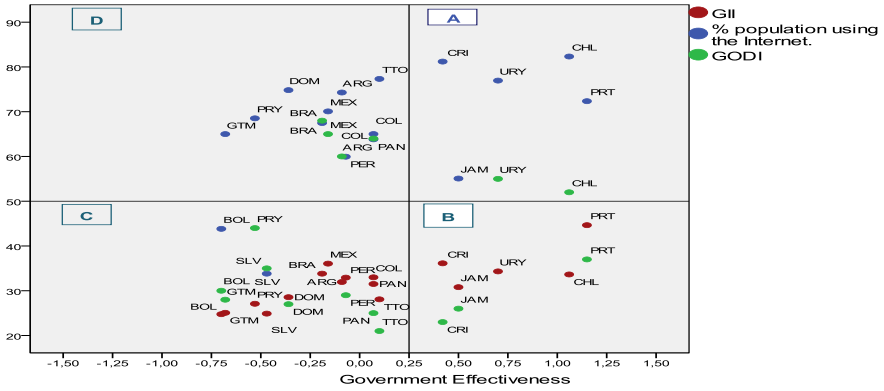

FIGURE 3
CLUSTERING OF THE GOVERNMENT EFFECTIVENESS (RANGING FROM APPROXIMATELY -2.5 TO 2.5) AND ITS RELATION WITH GII, GODI AND INTERNET USING

Table 4
NUMBER AND PROPORTION OF COUNTRIES BY INDICATOR

	InternetPP >50% InternetPP >50% InternetPP >50% InternetPP >50%	Innovation >50	GODI>50

	InternetPP >50% InternetPP >50		
GovEf >0.25	6 (25%)	0 (0%)	2 (8%)
GovEf <0.25	14 (58%)	0 (0%)	4 (17%)
Sub Total	83%	0%	25%
	Internet PP < 50%.	Innovation < 50	GODI < 50
GovEf >0.25	0 (0%)	6 (25%)	3 (13%)
GovEf <0.25	4 (17%)	15 (63%)	10 (42%)
Sub Total	17%	88%	55%
	InternetPP	Innovation	GODI
No data	0 (0%)	3 (12%)	5 (20%)

CONCLUSIONS

The purpose of this research is to describe the relationship of innovation, internet access and the availability of open public data with government effectiveness in Ibero-American countries, which will be useful to identify regional gaps that contribute to the establishment of new challenges and goals. Government effectiveness as an indicator that, according to the World Bank, reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Twenty-four Ibero-American countries were analyzed, 83% of which show that 50% or more of their population uses the Internet, which is a factor that could favor an environment for open government. However, the Government Effectiveness indicator shows favorable positive values for only six countries (25%): Costa Rica, Jamaica, Uruguay, Spain, Chile and Portugal.

A high association was found between Government Effectiveness and the Global Innovation Index, while with the other indicators the associations are moderate, however, in relation to the Global Open Data Index no significant association was found. This high association of Government Effectiveness with the Innovation Index, and with less incidence with the indicators of internet use and open data, is evidence that it is not enough to use hardware infrastructures, software or open data environments, and it is necessary an innovation ecosystem that combines various factors such as technological, human, knowledge management, organizational structures, among others, coinciding this with the proposal reported by Quintanilla and Gil-Garcia (2018) [14] regarding an open government ecosystem. Uruguay and Chile stand out as the Ibero-American countries with the best combination in terms of innovation, proportion of their population using the Internet and perception of government effectiveness.

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