La importancia de los mapas de conocimiento regional dentro del desarrollo municipal la experiencia de Santa Sofia Boyacá.

The importance of maps of regional knowledge within the municipal development experience Boyaca Santa Sofia.

Ariel Alfonso Reyes Castro

Luz Stella Gonzalez Santafe

Resumen

El desarrollo de una región depende en buena medida del aprovechamiento de sus recursos así como también de adecuados procesos de gestión participativa que permitan el desarrollo de planes de gobierno que desde los municipios identifiquen oportunidades y contribuyan a mejorar el desempeño de los territorios. Con esto en mente y utilizando la técnica de mapa de conocimiento se buscada identificar los elementos que pueden incidir en la competitividad futura del municipio y su articulación en 2030 al cumplimiento de los objetivos de desarrollo sostenible.

Palabras Clave: Conocimiento, desarrollo municipal, competitividad, sostenibilidad, región

Abstract

The development of a region depends to a large extent on the use of ITS as well as adequate resources participatory management Processes That the development of government allow Plans that Identify Opportunities from the municipalities and Contribute to Improving the performance of the territories. With This in mind and using the knowledge map technique, it is Sought to Identify the elements That Can Affect the Future Competitiveness of the municipality and Its articulation in 2030 to the fulfillment of the sustainable development goals.

Keywords: Knowledge, Municipal Development, Competitiveness, sustainability, region

Introduction

The municipality of Santa Sofia is part of the province of Ricaurte in the department of Boyaca. It is located 12 kilometers from the provincial capital town of Leiva and 53 kilometers from the provincial capital Tunja. Originally it was called Guatoque but in 1906 when he was 96 years of existence, changed its name to Santa Sofia in honor of the wife of President Rafael Reyes. The town is famous because every February 21 population meets the Moniquirá and Puente Nacional (Santander) at the top of Mazamorral to commemorate one of the most important battles in Colombia: the Thousand Days' War.

The municipality in turn has a population of 2921 to 2016 inhabitants, of which 851 are located in the urban center, achieving an area of 78 km^2, a population density of 27,59 inhabitants per square kilometer, which is distributed as follows:

sidewalk	**Population between 0 and 5 years.**	**Population between 6 and 12 years.**	**Population between 13 and 18 years.**	**Population between 19 and 27 years.**	**Population between 28 and 59 years.**	**Population 60+**	**Total.**
Hornillas	34	43	51	60	145	65	398
Salitrillo	17	10	16	2. 3	44	53	163
Guatoque	11	2. 3	33	36	75	75	253
agudelo	19	39	27	38	103	78	304
Barbila and Mane	9	16	25	eleven	43	26	130
Peaches and Colorados	16	26	26	31	84	54	237
Mata Ramo.	4	12	13	13	35	28	105
Puentecitas	10	14	22	21	40	24	131
Pantanillo	8	9	13	24	36	43	133
Sorocota	15	16	24	25	74	62	216
Casco Urbano	46	94	100	145	344	122	851
Total	189	302	320	427	1023	630F	2921

Table 1. Population distribution in the municipality of Santa Lucia. Source:(Municipality of Santa Sofia, 2016)

Its main economic activity is carried out by featuring the cold thermal floors moist environment in the development of farming, where the cultivation of Granada, the curuba of Castile, the greenhouse tomato, wild strawberry, raspberry premium, potato, corn, peas, beans, cassava and sweet potatoes, as well as in accordance with(Miranda, Fischer, & Carranza, 2013) the municipality has strengths in the production of deciduous, specifically those related to the peach and pear.

Also, the municipality has strengths related to the development of tourist activities hiking, canyoneering, canyoning, climbing, mountaineering and caving. Thanks to that the municipality places of interest are as:

- Step and cascade angel.
- Romera the pit.
- Cave diving and Hayal.
- Zaquencipa's astronomical observatory.

Now if we consider the welfare of society as sofileña depends largely on the way according to the(National Planning Department, 2019)the municipal development plans are focused to meet the objectives of sustainable development, starting from the ODS 11 which is sought the development of sustainable cities and communities from inclusion, resilience and security to gestate the development of actions to : 1) the development of actions that contribute to quality educational offer, 2) poverty reduction, 3) the development of actions to mitigate impacts posed by climate change, 4) development of conditions for sustainable economic growth 5) reducing inequalities, 6) the development of actions to promote basic sanitation, 7) the development of responsible production and consumption and 8) the reduction of problems related to malnutrition.For which it is necessary to identify the methodological, theoretical and institutional elements that allow the development of actions from the articulation between participatory democracy and managing for results enhance the competitiveness of the municipality.

theoretical basis.

The competitiveness of a country depends on its regions, and this in turn of the municipalities that comprise it. So, talk about regional competitiveness as the midpoint at both ends depends on what(Mancha, Moscoso, & Santos, 2016) associated with the basic pillars of competitiveness, which in turn are associated with:

1. Identify the variables that influence the growth of an economy. An emphasis on institutions, infrastructure development, development of

appropriate macroeconomic conditions, health and access to quality primary education.

2. Determine the variables that influence the efficiency of an economy. Which relate to aspects associated with: access to higher education and relevant vocational training, labor market efficiency and property, financial market development, technological readiness and market size.
3. Recognize the elements that favor innovation. Where the level of market sophistication and innovation capacity is analyzed.

In turn, according to (Sala-I, and others, 2015)They should also consider management issues related to the productive environment in which they are corporate culture, industry specialization, innovation, have a favorable industrial climate, availability of capital and the presence of strong institutional factors. Likewise also it depends on the availability of skilled labor, quality of management is attained and the level of higher education which is counted in the region.

Parallel to the above from the public point of view according to (Lombana & Rozas Gutíerrez, 2008) it is also necessary government structures help create knowledge infrastructure, transport and telecommunications to favor the development of so-called learning technologies and knowledge (TAC's) to operationalize technology infrastructure in order to create regions they are attractive to receive support via tax incentives or otherwise to be poles of development which receive public private investment, or FDI.

Also according to (Espinosa Cuervo, 2008), he (National Planning Department, 2011), (Salas Bourgoin, 2013) and the (Assembly of Boyaca, 2016)planning processes affecting municipalities and regions should be considered as criteria for measuring political outcomes (since the transfer of powers between region - province - municipality), economic, strategic (in order to identify risks, establish ideal scenarios and build territorial projects) as well as the development of collective intelligence processes that favor the development of synergies to local development actions in the case of the province of Ricaurte encourage the

development of value chains in sectors such as tourism, agribusiness and horticulture.

To allow in the medium term to transform the province of Ricaurte in an economic region planning a Boyaca department with the departments of Cundinamarca and Santander. This aspect is reinforced when reviewing the proposal(Gobernación de Boyacá, Colciencias, IDB, 2012) to establish in their PEDCTI your departmental vocation to development should focus towards agricultural sectors - agribusiness, tourism, transport, services and steel for which are priority to productive bets:

1. The conservation of the environment.
2. Basic sanitation.
3. Risk management considered for this actions related to mitigation of impacts to climate change.
4. Human development as a pillar of productive development.
5. Social mobility as a variable development towards social innovation.

Parallel to this to ensure that the department and the provinces / regions that do not conform to become competitive from the development of its municipalities should also be integrated according as expounded (Innpulsa, Cluster Development & Universidad del Rosario, 2018)actions from the perspective of the development of clusters or productive chains facilitate growth and competitiveness of productive sectors in certain territories. As in Boyaca department with metalmecánico cluster initiative and auto parts department and that is mainly in the municipality of Duitama. Aspect on which the municipality can learn as well as the experiences(Innpulsa Colombia, 2015)It developed through the so-called competitive routes in sectors such as dairy and passenger transport services products. However, these initiatives are cut when the provinces and municipalities not known how to integrate the needs of the market to the characteristics of the environment in which the municipality is framed.

Faced with this situation and given that development is achieved when involved and committed to the communities in achieving a common purpose is that

it is necessary to integrate into any process of development planning participatory aspects where one of the tools that allows make it possible to identify key knowledge to enable the generation of change has to do with what (Ramirez Jurado, 2014)associated with the use of knowledge maps and graphical tools that help determine where and how is the knowledge required by an organization to improve its performance. Which implies that the information showing evidences integrated and interrelated aspects. To achieve inter alia:

1. Take an inventory of what is known and what you need to know to achieve a specific goal.
2. Identification of gaps and breaks of knowledge must be supplemented or enhanced.
3. objective assessments of what is known and what should be known.
4. Visualization of relationships that enable the development of knowledge management processes.
5. The analysis of the type of knowledge that exists on a particular aspect. Identifying it as tacit or explicit.

So knowledge maps allow you to analyze, record, map, identify and structure the elements that allow the development of strategic planning processes where analyze what is known, the elements that should be known to register, it is determined where are the sources of such knowledge and connections are established to facilitate collection.

In addition to the foregoing and in accordance with (Howard, 1989), (Chavalarias & Cointet, 2008) Y (Rojas, Morales, & Dueñas, 2012) a knowledge map can also be built using the following methodology:

1. Search scientific databases on the subject of interest for example competitiveness. In order to build an initial database.
2. Defining a thesaurus of related terms.
3. Building a ranking with nodes that allows the articulation with keywords. For this case they can be used when aspects of bibliometric research tools

such as CFinder however in this research by their nature are used not used.

4. Developing a cooccurrence matrix and proximities.
5. The development of a cluster analysis process.
6. The development as such knowledge map.

Methodology.

The development of this document is based on the results of processes of participatory action research prior which were used to define management processes that support the development of a knowledge map to determine the necessary knowledge to help improve the competitive performance municipality and facilitate insertion into the province of Ricaurte as a dynamic author capable of influencing the competitiveness of the department which according to the (ECLA, 2017) It shows that the department has the following results:

Variable.	competitiveness	economic strength	Infrastructure and Logistics	social welfare and human capital.	Science, technology and innovation	Institutions and governance.
current level	Tall[1]	medium high	medium high	Tall	Low	Leader
Short term.	Stable	Emergent	Stable	Stable	Loser[2]	Stagnant
Medium term (expected vision).	Stable	Stable	winner	Emergent	Winner	Stable

Table 2. Results competitiveness criteria in the department of Boyaca. Source:(ECLA, 2017)

With this in mind it is important to mention that the determinants that make turn each of these variables analyzed in the municipality are:

- economic strength. Considering aspects associated variables affecting; market size, production structure, partnerships and entrepreneurship, foreign trade, access to financial services.

[1] According to the (ECLA, 2017) the ranking of competitiveness of the departments is expressed according to a general index that categorizes regions, departments (in this case), provinces and municipalities as (1) Extra leader, (2) leader, (3) high (4) medium high, (5) low, (6) colero and (7) behind colero

[2]In practice, a department is the winner if he wins in the variables analyzed positions or loser if you lose competitiveness. If kept constant in his assessment level and earn positions in the assessment it is characterized as emergent. If you keep your level but lost positions becomes stagnant and stable if their situation does not change.

- Infrastructure and logistics. Analyzing related to road infrastructure elements, terminals, digital connectivity.
- social welfare and human capital. Verifying issues related to access to health, education, public services, social development structures.
- Science, technology and innovation. Assessing the municipality in terms of scientific production, quality of higher education, investment in science, technology and innovation.
- Institutionality and public management. Diagnosing behavior in the municipality have variables related to governance, public finance, transparency and security.

Results and Discussion.

If we consider as a basis for this document line to the municipal development plan Santa Sofia can be established that strategic pillars in the short term determine the harmonious, competitive and sustainable development of the municipality it may be mentioned that these pillars are related to those previously exposed within this document.

In turn and in accordance with the (Municipality of Santa Sofia, 2016) and considering the result of Community research process the municipality has the following problems since its geopolitical structure which are vital to solving the time to develop management processes that help improve their competitiveness in the near future.

Number Variable	Variable Key.	Mata de Ramos	Sorocotá	Pantanillo	agudelo	Salitrillo	Hornillas	Guatoque	Peaches and Colorados	Puentecitas	Chinand Mane	Casco Urbano	Total, Veredas affected.
1	Roads Improvement	X	X	X	X	X	X	X	X	X	X	X	11
2	Health care	X	X	X	X	X	X	X	X	X	X	X	11
3	Aqueduct, infrastructure	X	X	X	X	X	X	X	X	X	X	X	11
4	Drinking water	X	X	X	X	X	X	X	X	X	X		11
5	Technical assistance	X	X	X	X	X	X	X	X	X	X		11
6	Agricultural projects	X	X	X	X	X	X	X	X	X	X		10
7	Organization of rural aqueducts	X	X	X	X	X	X	X	X	X	X		10
8	Construction of Artworks	X	X	X	X		X	X		X	X	X	9
9	Elderly Care	X	X	X	X	X	X	X	X			X	9
10	Construction of Reservoirs	X	X	X	X	X	X	X	X			X	9
11	Aqueduct, capture and conduction	X	X	X		X	X	X	X	X	X		9
12	afforestation		X	X	X	X	X	X	X	X	X		9
13	Preservation of watersheds and micro		X	X	X	X	X	X	X		X	X	9
14	Irrigation District	X	X		X		X	X	X	X	X		8
15	rural power grids		X	X	X	X		X	X	X	X		8
16	Risk management	X	X			X	X	X		X		X	7
17	Purchase of strategic land	X	X		X	X		X	X		X		7
18	Promoting Tourism Sector		X		X	X	X			X	X	X	7
19	Education infrastructure		X	X		X		X	X	X		X	7
20	Basic sanitation	X	X		X			X	X		X		6
21	Citizen participation		X	X		X	X	X				X	6
22	Recreation and Sports Programs		X	X		X			X		X	X	6
23	Loan machinery		X		X	X	X	X	X				6
24	Attention disabled population	X	X			X		X		X		X	6

25	Projects for Women			X	X	X				X	X	X	6
26	Health brigades				X	X	X		X	X	X		6
27	creating partnerships		X		X		X	X		X			5
28	cleaning Quebradas		X		X			X	X		X		5
29	Deforestation Control	X			X				X	X	X		5
30	Support cultural entity					X	X	X		X		X	5
31	Education Sector -Discapacitados		X					X		X		X	4
32	Security		X	X		X	X						4
33	educational agreements			X		X					X	X	4
34	Solid Waste Management				X				X		X	X	4
35	Migration		X			X						X	3
36	Environmental Management Plan		X		X							X	3
37	Inclusion of gender policy		X	X								X	3
38	Digital kiosk Internet-TICS			X		X		X					3
39	Processing facilities			X				X	X				3
40	Natural gas			X	X							X	3
41	School coverage			X		X	X						3
42	Sewer improvement			X				X		X			3
43	Sports infrastructure				X	X					X		3
44	Youth Programs							X			X	X	3
45	Institutional abandonment		X				X						2
46	Marketing of agricultural products		X	X									2
47	Zoonosis program		X									X	2
48	Training in information technology			X								X	2
49	Sex education			X								X	2
50	Animal Control Policy			X								X	2
51	Promotion of SMEs			X						X			2
52	Endowment Health Center			X								X	2
53	Promotion of green crops				X						X		2

54	Psychological care for students		X				X	2
55	administrative efficiency and accountability		X				X	2
56	community radio station - Radio speaker		X	X				2
57	cadastral update		X	X				2
58	Vocational guidance programs				X		X	2
59	Opening routes	X						1
60	agricultural diversification		X					1
61	ESE programs with Education Sector		X					1
62	Ambulance Service		X					1
63	Adapting to climate change		X					1
64	Genetic improvement			X				1

Table 3. Variables that generate opportunities for improvement for the municipality of Santa Sofia. Source: Authors.

In reviewing the number of variables analyzed is that there are 313 affectations which are organized from highest to lowest for each of the variables analyzed thereby establishing that according to can implement the technique Pareto to identify variables that should be handled a priority for which it was established that the order from highest to lowest frequency of occurrence the sum of variables that would result in a value close to 250.4 requirements should be considered. Thus of the 64 variables analyzed is a priority considering the results jointly relate to variables 1 to 34 solid waste management. These variables that will be on which construction work on the city map knowledge.

According to the above could establish which of these 34 variables analyzed were the following behavior:

Variable	behavior-related criteria analyzed	Relevance to the community.
Economic strength.	Variables number: 6, 12,14, 17, 18, 23, 25, 27.	23.29%
Infrastructure and logistics.	Variables number: 1, 3, 4, 7, 10, 11, 15, 28 and 34.	33.33%
social welfare and human capital.	Variables number: 2, 9, 10, 11, 13, 16, 20, 22, 24, 26, 31.	18.88%
Science, technology and innovation.	Variables number: 5, 8, 19, 30, 33	14.06%
Institutionality and public management.	Variables number: 16, 21, 29, 31, 32	10.44%

Table 4. Evaluation Variables associated with the elements that affect the competitiveness of the municipality.

Source: Authors.

According to the above future administrations of the municipality should consider not only the alignment of participatory planning processes supported in the(National Planning Department, 2019)and sets from the enactment of the national development plan the Pact for Colombia integrating the aspects related to: 1) sustainability 2) decentralization, 3) projects that promote equality for women, 4) actions to strengthen conditions for peace 5) processes that contribute to strengthening the digital transformation of the municipality, 6) the development of actions to promote the development of processes associated with science, technology and innovation. Looking for this that 7) the inclusion of all people with disabilities looking for with this a more equitable and inclusive country is promoted. Looking for this that according to(Dnp, 2019) the region will become a center of innovation and logistics hub of national and international productive integration achieved within their development processes according to the (Dnp, 2017)[3] and the (GRI, Global Compact & WBCSD, 2018) in integrating their actions achieve their competitiveness on par with the fulfillment of the so-called sustainable development goals and considering the development of specific actions for the municipality in the

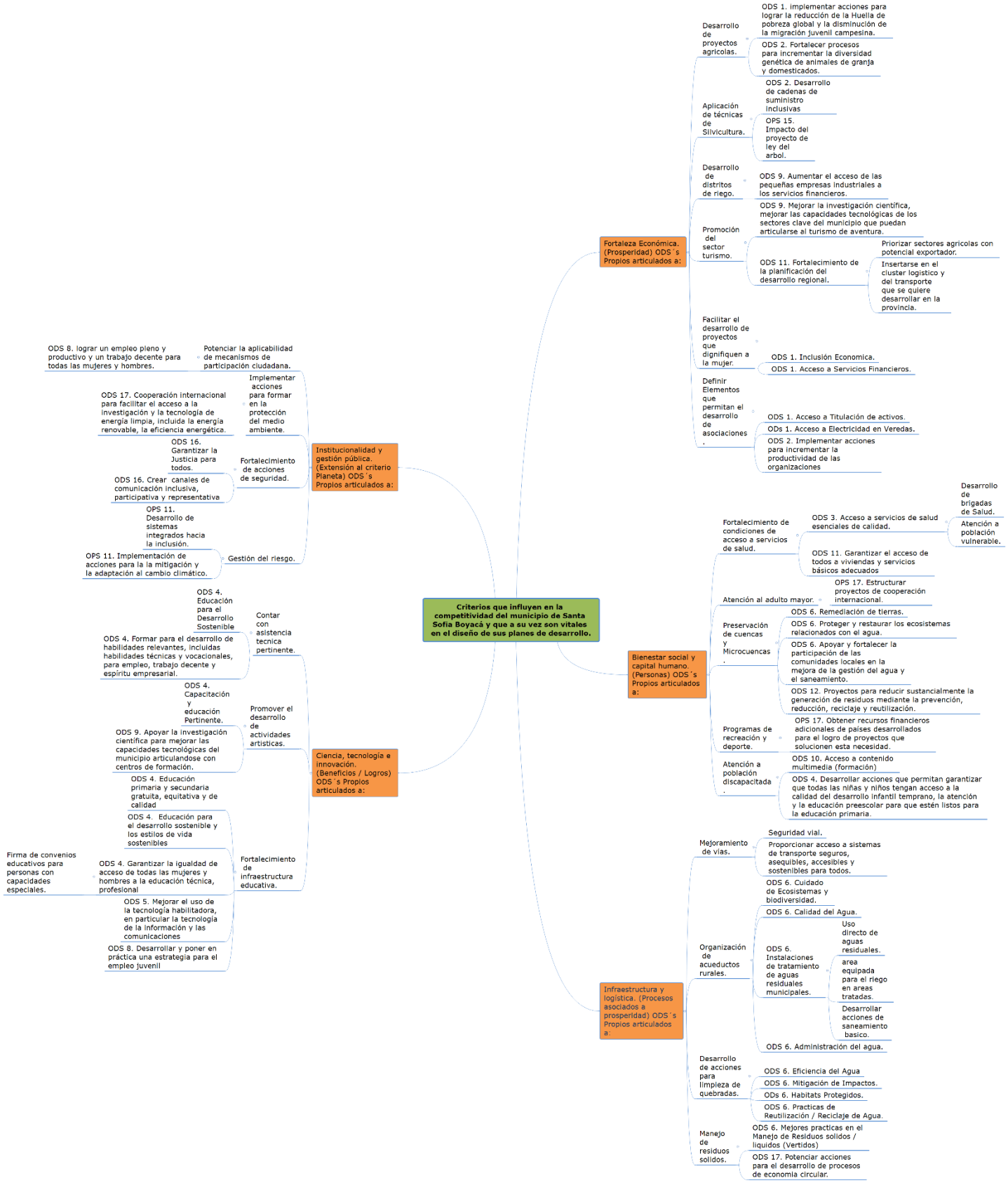
[3] Considering the social dimension, the economic dimension, environmental dimension and the institutional dimension.

following aspects of management that integrate the (Global Compact, 2014)5P termed as the methodology for the development of the region and the municipality. Which relate to:

- People: ODS's 1,2,3,4,5.
- Planet ODS's 6, 12, 13, 14, 15.
- Prosperity: ODS's 7,8,9,10 and 11.
- Peace: ODS 16.
- Benefits: ODS 17.

Thus from the above and the following elements should be the criteria to consider in formulating future development plans in the development of the municipality of Santa Sofia Boyacá:

Figure 1. Structure of knowledge map for development plans in the municipality of Santa Sofia. Source authors



Conclusions.

- The use of tools to develop knowledge maps becomes a valuable ally to identify key issues that influence the development of a municipality as in this case, a region, a department or even because they say the set of we should focus a territory to become competitive.
- Knowledge maps are essential for when you want to go to handle data into information and then find affinities to transform this knowledge and from there to the development of processes of organizational intelligence that allow from what it does an organization integrate what other manage and develop best management practices that benefit the behavior of a performance enhancing sector.
- Since the inhabitants of the municipality established as a fundamental pillar of development of the municipality actions that have to do with infrastructure processes, it is vital to establish that the first pillar of growth of the municipality should focus on the development of sustainable development goals that have to do with the numbers 7, 8,9, 10 and 11. coordinating with those who have to do with the development of the local inhabitants, as well as the ODS 6.
- But if we compare the challenges of the municipality with which it has Colombia must say that according to the (Sustainable development network solutions, 2018) Performance trends are as follows:
    - Decreased performance: ODS 11 cities and sustainable communities.
    - Stalled in: ODS 4. Quality education, underwater life ODS 14, ODS 15 life and terrestrial ecosystems and 16 ODS peace, justice and strong institutions.
    - moderate increase in: ODS 2 Zero Hunger, health and welfare ODS 3, 5 ODS gender equality, ODS 7 affordable and clean energy, ODS 9 industry, innovation and infrastructure and ODS 17. Alliances for achieving the goals.
    - Advancing criteria enabling the country to meet the ODS in 2030. ODS 1. End poverty and ODS 8. Decent work and economic growth.

    - ODS 13. Climate action: suitable for achieving the goals in maintenance.
    - No data to define a trend: 10 Settlement ODS and ODS inequalities 12 Production and responsible consumption.
- Thus with the use of maps of regional knowledge it makes it easier to identify, transfer, share and use knowledge to identify pillars for the case to determine essential criteria for formulating the development plan Santa Sofia in the next triennium, the definition of programs that can build such a plan and priority projects are to be developed with funds from the municipality or co-financed with resources such general royalty system or by applying the ODS 17 by developing international cooperation projects. However it should also be mentioned that the application of this technique is personal to each municipality, province, region or department.
- A future is then necessary to mention that the technique can be strengthened to enhance their impact through the use of factor analysis where from data reduction can correlate to define key variables when their number is very large.

References

Assembly of Boyaca. (2016). departmental development plan Boyaca - Boyacá believe in a land of peace and freedom 2016-2019. Tunja: Assembly of Boyaca.

Cepal. (2017). Ranking of the competitiveness of the departments of Colombia 2017. Bogota DC: Cepal.

Chavalarias, D., & Cointet, J. (2008). Bottom-up scientific field detection for dynamical and hierarchical mapping science, methodology and case study. Scientometrics, Vol. 75, 37-50.

National Planning Department. (2011). Boyacá Vision 2019: Bicentennial territory of freedom and prosperity. Bogotá DC: DNP.

National Planning Department. (2019). National Development Plan 2018-2022. Colombia pact, a pact for equity. Bogotá DC: National Planning Department.

National Planning Department. (2019). Toward Integration at last? The Sustainable Development Goals as a network of targets. New York: UN.

dnp. (2017). Inclusion of ODS in the plans of territorial development, 2016-2019. Bogotá DC: dnp.

Dnp. (2019). Central Region: Innovation Center and logistics hub of national and international productive integration. Bogotá DC: National Planning Department.

Espinosa Cuervo, J. (2008). Territorial Foresight: A way for the social construction of territories future. Externado University of Colombia., 301-336.

Global Compact. (2014). The P5 of GPM Global Standard for sostenibilidaad on sustainability in project management. the Global Compact.

Governor of Boyaca, Colciencias, IDB. (2012). Departmental Strategic Plan for Science, Technology and Innovation PEDCTI Boyacá 2022. Bogotá, Colombia: Administrative Department of Science, Technology and Innovation. Colciencias.

GRI, Global Compact & WBCSD. (2018). The guide for corporate action in ODS. SDG Compass.

Howard, R. (1989). Knowledge Maps. Management Science, Vol 903 35 ,, -. 922.

Innpulsa Colombia. (2015). Competitive routes program. Bogotá DC

Innpulsa, Cluster Development & Universidad del Rosario. (2018). Cluster initiatives in Colombia. Instruments of economic development and competitiveness. Bogotá DC: Innpulsa, Cluster Development & Universidad del Rosario.

Lombana, J., & Rozas Gutíerrez, S. (2008). analytical framework for competitiveness. foundations for the study of regional competitiveness. Thought and Gesión No. 26, 3-38.

Mancha, T., Moscoso, F., & Santos, J. (2016). Measuring the difficult concept of competitiveness What factors affect regional competitiveness? University of Alcala.

Miranda, D., Fischer, G., & Carranza, C. (2013). Deciduous Fruit in Colombia. present situation, cropping systems and development plan. Bogotá, Colombia: Balance Graphic Editorial Ltda.

Municipality of Santa Sofia. (2016). Development plan of the municipality of Santa sofia Boyaca. "Making a difference with experience, commitment and management from 2016 to 2019. Santa Sofia Boyaca.

Ramirez Jury, G. (2014). Construction of knowledge maps in universities. Knowledge management., 65-78.

Rojas, D., Morales, M., & Dueñas, M. (2012). methodological proposal for knowledge maps. Faculty Economics magazine vol XX sciences., 77-90.

Sala-I, M., Blanke, X., Hanouz, M., Geiger, T., Mia, I., & Pua, F. (2015). Drivers of long run prosperity: Laying the foundations for an updated overall index competitiviness. Hampshire.

Bourgoin Salas, M. (2013). territorial foresight: approach to a conceptual basis and methodology. Universidad de los Andes Venezuela.

Sustainable Development Solutions Network. (2018). SDG Index and Dashboards Report 2018 Global Responsasbilities Implementing the Goals country profiles edition.