DIMENSIONAL ANALYSIS APPLIED IN THE ESTIMATION OF AN IDEAL CITY PROFILE AND ITS IMPACT ON THE DEVELOPMENT: CASE STUDY IN GUADALAJARA DE BUGA (COLOMBIA)

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Abstract. The level of community development is measured with different indicators that guide, among other factors, knowledge of the progress of a region. The scarce availability of resources, particularly in the developing countries, makes necessary to establish efficiently the projects-programs that formulated and executed must be to improve the conditions of the community. This research proposes a methodology for the identification of those project-programs that a community must carry out in order to reach the level of another one under ideal conditions. To do that, information taken was on indicators available in institutional repositories of capital cities, special and one category in Colombia, which are municipalities that hold the highest rating for infrastructure development and other factors. Fifty-seven indicators selected were from the social progress index and the municipal performance measure with data on unsatisfied basic needs, welfare basics and opportunities. The dimensional analysis DA method used was considering the attributes Type of indicator, municipality and year of the information found. Subsequently, the indicators with the highest similarity value selected were for the ideal city profile (S). The DA applied was to Guadalajara de Buga, municipality category 2, and the indicators furthest from S identified were in standard deviations. Finally, the execution of the projects proposed in the Municipal Development Plan verified was and other types of interventions for the improvement of the municipality identified were.

Keywords: Proposal of methodology, category, public works.
JEL Codes: O12, O21,022

1. Introduction

During the first decade of the 20th century, an average annual increase of 2.20% of gross domestic product was reported worldwide (Guisán, 2014), a situation that has undergone significant changes over time. Each country presents a level of development resulting from social, cultural, economic and environmental factors, among others. In the Millennium Declaration, signed by 189 countries, eight global goals have been established, with 21 objectives and 60 associated indicators as development criteria, including poverty, inequality, health education, among others (Jacob, 2017). Unfortunately, the interest of some government authorities to present better results of their public management, derives in Accountability Documents adjusted with accounting information disguised to show productivity (Halachmi, 1999) as evidence of good administration (Taylor, 2009). This reality shows, in a vehement way, that follow-up mechanisms are required for the execution of advanced expenditures and investments as a result of public management (Head, 2008). On the other hand, to reinforce the convenience of the use of decision-making tools that help to those responsible for the treasury to prioritize investments, so that they really respond to the needs of the communities.

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The measurement of the development of a community presents different edges according to the macroeconomic behavior. That is reflected in the way in which the society that composes lives (Quintero, 2017) based on the added income and expenses without including variables such as the distribution of wealth or the way in which each person takes advantage (spends) the wealth that he or she has. The foregoing motivated the American economist Michael Porter to create the Social Progress Index (SPI). This measures the success of a community based on the fulfillment of unmet basic needs; well-being and opportunities. These are essential dimensions that are related to the style and conditions of life of the inhabitants and that together provide a complete and profound view of the main problems that a community can face (Porter, Stern and Green, 2015) although the causal relationship between one dimension and another is not easily identifiable (Guisán, 2008). In the SPI, information is collected following design keys (Porter, Stern and Green, 2015):

• Exclusive environmental and social indicators, which allow us to understand the impact of different impacts on the cause-effect connection of the main problems presented in the community under study.

• Results rather than efforts in order to make evident the effective improvement in the quality of life of the inhabitants.

• Holistic and relevant for all countries or cities, so that they can be extrapolated to diagnose the health of society by identifying those that are in critical socioeconomic conditions.

• Applicable, with the purpose of providing direction to leaders and members of the administrative branch.

The SPI is widely used internationally to perform various studies; however, some countries have developed their own model to establish that in certain cities of the country. This is the case of Colombia, which is based on the information collected by the account of the Network of Cities How We Go (RCCV), which is a group responsible for collecting reliable and comparable information on issues related to quality of urban life and citizen participation. . This network currently includes 13 urban centers (Red de Ciudades Como Vamos, 2016), among which the five capitals in the special category stand out according to the classification of the National Department of Planning NDP of Colombia. It is relevant to clarify that the municipal categorization in Colombia is done according to the number of inhabitants, current revenues of free destination, economic importance and graphic situation, and the municipalities with the highest category are nominated with special categories and one are those with the highest category and with the lower until six. The network uses the methodology proposed by Porter to evaluate the current situation of each municipality until it derives into an integral performance indicator (IPI). The IPI measures the behavior of municipalities in terms of meeting the goals of the 32 departments, districts and municipalities, including the five special districts, and 20 corregimientos (Departamento Nacional de Estadística, 2016), which make up physiographically to Colombia.

Each department has its own level of development, which is why different categories are obtained and therefore, to the extent that the conditions of the municipalities are improved, their level of categorization can improve (Ayala Borrero, et al., 2017). In addition to the IPI, there is the Integral Performance Measurement (IPM) whose objective is to measure, compare and order urban centers taking into account the specific characteristics of each of these - initial endowments - in order to encourage better management processes, execution of expenditure and investment oriented to results

(Departamento Nacional de Planeación, 2018b). Like the SPI, the IPM considers three components, equivalent to dimensions under the Porter methodology (Porter, Stern and Green, 2015), divided into subdivided variables in turn, in several indicators (Departamento Nacional de Planeación, 2018b):

• Initial allocations, used to compare municipalities with comparable possibilities.
• Management components, understood as actions and decisions made by the local administration aimed at improving the welfare of the population and increasing development.
• Component of results, which considers the constituent elements of social welfare, defined by the 1991 Constitution and international organizations.

This paper proposes a procedure to define an ideal city profile (S) based on the selection of information from different government repositories. In that way, are included indicators contained in the SPI and in the components of the IPM of Colombian capital cities with special category and one category, which, according to what is contemplated in Law 617 of 2000 (Congreso de Colombia, 2000) and Law 1551 of 2012 (Congreso de Colombia, 2012), show the best categorization. That in order to identify the actions or sectors to be improved in other cities of lower categorization. For this, it was used as a comparison municipality to Guadalajara de Buga, which is category 2 municipality and whose Accountability document allows us to assess how far this municipality is from the ideal conditions of development.

2. Methodology

The center of this study is the identification of information available in government repositories of municipalities (cities), special category and one, related to the valuation of the indicators considered in the SPI and with the IPM of each of these communities. Based on these data, the ideal city profile (S) is identified, using for it the dimensional analysis, a technique that uses a matrix-based decision-making approach (García Alcaraz, et al., 2013). With this technique is possible, by means of selected attributes, to estimate a similarity index (SI) to which cities should approach to reach a development condition similar to the condition of the ideal profile.

2.1. Selection of municipalities

For the conformation of the city profile, the capital cities corresponding to the special and one categories were considered (Departamento Nacional de Planeación, 2018a). This information is extracted from the categorization of the 22 municipalities of Colombia. (Table 1).

Table 1. Selected capitals cities and category

Special	Medellín, Barranquilla, Bucaramanga, Cali, Bogotá D.C., Cartagena de Indias
One	Popayán, Pasto, Cúcuta, Armenia, Pereira, Rionegro, Palmira, Itaguí, Envigado, Mosquera, Chía, Floridablanca, Barrancabermeja, Yumbo, Tunja, Manizales, Valledupar, Montería, Neiva, Santa Marta, Villavicencio, Ibagué, Buenaventura, Sabaneta, Soacha, Funza, Bello
Two	Sincelejo, Yopal, Guadalajara de Buga, Cajicá, Madrid, Piedecuesta, Soledad, Sogamoso, Facatativá, La Estrella, Fusagasugá, Zipaquirá, Florencia, Girardot, Girón, Tocancipá, Tuluá, Dosquebradas.
Three	Acacías, Girardota, Guarne, Caldas, Candelaria, Duitama, Jamundí, La Ceja, Tenjo, Copacabana, Cota, Apartadó, Ipiales, Sopó, Espinal

Source: authors.

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2.3. Selection of indicators

A total of 57 indicators, extracted from the SPI and the IPM, were evaluated through the method of dimensional analysis considering the attributes Type of Indicator (IT), Municipality and Year of the information found (Table 2). This last attribute is important because if information that is not up-to-date or not recent is used, it can lead to inaccuracies in the data analysis.

Table 2. Criteria for dimensional analysis and its description.

Criteria	**Description**
Indicator Type (TI)	Discriminates the indicator in measurable in number (one) or measurable by perception (0.5)
Municipality	Number of municipalities on which there is information extracted from the same source
Año	Year in which information was collected for the most recently published report by state agencies

Regarding the type of indicator, it must be taken into account that the form of measurement of each one varies depending on the type of component to be analyzed, that is, whether it is unsatisfied basic needs UBN, Welfare foundations or Opportunities. According to the above, to measure UBN, we take into account:

• Infant Mortality: Deaths of children under one year per thousand live births
• Maternal mortality: Deaths derived from pregnancy, childbirth or puerperium over total deaths
• Mortality from contagious diseases: Deaths from contagious diseases / Total deaths
• Mortality due to malnutrition: Deaths caused by malnutrition / Total deaths
• Water quality: National water quality index (NWQI)
• Access to electricity (Rural area): Electricity coverage index
• Homicide rate: Number of homicides per 100 thousand inhabitants
• Mortality due to traffic accidents: Number of deaths in traffic accidents per 100 thousand inhabitants

For measurement of Welfare Foundations:

• Coverage in primary education: Students / Total of possible students
• Coverage in secondary education: Students / Total of possible students
• Coverage in secondary education: Students / Total of possible students

• Internet penetration: Total subscribers / Total inhabitants
• Suicide rate: Number of suicides per 100 thousand inhabitants
• Premature mortality: Deaths of children under five years of age per 1,000 live births
• Physical activity: Percentage of individuals who did not perform any activity
• Freedom of movement: Percentage of citizens who are victims of a crime
• Use of non-motorized transport: Percentage of inhabitants who use means of non-motorized transport regularly

To measure Opportunities:

• Child labor: Population from 5 to 17 years of age that works or performs more than 15 hours in housework for every 1000 inhabitants
• Teen pregnancy: Mothers from 15 to 19 years old for every 1000 births
• Regarding the execution of resources, mobilization of own resources, open government and transparency, territorial planning, education, health, services, security and coexistence, the information available in the municipal performance measurement reports (MPI) was used.

Finally, the estimation of the importance was made based on a scale of assessment normalized by weight of the selected attributes, according to the judgment of the experts (Zyoud & Fuchs-Hanusch, 2017), which, as González y Rodriguez (2009) and ratified by Ahmadi and others (2015), initially has a subjective nature. The work team of this research defined these values and an importance of each criteria was obtained as follows: Municipality and Type of indicator, each one 41.7% and 16.7% time (year) of information collection.

The information of each indicator was then collected and organized (See Table 3) to determine the best value (S) that corresponds to the maximum among all the data found for each criterion, and then proceed to calculate the similarity index (IS) of each indicator (García Alcaraz, et al., 2013) as indicated in equation 1.

$$IS_i = \left(\frac{TI_i}{S_{TI}} * \frac{Municipality_i}{S_{Municipality}} * \frac{year_i}{S_{year}}\right)^{\frac{1}{\sum importance}} \qquad (1)$$

Subsequently, 50% of the indicators with the highest IS value were selected, which corresponded to 28 indicators, to make up the list of indicators of the ideal city profile (S). The list of the SPI dimension, the IPM component and the corresponding indicators are summarized in Table 4.

Table 3.Data, dimensional analysis and IS for indicators.

#	Indicador	TI	Municipios	Año	Análisis dimensional			IS
					TI	Municipios	Año	
1	Child mortality	1	22	2015	1	1	0.9990	0.9998
2	Maternal mortality	1	22	2015	1	1	0.9990	0.9998
3	Mortality from contagious diseases	1	22	2015	1	1	0.9990	0.9998
4	Mortality due to malnutrition	1	22	2015	1	1	0.9990	0.9998
5	Access to drinking water	1	5	2005	1	0.0246246	0.9941	0.5388
6	Access to improved sanitation	1	5	2005	1	0.0246246	0.9941	0.5388
7	Water quality	1	22	2015	1	1	0.9990	0.9998
8	Quality of sanitation infrastructure	0.5	10	2013	0	0.1392975	0.9980	0.5392
9	Access to electricity	1	22	2015	1	1	0.9990	0.9998
10	Quality of electric service	0.5	5	2005	0	0.0246246	0.9941	0.4037
11	Quality of housing	0.5	5	2005	0	0.0246246	0.9941	0.4037

#	Indicador	TI	Municipios	Año	Análisis dimensional			IS
					TI	Municipios	Año	
12	Access to adequate housing	0.5	5	2005	0	0.0246246	0.9941	0.4037
13	Homicide rate	1	22	2016	1	1	0.9995	0.9999
14	Mortality due to traffic accident	1	22	2016	1	1	0.9995	0.9999
15	Alphabetization rate	1	5	2005	1	0.0246246	0.9941	0.5388
16	Coverage in primary education	1	21	2015	1	0.8902081	0.9990	0.9806
17	Coverage in secondary education	1	21	2015	1	0.8902081	0.9990	0.9806
18	Coverage in secondary education	1	21	2015	1	0.8902081	0.9990	0.9806
19	Quality of basic education	1	10	2013	1	0.1392975	0.9980	0.7197
20	Internet penetration	1	22	2016	1	1	0.9995	0.9999
21	Mobile phone users	1	0	NR	1	0	0.0000	0.0000
22	Use of personal computers in homes	1	0	NR	1	0	0.0000	0.0000
23	Life expectancy at birth	1	5	2005	1	0.0246246	0.9941	0.5388
24	Suicide rate	1	22	2016	1	1	0.9995	0.9999
25	Premature mortality	1	11	2013	1	0.1767767	0.9980	0.7489
26	Physical activity	1	11	2016	1	0.1767767	0.9995	0.7491
27	Noise pollution	0.5	10	2013	0	0.1392975	0.9980	0.5392
28	Affectation due to national disasters	1	10	2013	1	0.1392975	0.9980	0.7197
29	Use of non-motorized transport	1	11	2016	1	0.1767767	0.9995	0.7491
30	Use of transportation alternatives	1	7	2013	1	0.0571069	0.9980	0.6204
31	Access to garbage collection	1	10	2013	1	0.1392975	0.9980	0.7197
32	Freedom of assembly / association	0.5	11	2016	0	0.1767767	0.9995	0.5612
33	Political rights	0.5	10	2013	0	0.1392975	0.9980	0.5392
34	Freedom of movement	1	10	2016	1	0.1392975	0.9995	0.7199
35	Teen pregnancy	1	10	2013	1	0.1392975	0.9980	0.7197
36	Perception of corruption	0.5	10	2016	0	0.1392975	0.9995	0.5393
37	Child labor	1	21	2017	1	0.8902081	1.0000	0.9808
38	Satisfaction with the cultural and recreational offer	0.5	11	2016	0	0.1767767	0.9995	0.5612
39	Tolerance towards homosexuals	0.5	0	ND	0	0	0.0000	0.0000
40	Inclusion of people with disabilities	1	0	ND	1	0	0.0000	0.0000
41	Tolerance towards the demobilized	0.5	0	ND	0	0	0.0000	0.0000
42	Inclusion of displaced population	1	0	ND	1	0	0.0000	0.0000
43	Respect for basic rules of coexistence	0.5	10	2013	0	0.1392975	0.9980	0.5392
44	Percentage of adults with postgraduate	1	0	ND	1	0	0.0000	0.0000
45	Percentage of adults with full undergraduate	1	0	ND	1	0	0.0000	0.0000
46	Quality of secondary education (Knowledge 11)	1	10	2013	1	0.1392975	0.9980	0.7197
47	Rate of undergraduate students	1	0	ND	1	0	0.0000	0.0000
48	Rate of students with postgraduate	1	0	ND	1	0	0.0000	0.0000
49	Unsatisfied basic needs	1	22	2012	1	1	0.9975	0.9996
50	Mobilization of own resources	1	22	2016	1	1	0.9995	0.9999
51	Execution of resources	1	22	2016	1	1	0.9995	0.9999
52	Open government and transparency	1	22	2016	1	1	0.9995	0.9999
53	Territorial planning	1	22	2016	1	1	0.9995	0.9999
54	Education	1	22	2016	1	1	0.9995	0.9999
55	Health	1	22	2016	1	1	0.9995	0.9999
56	Services	1	22	2016	1	1	0.9995	0.9999
57	Security and coexistence	1	22	2016	1	1	0.9995	0.9999
	S	**1**	**22**	**2017**				

ND: No data published in government entities. Source: Author.

Table 4. Component indicators of the city profile related to SPI and IPM methodology.

Dimension SPI	Component IPM	Indicators	Source
Basic human needs	Results component	Mortality (maternal, malnutrition and contagious diseases)	(Departamento Administrativo Nacional de Estadísticas, 2015a)
		Child mortality	(Departamento Administrativo Nacional de Estadísticas, 2015b)
		Water quality	(Ministerio de Salud y Protección Social - Subdirección de salud ambiental, 2016)
		Access to electricity (Rural area)	(UPME, 2016)
		Unsatisfied basic needs	(Departamento Administrativo Nacional de Estadísticas, 2012)
		Homicide rate	Grupo Centro de Referencia Nacional sobre Violencia, 2017)
		Mortality due to traffic accident	
Fundamentals of well-being	Results component	Coverage in education (elementary, middle and high school)	(Ministerio de Educación Nacional, 2016)
	NA	Internet penetration	(Ministerio de Tecnologías de la Información y Comunicación, 2017)
		Suicide rate	(Instituto Nacional de Medicina Legal y Ciencias Forenses Grupo Centro de Referencia Nacional sobre Violencia, 2017)
		Premature mortality	(Red de Ciudades Cómo Vamos, 2014)
		Physical activity	
	Management component	Freedom of movement	(Red de Ciudades Cómo Vamos, 2016)
	Initial endowments	Use of non-motorized transport	(Red de Ciudades Cómo Vamos, 2016)
Opportunities	NA	Child labor	(Departamento Administrativo Nacional de Estadísticas, 2018)
		Teen pregnancy	(Red de Ciudades Cómo Vamos, 2014)
	Management component	Execution of resources	(Departamento Nacional de Planeación, 2017)
		Mobilization of own resources	
		Open government and transparency	
		Territorial planning	
	Management component	Education	
		Health	
		Services	
		Security and Coexistence	

Note: NA Not available in government agencies. INML= Instituto Nacional de Medicina Legal y Ciencias Forenses (National Institute of Legal Medicine and Forensic Sciences)

3. Ideal city profile proposal (S)

To select the ideal city profile (S) the information of each indicator was collected in the municipalities in order to select the best data according to the positive or negative direction. It is considered positive impact when it is relevant to take into account the highest ideal value (for example: for education coverage the ideal is to have a high coverage value). Besides, using this criterion, it is assumed negative impact, when it is relevant to take the lowest ideal value (for example: premature mortality where the ideal is to have a low mortality value), also calculating the average and standard deviation of all the data (Table 5).

Table 5. Profile, city, average and standard deviation.

Indicator	Impact	City	Profile	Average	Standard deviation
Basic human needs					
Child mortality	-	Cali	7.8	11.85455	2.63198
Maternal mortality	-	Pereira	0.06%	0.17%	0.11%
Mortality from contagious diseases	-	Tunja	0.57%	2.37%	1.11%
Mortality due to malnutrition	-	Bogotá D.C.	0.26%	0.86%	0.43%
Water quality	-	Barranquilla y Armenia	0.00%	10.19%	13.96%
Access to electricity (Rural area)	+	Conjunto de ciudades[*1]	100%	93.20%	12.90%
Unsatisfied basic needs	-	Bogotá D.C.	9.20%	20.21%	9.94%
Homicide rate	-	Tunja	5.21	24.61	11.05
Mortality due to traffic accident	-	Bogotá D.C.	7.41	16.37	5.85
Fundamentals of well-being					
Coverage in primary education	+	Yopal	107.52 %	89.85%	9.43%
Coverage in secondary education	+	Medellín	91.43%	68.52%	26.45%
Coverage in secondary education	+	Bucaramanga	56.72%	45.70%	10.86%
Internet penetration	+	Bucaramanga	25.98%	16.30%	4.22%
Suicide rate	-	Florencia	2.85	5.51	1.95
Premature mortality	-	Cali	10.4	12.4	2.11
Physical activity	-	Cartagena	88.00%	80.64%	4.32%
Freedom of movement	-	Pereira	8.40%	15.19%	4.53%
Use of non-motorized transport	+	Bogotá D.C., Manizales y Pereira	14.00%	10.27%	3.44%
Opportunities					
Trabajo infantil	-	Cartagena	0.9	3.780952	2.0682
Embarazo adolescente	-	Barranquilla	18	36.2	20.810
Ejecución de recursos	+	Medellín	91.5	70.05	9.67
Movilización de recursos propios	+	Medellín	84.79	55.95	17.92
Gobierno abierto y transparencia	+	Medellín, Armenia e Ibagué	100	77.59	19.63
Ordenamiento territorial	+	Pereira	72.32	48.11	10.87
Educación	+	Bucaramanga	61.4	53.52	4.9
Salud	+	Manizales	96.27	92.72	2.6
Servicios	+	Armenia	73.09	61.98	7.66
Seguridad y Convivencia	+	Cartagena	93.2	77.72	9

Note [*1]: set of cities conformed by Medellín, Bogotá D.C., Cartagena, Manizales, Pasto, Armenia, Pereira, Tunja, Bucaramanga, Sincelejo y Florencia

4. Application of the ideal city profile for Guadalajara de Buga

4.1 City selection

In order to contribute a practical component to the present study, the current situation of the city Guadalajara de Buga, also known as the Ciudad Señora, was analyzed in category 2 according to the DNP. The municipality is located in group 1 and, according to the IPM, has the endowments initials necessary to reach the level of other cities present in the profile. This city was founded in 1570 by the Spaniards who had to face the tribe "the bugas" (Alzate, 2016) and it is characterized for being of high tourist attraction because of the historical and religious legacy of the Basilica of the Lord of Miracles.

4.2 Information gathering

The data of the selected indicators come from studies carried out in the cities belonging to the How Cities Network. In the case of Guadalajara de Buga, the information was supplemented with that available in the Municipal Accountability documents; and, the behavior of this city was compared with those of the defined ideal condition, finding that in some cases the municipality was above or below (that is, better or worse respectively) of the ideal profile (S). Bearing in mind that for the purpose of this study, the critical condition was to be below the ideal profile S, we proceeded to determine how many standard deviations were removed from it according to the following equation:

$$standard\ deviation\ so\ far\ from\ \ i = \frac{|Value\ of\ profile\ at\ i - Value\ of\ municipality\ at\ i|}{Standard\ deviation\ at\ i} \quad (2)$$

Where i is the indicator j, with j varying between 1 and 28. The calculation of the average distance in standard deviations for the case of the city evaluated is presented in table 6.

Table 6. Application of the city profile (Guadalajara de Buga case)

Indicator	**Guadalajara de Buga**	**Valuation**[*1]	**Standard deviation far a way from the profile**
Child mortality	8.9	Worst	0.417935082
Maternal mortality	0.000%	Best	It does not apply because is better than the profile data
Mortality from contagious diseases	2.083%	Worst	1.369764832
Mortality due to malnutrition	0.7675%	Worst	1.175637371
Water quality	32.44%	Worst	2.323720432
Access to electricity (Rural area)	88.35%	Worst	0.905041546
Unsatisfied basic needs	11.56%	Worst	0.237527627
Homicide rate	61.73	Worst	5.113439071
Mortality due to traffic accident	31.3	Worst	4.086735581
Coverage in primary education	103.79%	Worst	0.395383108
Coverage in secondary education	95.68%	Best	It does not apply because is better than the profile data
Coverage in secondary education	53.55%	Worst	0.291808942
Internet penetration	17.46%	Worst	2.01883985
Suicide rate	3	Worst	0.076404505
Execution of resources	89.2	Worst	0.237888508
Mobilization of own resources	50.6	Worst	1.908000492
Open government and transparency	83.3	Worst	0.850777951
Territorial planning	34.9	Worst	3.443069719
Education	58.73997	Worst	0.542664931
Health	95.9800507	Worst	0.113576844
Services	58.4264795	Worst	1.913714768
Security and Coexistence	75.9723061	Worst	1.913461257

Source: author. Note 1: The assessment is given based on the qualitative evaluation of Best / Worst status against the determined city profile. Note 2: As there is no municipality information on criteria such as premature mortality, physical activity, freedom of movement, use of non-motorized transport, child labor and adolescent pregnancy, they are excluded from the dimensional analysis with the ideal city profile.

4.3 Indicators to improve

According to the results obtained through the proposed analysis, the five indicators that were farthest from the profile in standard deviations were selected (See table 7). Subsequently, it was verified if in the corresponding Municipal Development Plan (MDP) projects (or program of projects) that justly helped to reduce the identified gap, as well as, point out possible points for improvement for the municipal administration.

Table 7. Indicators furthest from profile, measured in standard deviations (Guadalajara de Buga case).

Indicator	**Impact**	**City profile**	**Guadalajara de Buga**	**Standard deviation far a way from ideal profile**
Homicide rate	-	5.21	61.73	5.11
Mortality due to traffic accident	-	7.41	31.3	4.09
Territorial planning	+	72.32	34.9	3.44
Water quality	-	0%	32.44%	2.32
Internet penetration	+	25.98%	17.46%	2.02

Source: authors.

4.4 Municipal Development Plan (MDP) Vs Indicators

Table 8 summarizes the indicators identified as critical following the proposed city profile methodology. On these indicators, the corresponding budget item should be allocated so that with the execution of the required works the quality of life of the municipality is improved.

Table 8. Indicators, MDP goals and other improvement proposals.

Indicator	**Goal of MDP**	**Additional proposals**
Homicide rate	Three new security quadrants; optimal functioning of 90 security cameras; installation and implementation of 10 community alarms	Carry out anti-narcotics control operations in various points of the city; ban the man barbecue
Mortality due to traffic accident	Raise and put into operation a route of attention in municipal health in traffic accidents	Regulate the informal service offered by motorcycle taxi drivers; increase control operations and document review in all types of vehicles
Territorial planning	Review and adjust the Territorial Ordering Plan (TOP)	Offer discounts on interest to delinquent debtors of the property tax
Water quality	Five new systems of drinking water treatment plants; expansion and replacement of 1000 meters of aqueduct network	Significantly expand the effective coverage of optimal water supply and sewerage networks in rural areas
Internet penetration	Execute a comprehensive plan for modernization and expansion of ICT infrastructure and networks in the municipality	Expand the Wi-Fi offer in public spaces for free; update computers in public schools that require it

Source: authors

In the case of Guadalajara de Buga, the Municipal Development Plan reports the infrastructure works required to improve the quality of life of the municipality (Secretaría Municipal de Planeación, 2018), which are in line with what was found in this study. However, with the proposed methodology, it is possible to identify other types of interventions that, as projects or programs, could be carried out to achieve the expected development. These works, both public infrastructure and social type, can be advanced in the city to achieve a better approximation of the municipality to the ideal city profile (S).

5. Discusión

The conditions of poverty and the low level of development of some regions are due precisely to the low investment, the precarious conditions of production of goods and services that result in low quality of life (Guisán, 2014). The physiographic division of a country it favors the political organization and the management of resources in each geographically determined space, seeking to reduce the inequalities that arise. And, precisely, to achieve development in each community, different types of works must be promoted that satisfy the variety of needs in relation to social, cultural, political, and economic aspects, among others. As it is understood, the execution of this type of works requires financial resources that are based on a budget that must be thoroughly prepared (Auditoría General de La Nación, 2012). On the other hand, it sometimes may require public-private partnerships and capital foreign, since, at least the latter, it contributes significantly to the gross domestic product of the regions and favors the execution of works with a high budget (Asongu & Odhiambo, 2018). The reality is that the tight budget availability available to most countries, and particularly developing countries such as Colombia, requires prioritizing the execution of investments, seeking to realize those that generate the greatest benefit to the communities.

Colombian legislation allows citizens to establish control mechanisms against budget allocations. Thus, citizens covered by Article 77 of Law 136 of 1994, may object to the designation of investments. Moreover, they can "submit observations on any project ... whose study and examination is being conducted in any of the permanent committees" responsible for the allocations of the treasury for the different works (Congreso de Colombia, 1994). As well as, in accordance with the provisions of article 78 of the same law, "to object to the projects in accordance with the budget approved by the Council for reasons of inconvenience or because they are contrary to the Constitution, the law and the ordinances" (Auditoría General de la República de Colombia, 2012). This regulation makes possible to guarantee the macroeconomic coherence indicated by the General Audit of the Republic of Colombia (Auditoría General de la República de Colombia, 2012). According with that agency, investments at the local level must be made in line with investments at the national level, as well as also, enjoy budgetary homeostasis so that the relationship between the growth rate of the economy and the behavior of budgets is maintained.

In this study, the condition of the ideal city profile was identified based on the evaluation of 28 attributes that could respond to the considerations for the SPI established by Porter, but that do not include the indicators of (Asongu & Odhiambo, 2018) because they do not currently are available in the Colombian media. In spite of the wide and diverse typology of attributes to qualify the development of a region, the evaluation of investments in public works infrastructure that could become necessary to supply some particular basic

needs is left aside. But, even so, the proposed methodology gives priority to projects aimed at improving the quality of life, connectivity and security, which in essence also contribute to municipal development. This demonstrates that public policy should be oriented toward those projects that ultimately generate a social benefit over the private benefit of the person who executes them (Warburton, 2019).

Taking into account that the development of the communities is not homogeneous (Quintero, 2017) and, given the lack of updated information in government repositories, it is recommended that focus group be set up in each territorial entity. In that way, a base line can be drawn up basis of each region and the ideal city profile will be particularized for the consequent prioritization of investments.

6. Conclusion

The governmental entities have a felt responsibility to improve the development condition of each of the municipalities. It is convenient that, at the level of the administrative structure of the municipal governments, criteria for evaluating this development be defined, taking into account the social, economic, physiographic and environmental heterogeneity of each city. There are municipalities in which it is urgent and priority to improve social conditions over physical works of infrastructure. However, this does not exclude or exempt the commitment to perform other types of works related to urban and rural improvement. In this study, an ideal city profile was determined starting from the indicators of the social progress index (SPI) and the Integral Performance Measurement (IPM) of capital cities in category zero and one. Likewise, the report of Accountability of Guadalajara de Buga, a city in category two, was analyzed, seeking to identify the type of projects or programs proposed in this municipality and proposing additional ones in order to improve the quality and living conditions Of the inhabitants. Although this model is approximate, concertation mechanisms must be established so that, from the local level, the needs initiatives of the communities can be raised to the national territorial entities.

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