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Analysis of Public Information Requests in e-Government through Bayesian Network Models

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Abstract Access to information is a right to request, seek and receive information generated by the public administration, which is considered as one of the main instruments to promote transparency, accountability and citizen participation, the goal is advance in the construction of a society that makes use of its rights and at the same time takes part of its responsibility for the making of decisions. Access to information creates a link between citizens and rulers, so that the former can learn about the actions of their rulers, and for the government to regain the lost confidence of its citizens. The present article to show the findings found when studying the municipalities of the state of Oaxaca through its web pages, analyzing them mainly in the matter of access to information. For this, the municipalities that have a web portal will first be identified, then the type of information will be evaluated, and finally the extent to which such information could be of benefit to the users.

Keywords access to information, municipalities, Oaxaca, web pages

Introduction

Access to information is a right that has become very important in recent years, since the need to be informed and the State's commitment to be transparent has allowed the creation of laws, norms and institutions to enforce this right. To mention the most relevant actions that have been done regarding the right to access to information can be mentioned the reform made to article 6 constitutional, made in 1977. On the other hand, in 2002 was published in the Journal Federal Official of the Federation (DOF) the Federal Law of Transparency and Access to Governmental Public Information (LFTAIPG), which later evolved until the General Law on Transparency and Access to Public Information (LGTAIP) was issued in 2015 This law establishes that any natural or legal person who receives or exercises public resources is obliged to publish the information that is generated during its exercise, in order that it may be available and be reused by any person for the purposes that Best suits you. It is also important to mention that Article 4 of the LGTAIP states that the human right of access to information includes requesting, investigating, disseminating, seeking and receiving public information, without the need to prove personality or legal interest.

However, despite the existence of regulations and institutions in terms of access to information, transparency portals do not contain information that citizens consider important, therefore they have to make requests to the corresponding institutions, finding themselves in difficulty to obtain the information that interests them.

Requests for Public Information

According to the Office of the Attorney General of the Republic (2015), a Request for Public Information (SIP) is the request made to dependencies, entities of the Federal Public Administration and other subjects required by law to generate, obtain, acquire, transform or conserve, The requested information can be about any activity that they carry out. To mention some examples, it could be about organization chart, minutes of meetings, results of

the projects and programs, expenses that make, in summary, everything that they produce and that is not reserved for confidential information.

However, the obligation to provide information held by the obligated parties, does not include delivering the processed information, ie, does not need to be presented in the interests of the applicant; For example a summary, statistics, research, among others.

On the other hand, article 23 of LFTIP mentions the means through which a request for information can be made. It then states that: "Any person by himself or through his representative, may submit a request for access to information before the Transparency Unit, through the National Platform, at the office or offices designated for it, via email, Postal mail, messaging, telegraph, verbally or any means approved by the National System.

The requirements to be covered by the application are described in article 125 of the LFTIP, which are:

- Name or, where applicable, the general data of your representative;
- Address or means to receive notifications;
- The description of the requested information;
- Any other information that facilitates its search and eventual location, and
- The modality in which he prefers to grant access to information, which may be verbal, provided that it is for guidance purposes, through direct consultation, through the issuance of simple or certified copies or reproduction in any other medium, including The electronic ones.

Also, it is important to mention that in order to request public information the applicant does not need to explain what the purpose of such request is. However, although Mexico has created laws and regulations to make access to information a public good, there are still many gaps in the strategies implemented to respond to requests for information that citizens make. It is useless to claim that Mexico is a transparent country if the public policies that promote efficiency in this area are not created.

Bayesian Networks Theory

According to De la Torre-Gea *et al*. [1], a Bayesian network is a directed acyclic graph, composed of nodes (variables) and arcs or arrows (probabilistic dependencies). Where the nodes to which the arrow points are dependent (cause-effect) of which is in the origin of this. In addition, the author cites [2-4] that the network structure provides information on probabilistic dependencies between variables, as well as the conditional independence of a variable. They also say that obtaining a Bayesian Network from raw data is divided into two stages: structural learning and parametric learning [5].

According to Ortiz-Vazquez *et al.* [6], structural learning consists in obtaining relations of dependence and independence between the variables involved. Parametric learning. It aims to obtain the a priori and conditional probabilities required from a given structure [7-8].

Materials and Methods

In order to obtain the data, the National Survey of Access to Public Information and Protection of Personal Data (ENAID), made in 2016 by the National Institute of Statistics and Geography (INEGI) was used, Obtain information on the experiences, attitudes and perceptions of information quality issues provided by the government, transparency obligations, requests for public information and protection of personal data.

The ENAID was applied in the 32 federative entities, however, for this investigation only the analysis of the surveys carried out in the state of Oaxaca was done using 24 variables divided into two segments. The first segment consists of the following variables: 1) formal request for information, 2) the medium for which the request was made, 3) the cost of the request, 4) the purpose of the request, 5) the type of information requested, 6) the response of the request, 7) the reason for which it did not receive a response, 8) the action taken for not having responded. On the other hand, it was analyzed the compound variable (second segment of variables), information of the government that the citizen would like to know, which consists of 15 variables: 1) directory of public servants, 2) budget and use of public resources, 3) reports of activities, 4) laws, regulations and statutes, 5) salaries and salaries of government workers, 6) contracts, concessions, purchases and public works services, 7) formalities, requirements and formats, 8) internal organization, 9) public security and crime in the country, 10) poverty levels, 11) employment levels, 12) economic situation of the country, 13) elections and

political parties (budget, campaign expenses, results), 14) Capital, national and foreign, and 15) support through social programs.

Tables 1 and 2 show the questions, variables, and responses of the two segments of variables analyzed for the creation of Bayesian Networks models that describe the relationships between the variables mentioned above.

Table 1: Questions and answers from the first segment of variables

Question	Variable	Answers
1. Have you ever made a formal request for information to a government institution?	Solicitud_formal	S1: Yes S2: No S9: Do not know / not answer
2. What information did you ask for in your last application?	Tipo_Informacion	S1: Education and / or scholarship services and reports. S2: Support and social programs S3: Procedures, requirements and formats S4: Public Safety and Delinquency S5: Directory, remuneration, public expenditure and functions of public servants. S6: Other answer S9: Do not know / not answer
3. To which government institution did you last apply?	Institucion	S1: Federal Institute of Access to Information (IFAI) S2: National Institute of Transparency, Access to Information and Protection of Personal Data (INAI) S3: State Transparency Institute S4: Other intuitions S9: Do not know / not answer
4. By what means?	Medio	S1: Personally (transparency offices) S2: By Internet (national or state transparency platform) S3: By email S4: Postal, telegraph or courier service S5: By phone S6: By free writing S7: Other S9: Do not know / not answer
5. For what purpose did you last apply?	Finalidad	S1: Personal S2: School S3: Work S4: Business S5: Research S6: Other S9: Do not know / not answer
6. Did you get the information you needed?	Obtuvo_Informacion	S1: Yes S2: No S9: Do not know / not answer
7. Receiving the information, did you incur an additional expense at the cost of reproduction and / or shipment?		S1: Yes S2: No S9: Do not know / not answer
8. What was the reason you did not get the information?	Razon_no_Informacion	S2: The information provided was incomplete S3: The information provided is not related to the request S4: He was told that the information had another institution S5: Other S6: Did not have any type of response S9: Do not know / not answer

9. What did you do about it?	Accion_no_Informacion	S2: He filed a review appeal S3: He complained to the corresponding government department S4: Other S5: Nothing S9: Do not know / not answer

Table 2: Questions and answers of the second segment of variables

Question		Answers
1. If you make a formal request to government institutions, would you like to request information on budget and use of public resources?	Info_Presupuesto	S1: Yes S0: No S9: Do not know / not answer
2. If you make a formal request to government institutions, would you like to request information on activity reports?	Info_Informe_Actividades	S1: Yes S0: No S9: Do not know / not answer
3. If you will make a formal request to government institutions, would you like to request the directory information for public servants?	Info_Directorio_SP	S1: Yes S0: No S9: Do not know / not answer
4. If you make a formal request to government institutions, would you like to request information on laws, regulations and bylaws?	Info_Leyes	S1: Yes S0: No S9: Do not know / not answer
5. If you make a formal request to government institutions, would you like to request information on salaries and salaries of government workers?	Info_Sueldos	S1: Yes S0: No S9: Do not know / not answer
6. If you make a formal request to government institutions, would you like to request information on procurement, concessions, purchases and public works services?	Info_Contrataciones	S1: Yes S0: No S9: Do not know / not answer
7. If you make a formal request to government institutions, would you like to request information on procedures, requirements and formats?	Info_Tramites	S1: Yes S0: No S9: Do not know / not answer
8. If you make a formal request to government institutions, would you like to request information about internal organization?	Info_Organigrama	S1: Yes S0: No S9: Do not know / not answer
9. If you make a formal request to government institutions, would you like to request information on public safety and crime in the country?	Info_Seguridad	S1: Yes S0: No S9: Do not know / not answer
10. If you make a formal request to government institutions, would you like to request information on poverty levels?	Info_Pobreza	S1: Yes S0: No S9: Do not know / not answer
11. If you make a formal request to government institutions, would you like to request information on employment levels?	Info_Empleo	S1: Yes S0: No S9: Do not know / not answer
12. If you make a formal request to government institutions, would you like to request		S1: Yes S0: No

information on the country's economic situation?	Info_Economia	S9: Do not know / not answer
13. If you make a formal request to government institutions, would you like to request information about elections and political parties (budget, campaign expenses, results)?	Info_PartidosPoliticos	S1: Yes S0: No S9: Do not know / not answer
14. If you make a formal request to government institutions, would you like to request information on capital investment, domestic and foreign?	Info_Inversion	S1: Yes S0: No S9: Do not know / not answer
15. If you make a formal request to government institutions, would you like to request support information through social programs?	Info_ProgramasSociales	S1: Yes S0: No S9: Do not know / not answer

The analysis of the Bayesian Networks was performed using ELVIRA software version 0.162 in three stages suggested by Garrote [9]:

- Pre-processing: lost and unknown values were replaced by zeros by the algorithm of the imputation of missing values.
- Processing: was done using the learning method K2 Learning, with a maximum of five parent nodes and without restrictions.
- Post-processing: the network structure was obtained showing the causal dependencies between the variables.

Results and Discussion

Two models of Bayesian Networks were obtained. The first network obtained is shown in Figure 1, where the relationships between the variables studied can be observed: 1) formal request for information, 2) medium for which the request was made, 3) the cost of the request, 4) the purpose of the request, 5) the type of information requested, 6) the response to the request, 7) the reason for not receiving a response, and 8) the action was taken because there was no response. It is important to mention that the red arrows indicate a high dependence between the variables, whereas the ones of lilac indicate a little relation. Also, it should be noted that when performing an instantiation, the red color indicates the values of probability a priori (without evidence) and with green color is detailed the values of probability a posteriori, that is to say, product of the imported data. In Table 3, the most important findings found in the network are visualized.

Table 3: Frequently Asked Questions

Variable	**Answer**	**Percent**
Formal request	If you made a formal request	7%
Institution Requested	Other (not contemplated by ENAID)	100%
Request Medium	Personally	96%
Purpose of the application	Work	93%
Type of information requested	Other (not contemplated by ENAID)	92%
Obtained information	Yes	98%
The information had some cost	No	99%
If you did not get information Reason	Did not get answer	99%
Action for not obtaining information	Any	97%

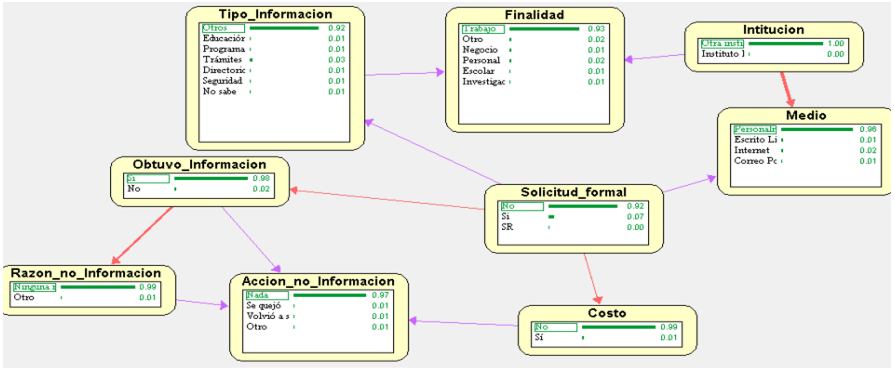

Figure 1: Bayesian Network to the first segment of the variables

The previous graph shows that the relationship between the institution and average variables is strong, and it is noted that the institution is the cause of the medium used to make a request for information, that is, that the requests depend on the channels provided by the institution So that an application can be made.

Likewise, it is possible to see in the figure the very close relationship between formal request and whether or not it obtained information, from which it can be said that for the obtaining of information it is of great relevance to make a formal request, reason why it is necessary to eliminate Bureaucratic barriers so that requests can informally be made in a formal way, or that a formal request is not needed to provide information to citizens. The relations between obtained information and the reason for which no information was obtained, as well as formal request and cost; Are relations that are explained by their nature. The reason for not having information depends on not obtaining information, which sounds coherent since if it had had information there was no reason for not informing. Similarly, the cost depends on the formal request, which in this case is void.

On the other hand, three assumptions were made to make inferences a priori with the imported data:

First assumption: If the means for making formal requests for information was through the internet, it would increase the requests. Assuming that there was a portal to request information from the different institutions, a larger number of formal requests would be made from 7% to 75%. They would increase the requests to the transparency institutions, the purpose of the request would be varied, not mainly work, the type of information was also varied since it would have digital data (Figure 2).

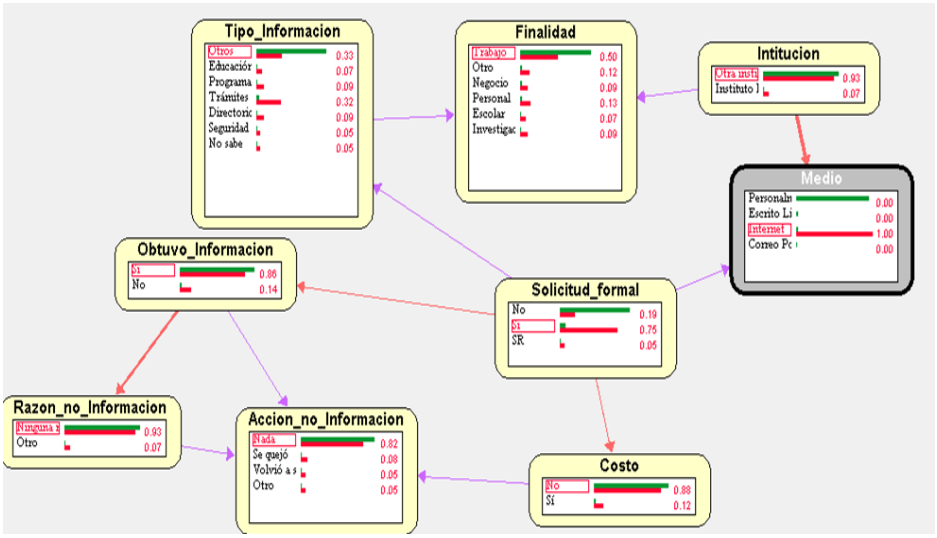

Figure 2: First assumption: The Internet as a means to make requests for information.

Second assumption: If there were less bureaucracy to make formal requests, information would always be obtained. This assumption would not be fulfilled since it would decrease from 98% to 84%. Likewise, there would be more possibilities to charge for the service, different means would be used to make the request and the type of information requested outside of different types (Figure 3).

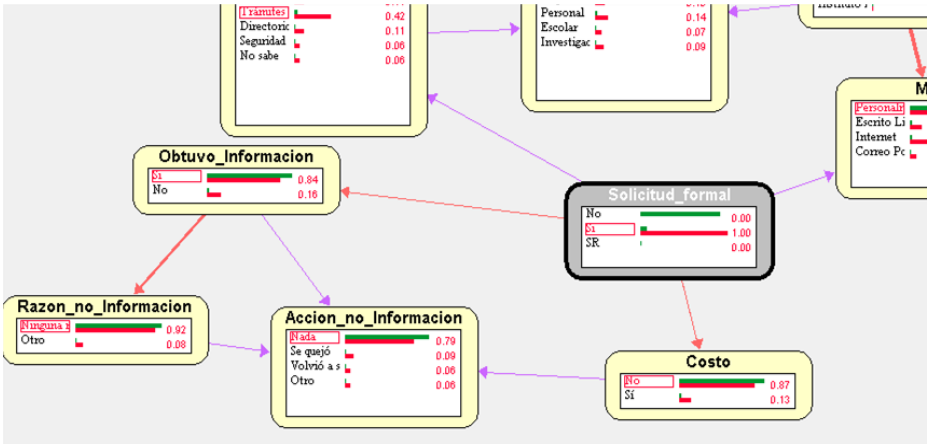

Figure 3: Second assumption: Less bureaucratic procedures for obtaining information

Third assumption: If everyone complained when they did not receive information, the answers to the requests for information were positive. When making a projection proposing that 100% of the citizens not to obtain answers to their requests will complain, it was obtained that the institutions would give the reasons for which it did not obtain information, the answers to the requests would decrease from 98% to 67% And opened up more possibilities for officials to charge a fee for providing the requested information (Figure 4).

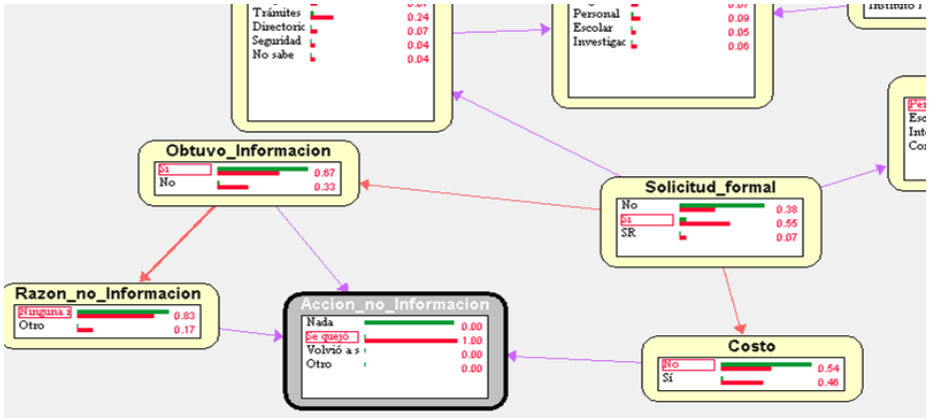

Figure 4: Third assumption: Putting complaints in case of not receiving information

Regarding the second segment of variables, in Figure 5 it can be seen that all variables are completely related. This segment sought to know the relevance of the government to publish information of different types, assuming that when the citizen will import information of some kind would not be interested in requesting other information. However, with the data fed to the network a posteriori performed, it is shown that this assumption is false since the variations are small. That is, the values of the information preferences 79% and 89% (Figure 5).

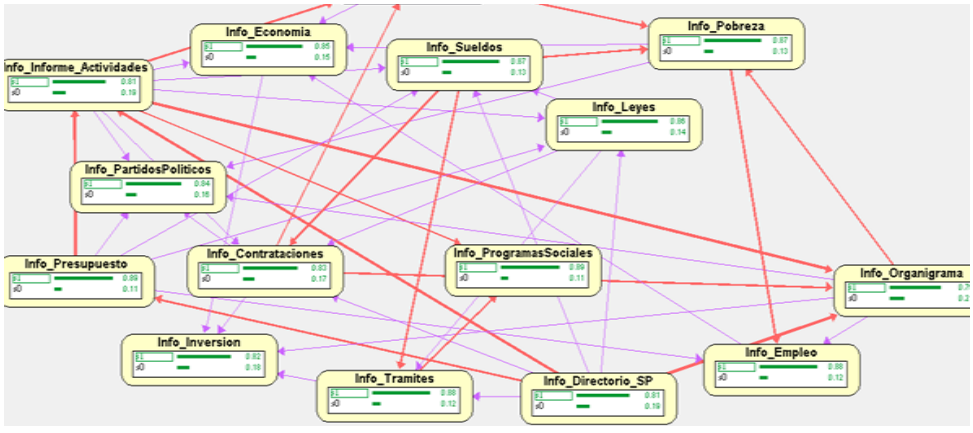

Figure 5: Bayesian network corresponding to the second segment of variables

When making projections, to see if the population only wants to be published information on security, social programs or political parties, it was found that in all three cases the preferences of other types of information would increase, ranging from 88% to 94%. Therefore, it can be said that the more information governments provide, citizens will be interested in the information that public administrations count on, as shown in Figure 6.

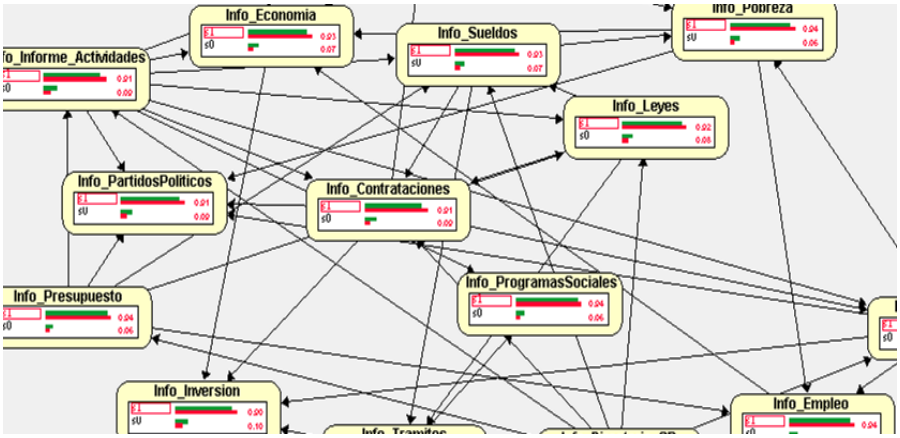

Figure 6: Case 1: Safety information

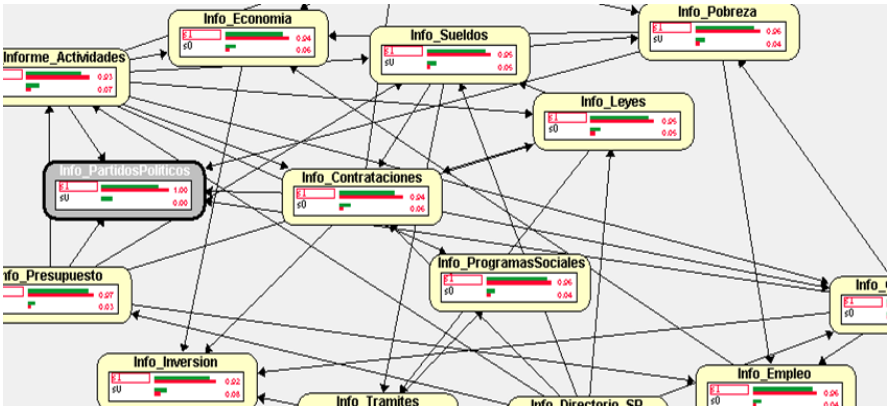

Figure 7: Case 2: Information from political parties

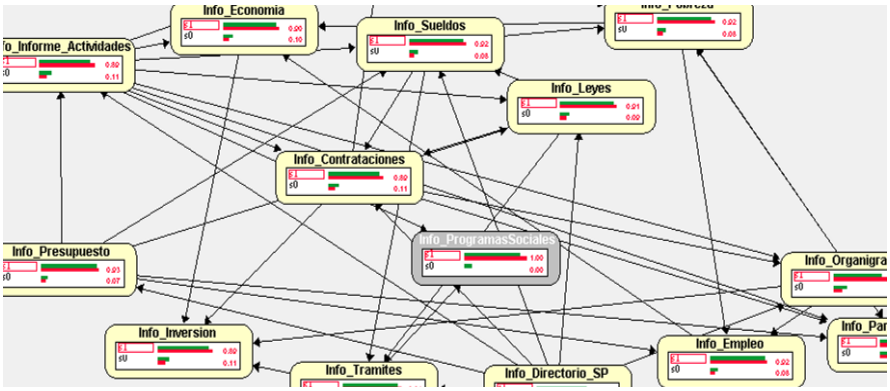

Figure 8: Case 3: Information on social programs

Conclusion

In the state of Oaxaca there is no culture of requesting information formally, perhaps because of the bureaucratic procedures that have to be carried out to request it or because of the lack of knowledge that the public information is a public good, or not being aware that at Paying taxes has the right to access information that any natural or legal person who obtains public resources has in their custody. On the other hand, when verifying that the information requested is done informally and personally, it does not agree with the way Oaxaca is viewed from the outside since Oaxaca occupies the third place in transparency portals [10]. Then there is the great

unknown, how did you get to that place? if the citizens do not think the same thing. Perhaps, it will be that municipal governments are not concerned with creating the mechanisms to make known the information they have in their possession or simply the will does not exist.

References

[1]. De la Torre-Gea, G., Soto-Zarazúa, G., Guevara-González, R., & Rico-García, E. (2011). Bayesian networks for defining relationships among climate factors. International Journal of Physical Sciences, 6(18), 4412-4418.

[2]. Pearl, J. (1988). Probabilistic reasoning in intelligent systems. Morgan Kaufmann, San Mateo, CA.

[3]. Hernández, J.; Ferri, C.; Ramírez, J. (2004). Introducción a la minería de datos; Capítulo 10: "Métodos Bayesianos"; PEARSON EDUCACION.

[4]. De la Torre-Gea G, Soto-Zarazúa GM, Lopez Cruz I, Torres-Pacheco I, Rico-García E. Computational fluid dynamics in greenhouses: A review. African Journal of Biotechnology. 2011;10 (77):17651-17662.

[5]. Wang S, Li X, Tang H. Learning Bayesian networks structure with continuous variables. In Li et al. (eds). Lecture Notes in Computer Science, Heidelberg: Springer-Verlang. 2006; 448-456.

[6]. Ortiz-Vazquez IC, Pérez-Robles JP, Fernandez-Loyola R, Pérez-Brito JF, De La Torre-Gea GA. A multivariable computational fluid dynamics analysis method based in Bayesian networks applied in a bioreactor. Journal of Applied Chemical Science International. 2015;6(1):10–17.

[7]. Correa M, Bielza C, Paimes-Teixeira J, Alique JR. (2009). Comparison of Bayesian networks and artificial neural networks for quality detection in a machining process. Expert Syst. Appl. 36:7270-7279.

[8]. Borunda M, Jaramillo OA, Reyes A, Ibargüengoytia PH. Bayesian networks in renewable energy systems: A bibliographical survey. Renewable and Sustainable Energy Reviews. 2016;62:32–45.

[9]. Garrote, L., Molina, M., & Mediero, L. (2007). Probabilistic forecasts using bayesian networks calibrated with deterministic rainfall-runoff models. Extreme hydrological events: new concepts for security, 173-183.

[10]. Sandoval, R., Marín, J. & Romero, T. (2016). Reporte del Ranking de Portales Estatales de Transparencia de México 2016.