Using SAS® Fraud Framework for Government to identify frauds in Brazil’s Federal Capital
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Tribunal de Contas do Distrito Federal - TCDF

**ABSTRACT**

Application of SAS® Fraud Framework for Government solution to:

- Avoiding frauds in bids
- Identify links between people and companies
- Inhibit illegal accumulation of public office

**Objectives:**

- Organize databases
- Map the existing links between individuals, companies and government agencies
- Build a risk matrix ranking the Federal District supplier companies

**Tools:**

- SAS Enterprise Guide®
- SAS® Stored Process
- SAS Enterprise Miner™
- SAS® Social Network Analysis

**WHAT IS TCDF?**

- Public institution responsible for controlling the assets and public resources in Brazil’s Federal Capital.
- It has the constitutional competence to supervise and judge the good and regular application of public resources by administrators and other officials.
- Assists the Legislative Chamber of the Federal District in the exercise of external control.

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**METHODS**

(Stage 1)

**BI Structure**

- **Dimension Tables**
  - P - Person
  - E - Enterprise
  - G - Government

- **Fact Tables**
  - 1) Owner Partner, Employees
  - 2) Hired Companies
  - 3) Government Employees
  - 4) Relatives
  - 5) Owner Partners

(Stage 2)

**Path to Government Agency**

- **Person Details**
- **Mapped Links**

**Path to Hired Company**

- **Government Agency Details**
- **Mapped Links**

(Stage 3)

**Social Network Analysis**

- **Data**
- **Network Visualization**

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Brazil’s Federal District has:
- 137 public agencies.
- 23,069 supplying companies = Total expenses around US$ 2.5 billion/year.
- 200,884 public servants = Total expenses around US$ 9.4 billion/year.

Link between government agencies and individuals:
- 11,639 potentially illegal links (7,640 in local agencies; 3,999 in outside agencies).
- Worst case: 6 accumulations = 157 hours worked weekly.
- Expenses around US$ 84 million per year.

Link between government agencies and supplying companies:
- 4,224 suppliers identified in the risk matrix = Total US$ 469 million.
- US$ 328 million spent on suppliers associated only with potential conflicts of interest.
- US$ 74 million with suppliers associated only with possible irregularities.
- US$ 73.4 million with suppliers involved in potential conflicts of interest and possible irregularities at the same time.
- US$ 1.2 million related to possible frauds.
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CONCLUSIONS

✓ Ability to analyze a large number of cases applying risk factors.
✓ Great integration provided by SAS®, reducing time and costs.
✓ Objective of organizing the data and supporting the decision-making process has been achieved.
✓ Relevant contribution to increase the supervision quality and the proper use of public resources.

WORK TO DO

✓ Check all the information generated.
✓ Improve the applied business rules.
✓ Develop new link tracks.
✓ Evolve the supplier companies risk matrix.
✓ Apply new techniques of data analysis.
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ABSTRACT

Avoiding fraud in bids, identifying links between people and companies, inhibiting the illegal accumulation of public office are the main topics where the SAS® Fraud Framework for Government solution is applied.

Brazil’s Tribunal de Contas do Distrito Federal – TCDF (Federal District Court of Accounts) is the public institution responsible for controlling the public assets and resources of the Federal Capital, promoting ethics in public management to guarantee the full exercise of citizenship of the Brazilian population. It has the constitutional competence to supervise and judge the good and regular application of public resources by administrators and other officials, assisting the Legislative Chamber of the Federal District in the exercise of external control.

Identifying undue actions by individuals and companies in public procurement requires data organization and the application of analytical intelligence. Frauds can be discovered by identifying links between people and companies and in the supply of products and services between sets of companies.

In general, the public official of the Federal District cannot work in more than one public office. However, applying statistical analysis, it was found that several public servants are circumventing this rule and working in other institutions.

INTRODUCTION

In the routine of audits carried out by TCDF, the auditor may encounter links between individuals, companies and government agencies that violate the law or indicate a potential conflict of interests, violating the principle of public interest, which provides that, in the Public Administration, the supremacy and the unavailability of the public interest must always prevail.

This work presents the methodology and procedures used with the implementation of SAS® Software solution in the identification of irregularities in the management of the Federal District.

OBJECTIVE

The project was designed to use SAS® analytical solutions to organize the databases held by TCDF, to map the links between individuals, companies and government agencies, to point out which combinations of these links may suggest lawlessness, fraud or conflict of interests and organize such data in a risk matrix making it easier to understand the information and to support decision-making on what cases deserves the Court's supervision.

METHODS

The first stage of the project consisted in assembling a Business Intelligence - BI structure, with Dimension Tables and Fact Tables, in which the data that indicated each of the previously specified possible links were stored. From the data stored on a Microsoft® SQL Server, the BI has been fully structured using the SAS Enterprise Guide® solution, as shown in Figure 1.
The second stage of the project consisted of taking advantage of the assembled BI structure and providing the auditors with prompt consultations on the individuals, companies and Government Agencies considered to be of interest to the Court, showing the links between them and allowing an intuitive navigation between these links, as shown in Display 1, Display 2 and Display 3. Still in this stage, focusing on the illegal accumulation of public offices, audit trails have been implemented to point out potentially illegal cases in existing links between individuals (public servants) and government agencies of the Federal District. The results of this step were built in the SAS Enterprise Guide® and are consulted and presented to the auditors through the SAS® Stored Process¹.

¹ SAS Stored Process is a SAS program hosted in a server and described by metadata.
Display 2. Browsing the BI Structure: Destination screen when clicking on the link indicated in Display 1

Display 3. Browsing the BI Structure: Destination screen when clicking on the link indicated in Display 2
In the third stage of the project, the use of data analysis techniques was started, albeit in an incipient way, through the algorithm Association Rules (Market Basket Analysis). Based on data from public purchases from the Federal District, which encompasses the bids and their participants, the SAS Enterprise Miner™ tool was used to identify which competitors always appear together.

In the last step of the project, the set of information generated in the previous stages was organized into a Hired Companies Risk Matrix, implemented through the SAS® Social Network Analysis solution, as shown in Display 4 and Display 5. Each combination of links that may suggest possible fraud, conflicts of interest or irregularities in hiring the government supplier is punctuated. Some examples are companies that do not have a valid registration in Brazil’s Internal Revenue Service, hired companies or some of their owner partners that were sanctioned in previous government contracts and cases where the owner partner of the hired company also works for the public agency that hired it.

Display 4. Risk Matrix Implemented in SAS Solution Social Network Analysis

Display 5. Risk Matrix: Hired Companies Detail Shows Applied Business Rules
RESULTS

In Brazil's Federal District there are 137 government agencies, 23,069 hired companies and 200,884 public servants. Yearly, the expenses with these government suppliers and public servants total around U$ 2.5 billion and U$ 9.4 billion, respectively.

In the part of the project investigating links between government agencies and individuals, the solution pointed out 11,639 potentially illegal links, being 7,640 with local government agencies and other 3,999 with government agencies outside Federal District. These possibly illegal links are related to 5,530 unique individuals and Federal District spends with then the amount of U$ 84 million per year. The worst-case points to an individual with 6 job accumulations, totaling 157 hours of work per week (some in government, some in private companies), as indicated in Figure 2.

![Public Office Accumulations Potentially Illegal Cases](image)

**Figure 2. Potentially Illegal Accumulations**

It should be noted that, even if all cases were considered irregular, the amount mentioned cannot be considered as a potential economy for Federal District. It is reasonable to assume that the occupation of the public office was necessary and that, without facing the law, could be given by different individual.

In the part of the project investigating links between government agencies and hired companies, it is worth mentioning the case of 4,224 single hired companies mentioned in the risk matrix, totaling U$ 469 million. Approximately U$ 328 million is spent on hired companies only associated with potential conflicts of interest, U$ 74 million with hired companies associated with possible irregularities, another U$ 73.4 million with hired companies involved both in potential conflicts of interest and possible irregularities, and more U$ 1.2 million related to possible fraud. The number of hired companies associated with each of these cases is shown in Figure 3.
Figure 3. Links between Government Agencies and its Hired Companies

The developed project represents a starting point for the Court's supervision routines, and a detailed investigation of each specific case is necessary. However, it already provides important information to consider when making decisions about what cases should be monitored.

CONCLUSION

The use of analytical solutions brings the possibility of analyzing a large number of cases and, applying the predefined business rules, indicate which of them are present indicative factors of risk, ordering them by relevance.

A great advantage to be highlighted in the development of the project using SAS® software environment was the integration provided, allowing a high reuse of efforts and previous accomplishments, reducing time and costs.

Given the results achieved and demonstrated here, it is understood that the objective of organizing the data and supporting the decision-making process has been achieved. But there is still a long and necessary path to be trod, checking the information generated, making the business rules applied more accurate, developing new link tracks and applying new techniques of data analysis.

In any case, it is perceived that the bigger and more precisely supply of information has the potential to contribute significantly to the increase of the quality of the supervision and, consequently, to the proper use of public resources.

CONTACT INFORMATION

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