

Politicians campaign financing and contracts network
Iván Romero Flórez 201717315, Gerardo Pérez Clavijo 201519403,
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Abstract— Datasketch is a digital platform specialized in journalistic research and data. It allows journalists and citizens to learn and consult data visualizations about different conjectural subjects. Its main objective is the democratization of knowledge. Nowadays, it's interested in investigations that allow them to evidenciate the relationship between public procurements and the financing of campaigns in Colombia. As part of this project, Datasketch along with the Citizen Monitor developed the portal "*Elecciones y Contratos*" (<http://elecciones-contratos.monitorciudadano.co>), which provides a tech solution that allows the data of popular election candidates and their lenders, to be known. However, they express their interest in extending this analysis, in order to include departmental behaviours and relationships between the financing and celebration of public biddings. As a result of the process of data and tasks extraction, 3 interactive visualizations are presented in accordance with the needs identified in Datasketch, based on the concept of the data visualization mantra design (Overview first, summand filter and details on demand).

Index Terms: candidates, financing, public procurement, irregularities, Colombia, visualization.

INTRODUCTION

Datasketch is a digital platform specialized in journalistic and data research. It provides a portal that allows journalists, data scientists, social scientist and citizens in general, to learn and consult about data visualization, tools, software and in-depth research about several conjectural subjects. It has free data tools and different projects in order to create a link between the data and citizenship, facilitating the democratization of knowledge and a critical review about social realities based on information contrasts.

This document shows a methodological framework based on a common language framed in the visualization development. It allows making data and task abstractions that are proper of the business problem Datasketch. Furthermore, it helps us to select the best idioms in order to generate insights to the users of the tool taking into account the context of the problem on its own.

OBJECTIVE

To provide visualization tools that let the possible irregularities in the financing of political campaigns for Congress and territorial aggregates at a departmental level to be explored, and their influence on public procurements.

1 COMPONENTS OF THE PROJECT

1.1 Users

- **Juliana Galvis** E-mail: jgalvisn@datasketch.co

Politologist and candidate for a master is in Digital Humanities. She is currently leading the development of the "Who Is" database, as well as supporting journalistic researches and databases creations.

- **Camila Achuri** E-mail: camila@randommonkey.io
Statistician and expert in programming R language. She has developed various applications of data visualization in mobility and open data topics.

1.2 Tasks

1.2.1 Main Tasks

- To summarize the contributions made to political campaigns nationwide per year.
- To identify each candidate's campaign funders, as well as their relationships and contracts with the State.
- To identify the relationship between the financing consideration and the quantity of the contracts awarded to the funder.

1.2.2 Secondary Tasks

- To obtain a list of contributions made to political campaigns at a department level.
- To identify each candidate's campaign funders and their contracts with the State.
- To show the relationships between candidates and campaign funders.
- To identify the correlation between the financing consideration and the number of contracts assigned to the funders.

1.3 Available Data

Datasketch has provided the following data set to carry out the project:

- A table of candidates
- A table of political campaign donors
- A table of public contracts related to those donors/candidates.

2 STATE OF THE ART

Currently the Citizen Monitor (www.monitorciudadano.co), based on the work that has been doing to provide to the citizens technological tools, that allow them to interact them with corruption and its actors date, has developed the portal “Elecciones y Contratos” (<http://elecciones-contratos.monitorciudadano.co>), which seek to offer a technological solution that allows to get to know data about the candidates for popular elections and their funders. What is mentioned above, contributes to social control and facilitates the realization of information crossings between official data of financed campaigns supplied by data sources as *Cuentas Claras* and official procurement contracts provided by *SECOP*.

3 WHAT

3.1 Dataset

The data set is a table type and it is described as following:

- Contratos_financiadores_data: this table contains 149,070 records and its purpose is to obtain public procurement information from state entities, with regard to the corresponding service providers. (2010 -2017) funders that have had contracts with the state.

3.2 Types of attributes:

The table Contratos_financiadores_data originally has 79 attributes from which 17 were picked. They are shown in the following table:

Attribute	Type
Corporation or Categorical Position	Categorical
Electoral Circumscription	Categorical
Department	Categorical
Candidate Name	Categorical
Funder	Categorical
Consideration	Quantitative
Department of Categorical Contributions	Categorical
Relationship	Categorical
Register. of Sequential Movement Date	Sequential
Campaign	Categorical
Contract Number	Categorical
Candidate	Categorical
Start Date of Contract Execution	Sequential
Contract Amount	Quantitative
Object	Categorical
Group	Categorical
Entity	Categorical

3.3 Availability

A Scheme was generated in which used datasets are published in OneDrive and GitHub.

4 WHY

4.1 Main Task 1.

To summarize the contributions made to political campaigns nationwide per year.

- ACTION (Summarize) (department: Categorical)
- TARGETS – (Features) (campaign: Categorical, total contributions: quantitative calculated)

4.1.1 Secondary Task 1:

To obtain a list of contributions made to political campaigns at a department level.

- ACTION (Summarize) (department: Categorical)
- TARGETS – (Features) (campaign: Categorical, total contributions: quantitative calculated, department of origin of the contribution: Categorical)

4.1.2 Secondary Task 2:

To identify departments with greater and lesser contributions to campaigns.

- ACTION (Summarize) (department of origin of the contribution: Categorical)
- TARGETS – (Features) (campaign: Categorical, total contributions: quantitative calculated, department: Categorical)

4.1.3 Secondary Task 3:

To identify the distribution of contributions to a campaign by the income of the department.

- ACTION (Discover - Locate- Identify) (department of origin of the contribution: Categorical)
- TARGETS– (Distribution) (Consideration: quantitative)

4.2 Main Task 2:

To identify each candidate's campaign funders, as well as their relationships and contracts with the State.

- ACTION (Present – Explorer- Identify) (Funder: Categorical)
- TARGETS– (Feature) (campaign: Categorical, Contract Number: Categorical, consideration: quantitative, relationship: Categorical)

4.2.1 Secondary Task 1:

To present candidates' relationships with campaign funders.

- ACTION (Present – Explore - Identify) (candidate: Categorical)
- TARGETS– (Feature) (funder: Categorical, relationship: Categorical, consideration: quantitative)

4.2.2 Secondary Task 2:

To identify the funders of multiple campaigns

- ACTION (Present – Explore - Identify) (Funder: Categorical)
- TARGETS– (Feature) (Candidate: Categorical, consideration: quantitative)

4.2.3 Secondary Task 3:

To summarize the total contributions per candidate

- ACTION (Summarize) (candidate: Categorical)
- TARGETS – (Features) (Funder: Categorical, total contributions: quantitative calculated)

4.2.4 Secondary Task 4:

To identify the candidates with the most campaign financing.

- ACTION (Summarize) (candidate: Categorical)
- TARGETS – (Features) (Funder: Categorical, total contributions: quantitative calculated)

4.3 Main Task 3:

To identify the relationship between the amount of financing and the number of contracts awarded to the funder.

- ACTION (Present – Locate - Identify) (Funder: Categorical)
- TARGETS - (Features) (contract: Categorical, consideration: quantitative y contract date: sequential)

4.3.1 Secondary Task 1:

To know the contracting behavior for the funder before and after a contribution.

- ACTION (Present – Locate - Identify) (funder: Categorical)
- TARGETS- (Features) (campaign: Categorical, the total of contributions: quantitative calculated, consideration: quantitative, contract date: sequential)

4.3.2 Secondary Task 2:

To present the number of contracts assigned to a funder in a period.

- ACTION (Present – Locate - Identify) (Funder: Categorical)
- TARGETS – (Features) (contracts: Categorical, start date: sequential)

5 HOW

5.1 Graphic Areas

This visualization consists in choosing departments, through a Colombian map, which based on a color scale emphasizes the relationship between the selected department and the financing departments of the political campaigns. This color scale will have as the main objective, to attract the perception of the user, pointing out those contributions that are in the high, medium and low scale.

On the other hand, when selecting the department, by a network chart, it will be observed, the relationship between candidates of the campaign and the selected departments, and its link with funders who have concluded contracts with the state, and that belong to the same department or to different departments.

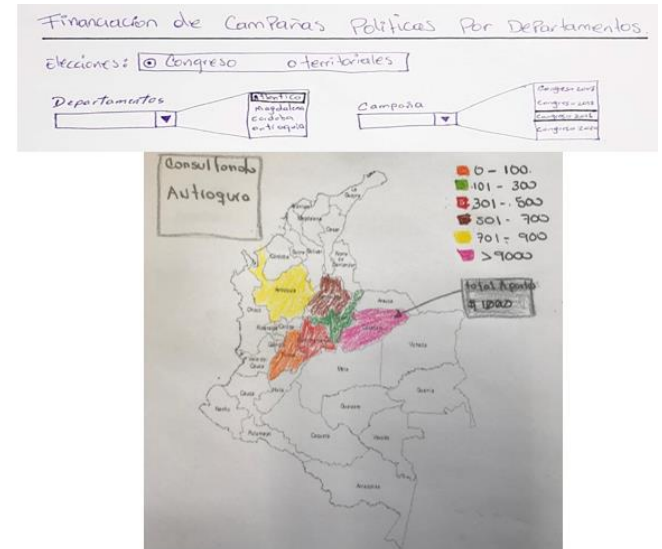


Image1. Display Prototype No.1

HOW	Description
Marks	- AREAS (Department)
Channels	- SATURATION (Attribute quantitative consideration)
Encode	- ARRANGE - EXPRESS (Attribute quantitative consideration)
Manipulate	- NAVIGATE - SELECT (Department)
Facet	- JUXTAPOSE - MULTIFORM - OVERVIEW /DETAIL: - AGGREGATE (Consideration quantitative)
Reduce	- FILTER: he proposed idiom allows the application of a filter (Categorical department)

5.2 Network Chart

With this visualization, the user gets to see the candidates of political campaigns, the state contractors that are registered as funders of its own campaigns. It consists in identifying the direct link with one or several candidates of the campaign and its categorization of the contribution in the high, medium and low rank, in addition, to show or not, the relationship to the user's judgment.

This visualization presents interactivity in the following way:

- It allows the redistribution of campaign financiers according to their relationship or not.

- It allows redistributing the visualization of campaign financiers, according to the amount of the contribution.
- It allows through a click event, to look at the timeline for the conclusion of contracts with the state, for each selected funder.

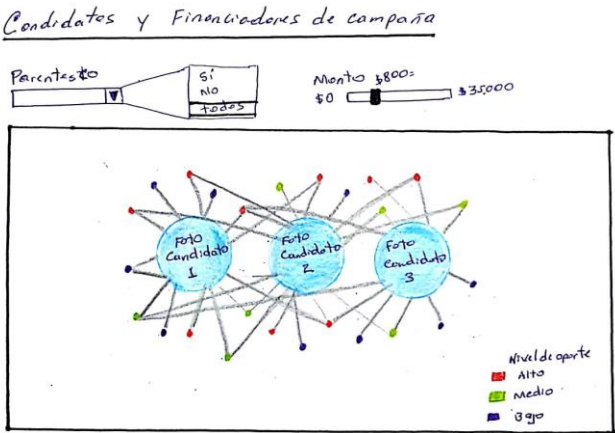


Image 2. Display Prototype No.2

HOW	Description
Marks	<div><ul style="list-style-type: none">- Points (Candidate - Funder)- Lines (Relationship Candidate - Funder)</div>
Channels	<div><ul style="list-style-type: none">- HUE (Attribute Candidate - Funder) Categorical- SIZE (size of Candidate - Consideration)</div>
Encode	<div><ul style="list-style-type: none">- ARRANGE- EXPRESS (Consideration quantitative)</div>
Manipulate	<div><ul style="list-style-type: none">- NAVIGATE- SELECT (Relationship)</div>
Facet	<div><ul style="list-style-type: none">- JUXTAPOSE- MULTIFORM- OVERVIEW /DETAIL:- AGGREGATE (Consideration quantitative)</div>
Reduce	<div><ul style="list-style-type: none">- FILTRO: the proposed idiom allows the application of a filter (categorical Relationship)</div>

5.3 Timeline Chart

It allows observing timeline corresponding to the conclusion of contracts of a selected campaign funder. Each point of the chart shows in which campaigns a funder has been registered.

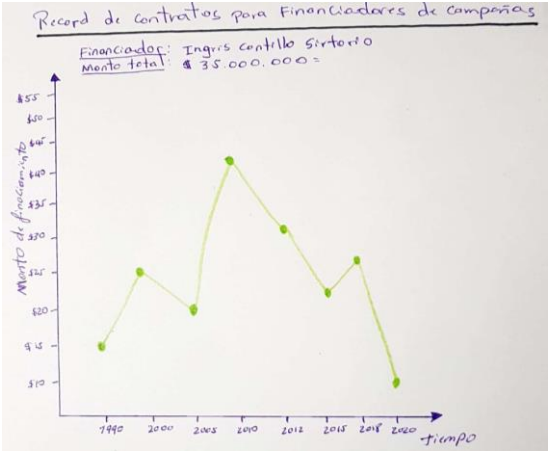


Image 3. Visualization prototype No.3

HOW	Description
Marks	<div><ul style="list-style-type: none">- Lines (Contract Amount)- Points (Consideration, Campaign / Contract Number)</div>
Channels	<div><ul style="list-style-type: none">- Position X quantitative (Start Date)- Position Y quantitative (Contract Amount)</div>
Encode	<div><ul style="list-style-type: none">- ARRANGE- EXPRESS (Consideration quantitative)</div>
Manipulate Facet	<div><ul style="list-style-type: none">- N/A- JUXTAPOSE- MULTIFORM,- OVERVIEW /DETAIL:- AGGREGATE (Contract Amount)</div>
Reduce	<div><ul style="list-style-type: none">- N/A</div>

6 TECHNOLOGICAL BASE

For the development of this project, it was agreed along with the client to use the following technologies

- HTML
- D3 version 4 (visualization)
- GitHub (repository and deployment)
- File format .csv

7 DATA PREPARATION

As a result of the construction process of the functional prototype, quality needs were evidenced on the data. Final attributes necessary to be used in the idioms were identified as well.

Likewise, it was necessary to debug records that didn't contemplate the necessary quality conditions of completeness. Also, as part of the necessary tasks on the data, the modification was made in the cases in which the "Name of the Person" was equal to the "Name of the candidate". To do that, all the records were marked with a flag that allowed its effective distinction. (see screenshot)

Nombre Candidato	Tipo Persona	Nombre de la Persona
HECTOR FABIO OSORIO RIVILLAS	Persona Natural	HECTOR FABIO OSORIO RIVILLA
LAUREANO ROA BONILLA	Persona Natural	LAUREANO ROA BONILLA
LIVIA YANETH AHUE CERRON	Persona Natural	LIVIA YANETH AHUE CERRON
ABAD DE JESUS MARIN ARCILA	Persona Natural	ABAD DE JESUS MARIN ARCILA

As a result of this process, an example is observed below with the inclusion of the flag for its differentiation:

Nombre Candidato	Tipo Persona	Nombre de la Persona
HECTOR FABIO OSORIO RIVILLAS (C)	Persona Natural	HECTOR FABIO OSORIO RIVILLAS
LAUREANO ROA BONILLA (C)	Persona Natural	LAUREANO ROA BONILLA (F)
LIVIA YANETH AHUE CERRON (C)	Persona Natural	LIVIA YANETH AHUE CERRON (F)
ABAD DE JESUS MARIN ARCILA (C)	Persona Natural	ABAD DE JESUS MARIN ARCILA (F)

These tasks allowed the previously selected idioms to be implemented in an expected manner.

8 FUNCTIONAL PROTOTYPE

For the development of the functional prototype, the techniques learned in class have been used, typical of Tamara's framework, which allowed us to perform data abstractions and tasks on a common language that orients our work to the selection of the best idioms, and the consequent generation of insight for the user. According to the indications provided by the client, the GitHub platform (<https://github.com/>) was used as a repository of the project and there, using the technologies mentioned in point 6, the deployment was carried out in the following URL: <https://63anp3ca.github.io/VA/>



Contratación pública y redes de financiamiento de campañas

Este análisis surge con el deseo de visualizar y alertar sobre las irregularidades en el financiamiento de campañas y la contratación pública en Colombia. De acuerdo con la Misión de Observación Electoral (MOE), financiar campañas políticas podría ser el mejor negocio de inversión en el país porque se obtienen ganancias por encima del 300%.

Visualizar el problema es una forma de aportar a la solución y así, cuantos más ojos haya sobre la contratación pública, más fácil será [revelar los 50 billones que se reparten al año por corrupción](#).

Metodología

El marco metodológico de Tamara Munzner, nos guía bajo un lenguaje común a realizar abstracciones de datos y tareas, propias del problema de negocio que nos provee Datasketch, y que nos ayuda a seleccionar las mejores visualizaciones para generar insight en los usuarios de la herramienta, propias del contexto del problema.

<https://www.cs.ubc.ca/~tmn/vadbook/>

Los resultados fueron revisados y completados con los investigadores Datasketch que han trabajado en el tema y conocen la realidad de la situación, como la norma que indica que [aquel que done más del 2% a una campaña política no puede contratar en el mismo municipio](#). La construcción de este proyecto, el igual que el análisis de la información, lo hicimos con D3.

<https://d3js.org/>

Datos

Toda la información de los contratos que celebran entidades públicas o privadas a nombre del Estado debe quedar consignada en Colombia Compra Eficiente para que cualquier ciudadano pueda verla y, si detecta alguna irregularidad, actuar.

<https://www.colombiacompra.gov.co/>

Los datos sobre la financiación de campañas se encuentran registrados en el Consejo Nacional Electoral y su aplicativo Cuentas Claras para que pueda ser consultada por los ciudadanos de acuerdo con el objetivo de transparencia del gobierno de Colombia.

<http://www.crecuentasclaras.com/>

[Visualizar datos >](#)

Three sections are identified in the prototype: (1) visualization section Map of Colombia, (2) visualization section of nets (see screenshots), and (3) visualization section of line chart of campaign finance contracts.

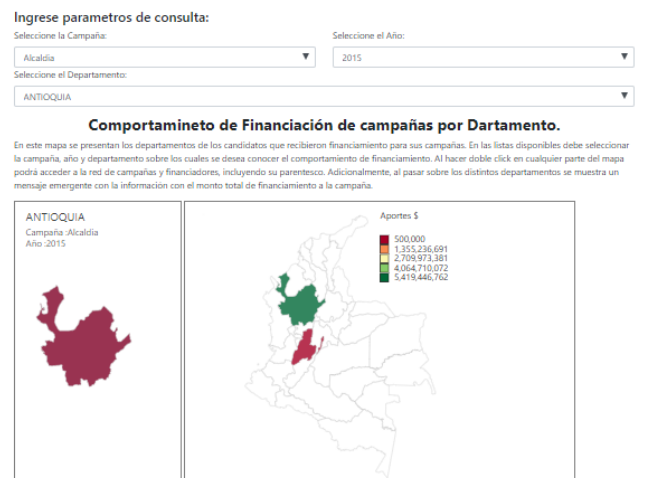


Image 4. Screenshot display No.1

Red de financiamiento de Candidatos por departamento.

La red de financiadores de campañas. Esta visualización permite: - Conocer la red de financiadores de campañas y su historial parentesco con el candidato. ¿Cómo explorar la red? Para obtener el detalle de un Candidato o Financiador de campaña, haga 'click' en los botones azules para conocer los candidatos o los purpuras para conocer los financiadores, en el enlace se pueden conocer los detalles de parentesco. Para regresar a la visualización general de la red vuelva a hacer 'click' en alguno de los círculos de color.



Image 5. Screenshot display No.2

Comportamiento en celebración de contratos públicos por el financiador.

Esta visualización de los datos de financiadores y contratos públicos, presenta la cantidad de contratos y la sumatoria de los montos de contratos para el periodo de años comprendidos del 2006 al 2018. Al situarse en los puntos se desplegará información con los detalles de montos totales.

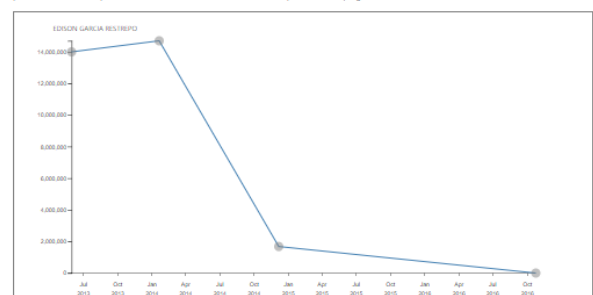


Image 6. Screenshot display No.3

9 USABILITY EVALUATION

In order to validate the selected idioms based on the results of the abstraction of data and tasks, in addition to the application of the principles of expressiveness and effectiveness, we perform an evaluation test of the usability of the tool, taking into account the following characteristics:

- Datsketch has extensive knowledge about the application of visualization techniques.
- A first controlled experiment was developed so that clients and external users could interact with the visualizations and draw conclusions tending to evaluate the usability of the tool.
- Each one was asked about the result of their interaction if they consider that they were useful or not and the proposed improvements.

9.1 Usability Assessment Test Criteria

CATEGORY	DESCRIPTION
Identity	Identify the corporate image of the institution that owns the site
Contents	Determine the quality assigned to the contents and whether the way they are presented allows the user to get a concrete idea of the information that is being delivered through the website.
Navigation	Evaluate how appropriate is the organization of the information of the website, according to the experience, knowledge, and expectations that the user has.
Web Graphics	Evaluate how meaningful the graphs or visualizations offered to the user are, and their perception of the speed of deployment.
Search	Establish if the search system meets the needs of the user.
Usefulness	General summary of the experience of navigating the site.

9.2 Profile Sociodemographic

User characteristics	Description
Level of study	Professional
Degree of knowledge	Full knowledge of the context of the problem
Office Domain	E-mail address. Word processors. Browsers Spreadsheets and statistics.
Age	Range: 21- 60 years old

9.3 Steps for Application of The User Test

Before the test

- There is a list of 6 questions, two for each member of the group, taking into account the areas of identity, content, navigation, web graphics, search, feedback, and usefulness.
- Schedule a meeting with the client to express opinions on the prototype of the visualization.
- In agreement with the members of the group, we choose the person who will expose the prototype to the users.

During the test

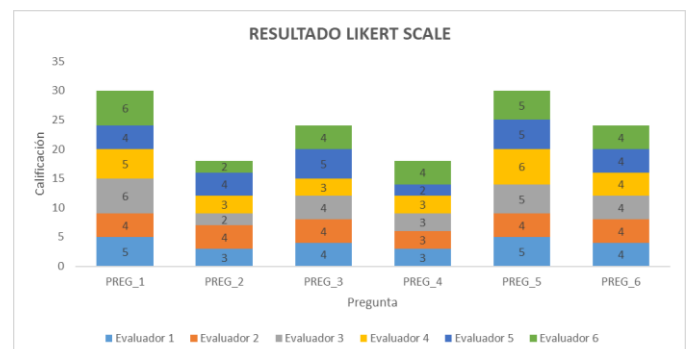
- A member of the group will explain the main idea in the development of this test and its role.
- The group members will take careful note of each user's opinions and reactions.

After the test

- With the user opinions, we will discuss the changes to be applied to the prototype according to their priority.
- Each of the recommended changes will be made.

Below there are a table and visualization that summarize the question scores per respondent, total and average respondent.

COD	LIKERT SCALE						Total	Average
	Eval .1	Eval .2	Eval .3	Eval .4	Eval .5	Eval .6		
PREG_1	5	4	6	5	4	6	30	5
PREG_2	3	4	2	3	4	2	18	3
PREG_3	4	4	4	3	5	4	24	4
PREG_4	3	3	3	3	2	4	18	3
PREG_5	5	4	5	6	5	5	30	5
PREG_6	4	4	4	4	4	4	24	4



10 APPROVED PROTOTYPE.

Comportamiento de financiación de campañas por departamento

En este mapa se presentan los departamentos de los candidatos que recibieron financiamiento para sus campañas políticas (Congreso 2018 y Regionales 2015). En las listas disponibles, debes seleccionar una campaña y departamento sobre el cual deseas conocer el comportamiento de financiamiento. También puedes usar [Todos](#) ver el comportamiento a nivel nacional.

- Haz doble click sobre el departamento seleccionado en el mapa para acceder a más información sobre red de campañas y financiadores, incluyendo su parentesco.
- Cuando oques sobre los distintos departamentos observarás un mensaje emergente con la información relacionada al monto total de financiamiento de la campaña.

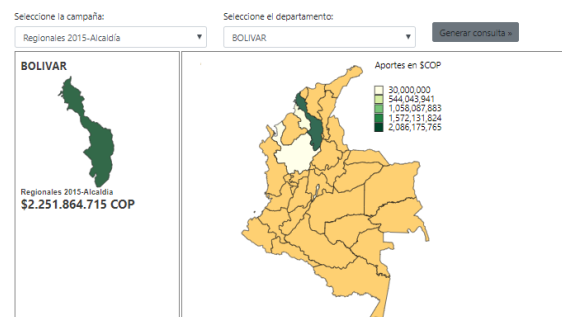


Image 7. Capture Prototype visualization No.1 Approved

Red de financiamiento de candidatos por departamento

Aquí podrás conocer la red de financiadores de campañas y el tipo de relación (parentesco) con el candidato. ¿Cómo explorar la red? Para obtener el detalle de un candidato o financiador de campaña, debes dar 'click' en los círculos de color azul para conocer los candidatos o en los de color rojo para conocer los financiadores si el contorno del círculo es rojo es porque tiene contratos con el estado colombiano, en caso contrario el contorno será de color azul, en las líneas de enlace se pueden conocer los detalles de parentesco.

- Puedes seleccionar un candidato dando clic sobre el círculo, de esta forma podrás observar la relación con los financiadores.
- Para regresar a la visualización general de la red vuelve a hacer 'click' en alguno de los círculos de color.

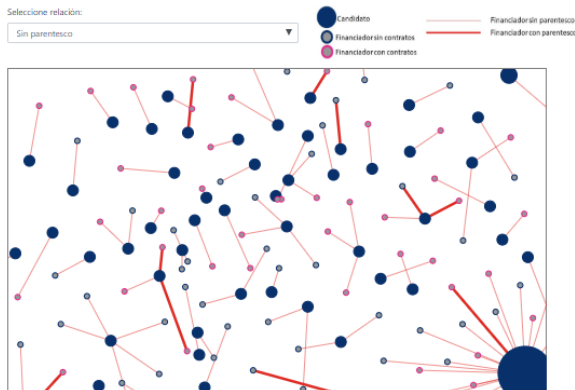


Image 8. Capture Prototype visualization No.2 Approved

Comportamiento en celebración de contratos públicos por el financiador

Esta línea de tiempo te permitirá conocer la cantidad de contratos realizados con estado colombiano y la sumatoria de los montos de contratos para el periodo de años comprendidos del 2006 al 2018.

- Cuando pases el mouse sobre los puntos se desplegará información con los detalles de montos totales.
- El punto de color verde que se encuentra flotando corresponde al monto total de aportes realizados a la campaña política.

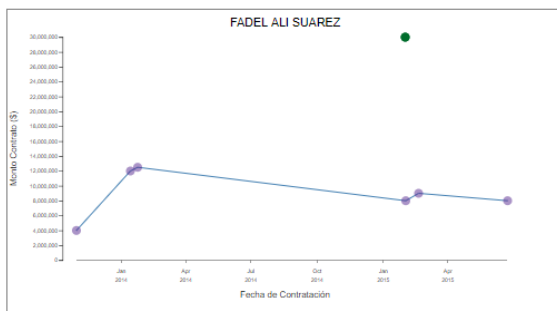


Image 9. Capture Prototype visualization No.3 Approved

11 INSIGHTS

In the preliminary analysis, we obtained the following findings:

- For the 2015 campaign of the Mayor's Office in Bogota, funding is identified from the departments of Antioquia and Santander.
- For the 2015 mayoral campaign in Bolívar, funding is identified from the departments of Antioquia and Bogotá.
- For the 2015 Mayor's campaign in Cundinamarca, funding is identified from the departments of Tolima, Bogotá and Magdalena.

These findings allow us to appreciate that there is a correlation of closeness between the departments. In most cases, it is observed that the border department is part of the financiers of the candidates. It is also identified that there are departments where the main cities are located, which finance other departments regardless of their territorial proximity. (For example Antioquia and Bogotá)

12 PRIVACY

As it is information that is available as open data from the National Electoral Council (CNE) and its portal of Cuentas Claras (<http://www.cnecontasclaras.com>). The information is published in compliance with the principles of transparency and publicity as stipulated in Article III of Resolution 1044 issued by the National Electoral Council (CNE) on August 25, 2011.

In addition, this tool allows the CNE to comply with some of the provisions contained in the Law on Transparency and Access to Public Information (Law 1712 of 2014), which reiterates that all information of public interest -such as that related to campaign financing- must be timely, objective, truthful, complete, reusable and available in formats accessible to all.

13 BLOG

Number 1

Date	09/10/2018
Participants	Juliana Galvis
Format	Email Address

Details:

- Sent mail for customer contact and coordinate appointments

Commitments:

- Dataskech will send a project data set

Number 2

Date	11/10/2018
Participants	- Juliana Galvis - Camila Achuri
Format	Email Address

Details:

- Data set delivery by Dataskech:
 - o Contratos_candidatos_data
 - o Contratos_financiadores_data
 - o Cuentas_claras_data

Commitments:

- Exploration of the dataset by project students.

Number 3

Date	12/10/2018
Participants	Juliana Galvis Camila Achuri
Format	Skype

Details:

- Presentation of the client and working group
- To know the expectations and needs of the client
- Clarification of the data set
- Definition of technology and end user

Commitments:

- Present proposals with scopes, tasks and characterization of the data

Number	4
Date	16/10/2018
Participants	Juliana Galvis Camila Achuri
Format	Email Address
Details:	
- Proposal sent to Datasketch	
Commitments:	
- Coordinate Skype call to validate the proposal	

Number	5
Date	16/10/2018
Participants	Juliana Galvis Camila Achuri
Format	Skype
Details:	
- Revision of the proposal	
- Customer Feedback	
- Approval of the scope	
Commitments:	
- Include adjustments and improve the proposal	

Number	6
Date	28/10/2018
Participants	Juliana Galvis Camila Achuri
Format	Email Address
Details	Proposal sent to Datasketch
Commitments:	Coordinate Skype call to validate the proposal

Number	7
Date	30/10/2018
Participants	Juliana Galvis Camila Achuri
Format	Skype
Details	Validation of the proposal to Datasketch
Commitments:	Include adjustments and improve the proposal

Number	8
Date	07/11/2018
Participants	Juliana Galvis Camila Achuri
Format	Skype
Details	Validation of the proposal to Datasketch
Commitments:	<ul style="list-style-type: none"> - Include adjustments - Usability evaluation - Improve the proposal

Number	9
Date	14/11/2018
Participants	Juliana Galvis Camila Achuri
Format	Skype
Details	Approval of the final proposal of visualizations.
Commitments:	Insights Validation

14 CONCLUSIONS

After carrying out this work and applying Tamara's own framework concepts, we can see the great value it brings in the realization of visualizations that generate a significant impact on the work of the users, reflected in the manifestation of insight for the business. Taking into account the design concepts that improve the user usability indexes, we made use of the visualization mantra technique, to guide the user from the general to the particular that would allow him to explore and identify significant events in his research.

15 BIBLIOGRAPHY

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- <http://elecciones-contratos.monitorciudadano.co/>
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- www.monitorciudadano.co