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Using SAS® Fraud Framework for Government to identify frauds in Brazil's Federal Capital

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Using SAS® Fraud Framework for Government to identify frauds in Brazil's Federal Capital

Rômulo Miranda Alvim; Vilcemar Fernandes Maia Filho; Rafaella Bandeira Cabral Cunha

Tribunal de Contas do Distrito Federal - TCDF

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.



<http://www.tc.df.gov.br>

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

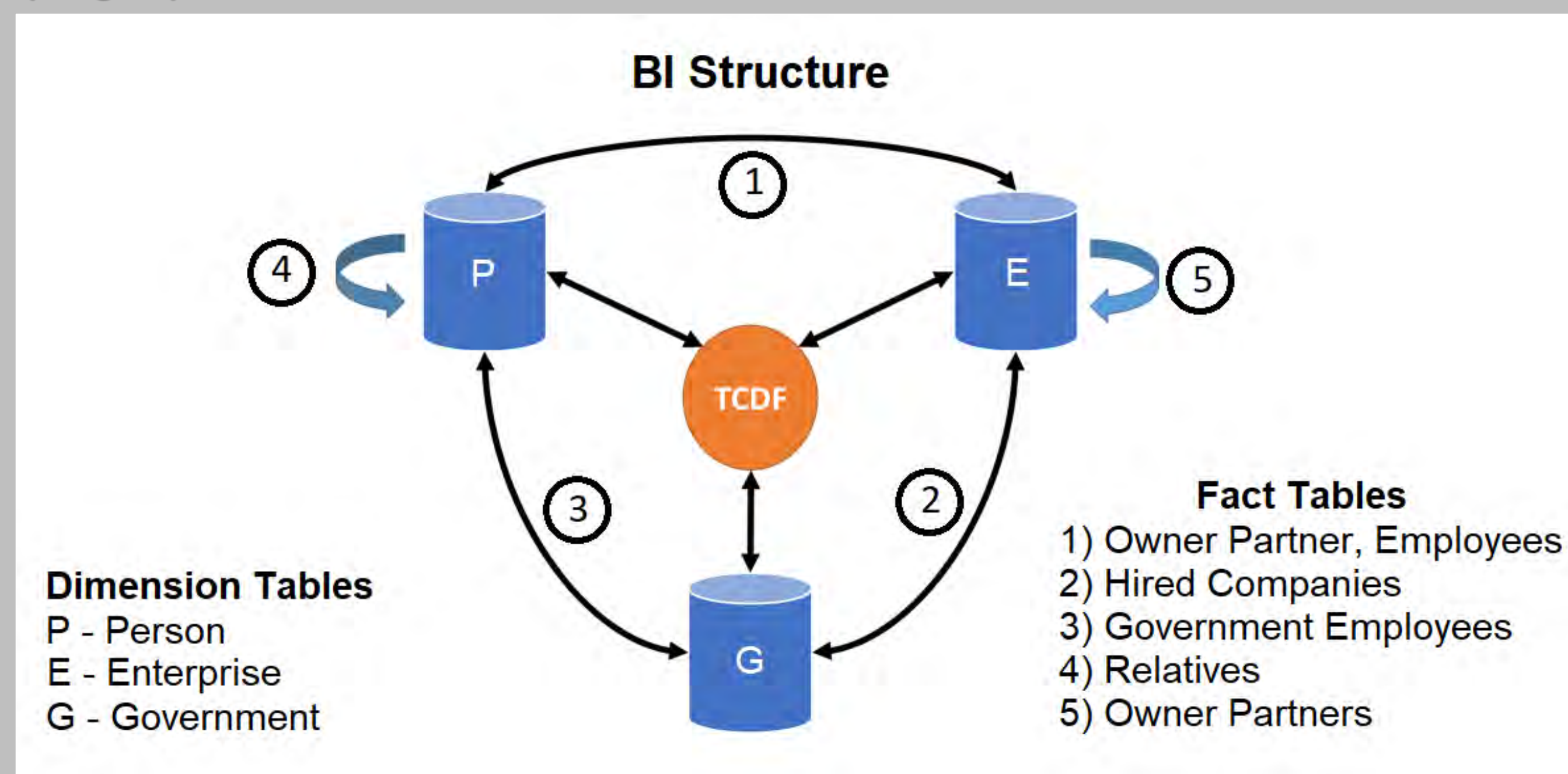
Using SAS® Fraud Framework for Government to identify frauds in Brazil's Federal Capital

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METHODS

(Stage 1)



(Stage 3)

SAS Social Network Analysis

CNPJ	Ração Social	Score	Situação Cadastro	CNAE Fiscal	Sigla da UF	Sancionado	Sócios Servidores	Participação em Licitação
00000000	S/S - EPP	5.909	BAIXADA	8630503	DF	Não	4	4
00000003		5.401	ATIVA	6810201	DF	Não	6	6
00000009		5.388	ATIVA	6422100	DF	Não	8	8
00000010		5.316	BAIXADA	8800600	DF	Sim	1	1
02000014	LTDA - ME	5.300	BAIXADA	5829800	DF	Não	1	1
07000022	S.A.	5.169	ATIVA	3514000	DF	Não	5	5
00000027		5.161	ATIVA	3600601	DF	Não	5	5
00000029	-ME	5.103	BAIXADA	4665600	DF	Não	1	1
05000022	LTDA - ME	5.100	BAIXADA	4649408	DF	Não	1	1
00000024	LTDA - ME	5.098	BAIXADA	4751201	DF	Não	1	1
00000010	LTDA - ME	5.097	BAIXADA	4741500	DF	Não	1	1
00000025	LTDA	5.097	BAIXADA	4330499	DF	Não	0	0
20000000	DISTRITO FEDERAL	5.093	ATIVA	9412099	DF	Sim	1	1
00000000	LTDA	5.093	BAIXADA	8219901	DF	Não	0	0
00000007	LTDA - ME	5.093	BAIXADA	4530703	DF	Não	2	2
20000000	LTDA - EPP	5.092	BAIXADA	4761003	DF	Não	1	1
30000000	LTDA - ME	5.092	BAIXADA	5620102	DF	Não	2	2
10000008	LTDA - ME	5.092	ATIVA	4751201	DF	Não	2	2
00000007	S/S LTDA	4.912	ATIVA	8630503	DF	Não	2	2
00000000	LTDA - EPP	4.912	ATIVA	8630503	DF	Não	10	10

SAS Social Network Analysis

ScoreCard

Nome do Campo	Valor do campo	Scorecard	Notas
CNPJ			
Ração Social	EPP		
Nome de Fantasia			
Score	5.909		
Situação Cadastro	BAIXADA		
Natureza Jurídica	Sociedade Simples Pura		
Início das Atividades			

Associação em Licitação

Órgãos	Licitações	Notas de Empenho	Quadro Sociário	Associação em Licitação	Participação	Suporte (%)	Confiança (%)	Lift (nº de vezes)
2	003110	054980			67	0.55	35.1	49
2	003110	762912			73	0.60	38.2	46
2	003110	041452			70	0.58	36.7	45
2	003110	017525			83	0.68	43.5	43
2	003110	086128			61	0.50	31.9	40

(Stage 2)

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL

Cadastro da Pessoa Física

Person Details

Path to Government Agency

Mapped Links

Remuneração de fonte Pessoa Jurídica

Código do Órgão	Nome do Órgão	Ano da RAIS	Janeiro	Fevereiro	Março	Abril	Maio	Junho	Julho	Agosto	Setembro	Outubro	Novembro	Dezembro
510	POLICIA MILITAR DO DISTRITO FEDERAL	2017		1.566,90	1.079,52	1.473,05	1.437,39	1.494,37						

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL

CADASTRO DA PESSOA GOVERNAMENTAL (BASE PESSOAS)

Government Agency Details

CNPJs Vinculados (BASE RFB)

UGS Vinculadas e Total Empenhado por Credor (BASE SIAFI)

Path to Hired Company

Mapped Links

ANO	CO UG SIAFI	CO CREDOR	RAZÃO SOCIAL DO CREDOR	NOME DO CREDOR	TOTAL EMPENHADO
2015	170393	24.315.658/0001-25	LIG-MOBILE	LIG-MOBILE	44.990.000,00
2015	170393	52.145.788/0001-69	COMPANHIA DE SANEAMENTO	CAESB	10.949.399,41
2015	170393	24.315.658/0001-25	LIG-MOBILE TELECOMUNICACOES LTDA	LIG-MOBILE	4.192.813,70
2015	170393	65.895.143/0001-58	UNIAO BRASILENSE	UNIVERSIDADE BRASILIA	361.378,02
2015	170393	28.654.358/0001-47	CIA URBANIZADORA DA NOVA CAPITAL		101.068,38
2015	170393	00.100.245/0001-82	BRB BANCO DE BRASILIA SA	BRB	3.205,99

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL

Cadastro da Empresa Pesquisada

Enterprise Details

Mapped Links

Notas Empenhadas

NUM_ANO	Órgão	Código do Elemento	Nome do Elemento	Valor Total do Empenho
2016	POLICIA MILITAR DO DISTRITO FEDERAL	30	MATERIAL DE CONSUMO	18.378,58
2016	POLICIA MILITAR DO DISTRITO FEDERAL	39	OUTROS SERVIÇOS DE TERCEIROS - PESSOA JURÍDICA	199.856,43
2015	POLICIA MILITAR DO DISTRITO FEDERAL	30	MATERIAL DE CONSUMO	27.481,16
2015	POLICIA MILITAR DO DISTRITO FEDERAL	39	OUTROS SERVIÇOS DE TERCEIROS - PESSOA JURÍDICA	174.046,40
2008	ADMINISTRAÇÃO REGIONAL DE OELANDA	30	MATERIAL DE CONSUMO	1.350,00
2008	ADMINISTRAÇÃO REGIONAL DE SAO SEBASTIAO	30	MATERIAL DE CONSUMO	810,00

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RESULTS

Brazil's Federal District has:

- ✓ 137 public agencies.
- ✓ 23,069 supplying companies = Total expenses around U\$ 2.5 billion/year.
- ✓ 200,884 public servants = Total expenses around U\$ 9.4 billion/year.

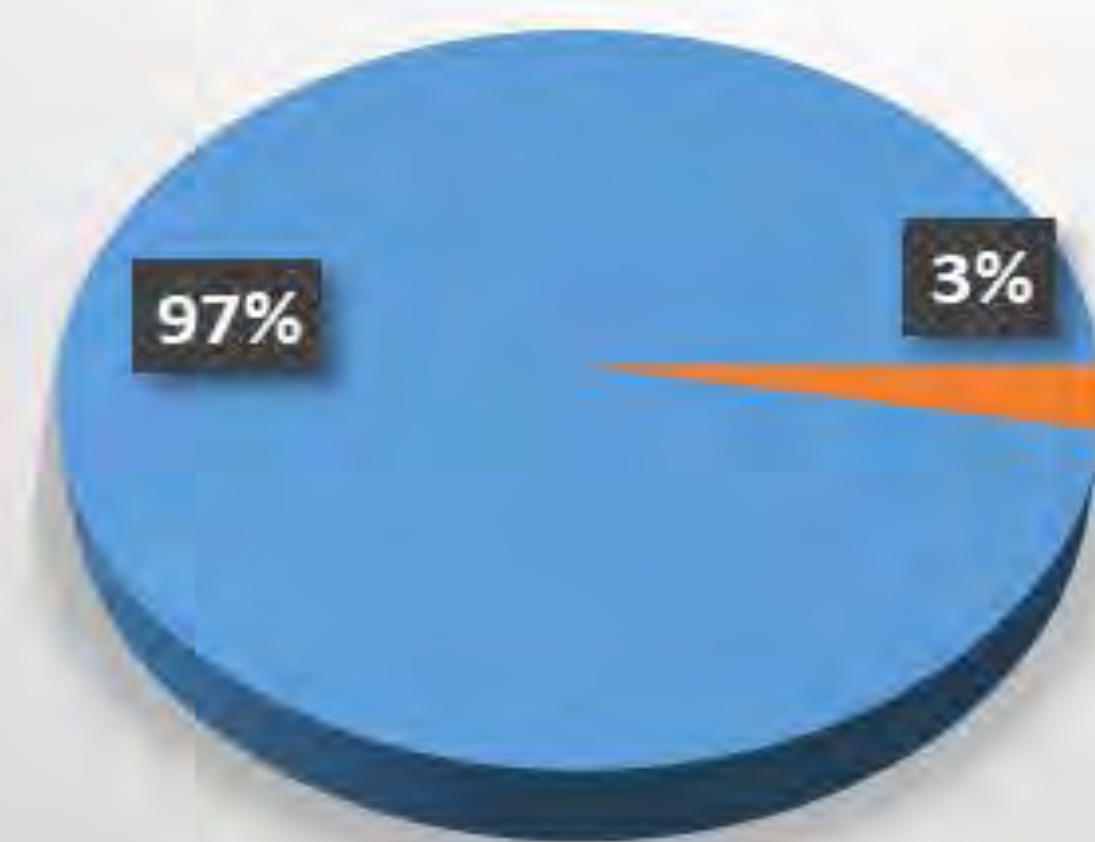
Link between government agencies and individuals:

- ✓ 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 U\$ 84 million per year.

Link between government agencies and supplying companies:

- ✓ 4,224 suppliers identified in the risk matrix = Total U\$ 469 million.
- ✓ U\$ 328 million spent on suppliers associated only with potential conflicts of interest.
- ✓ U\$ 74 million with suppliers associated only with possible irregularities.
- ✓ U\$ 73.4 million with suppliers involved in potential conflicts of interest and possible irregularities at the same time.
- ✓ U\$ 1.2 million related to possible frauds.

Public Office Accumulations Potentially Illegal Cases



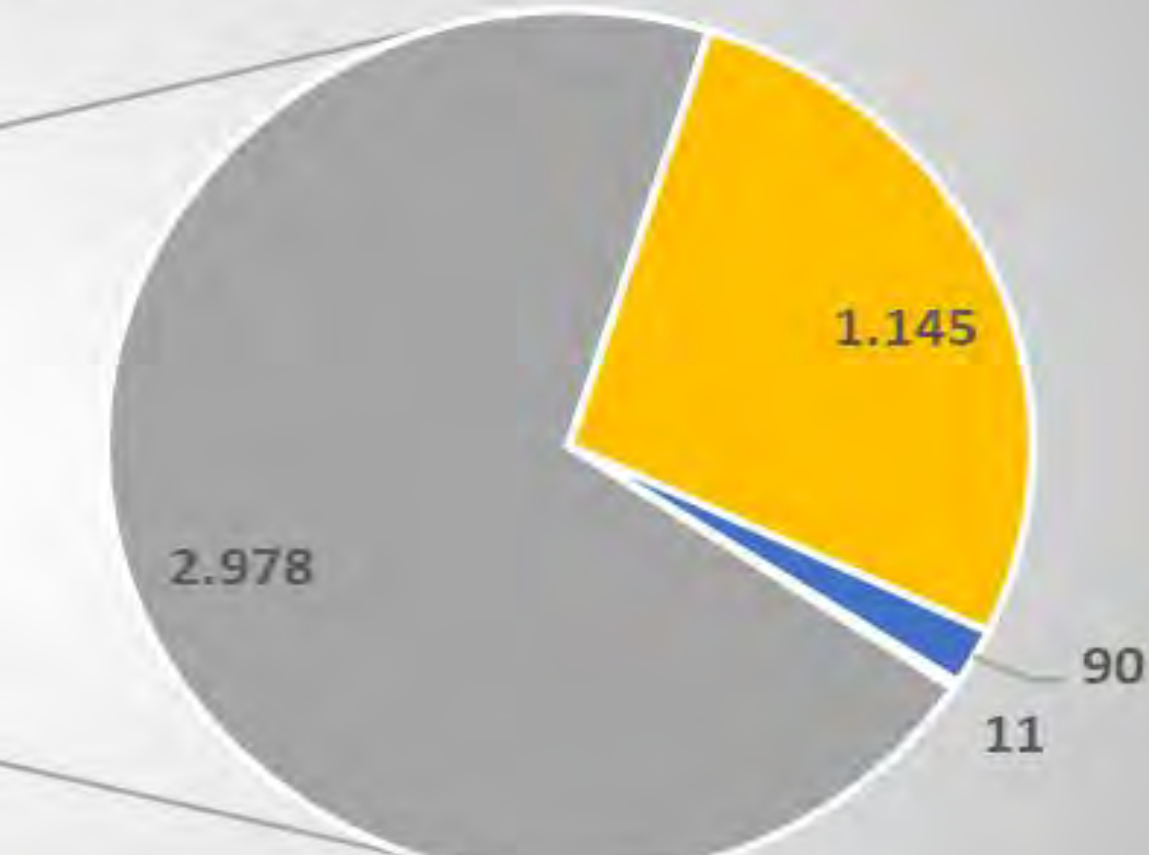
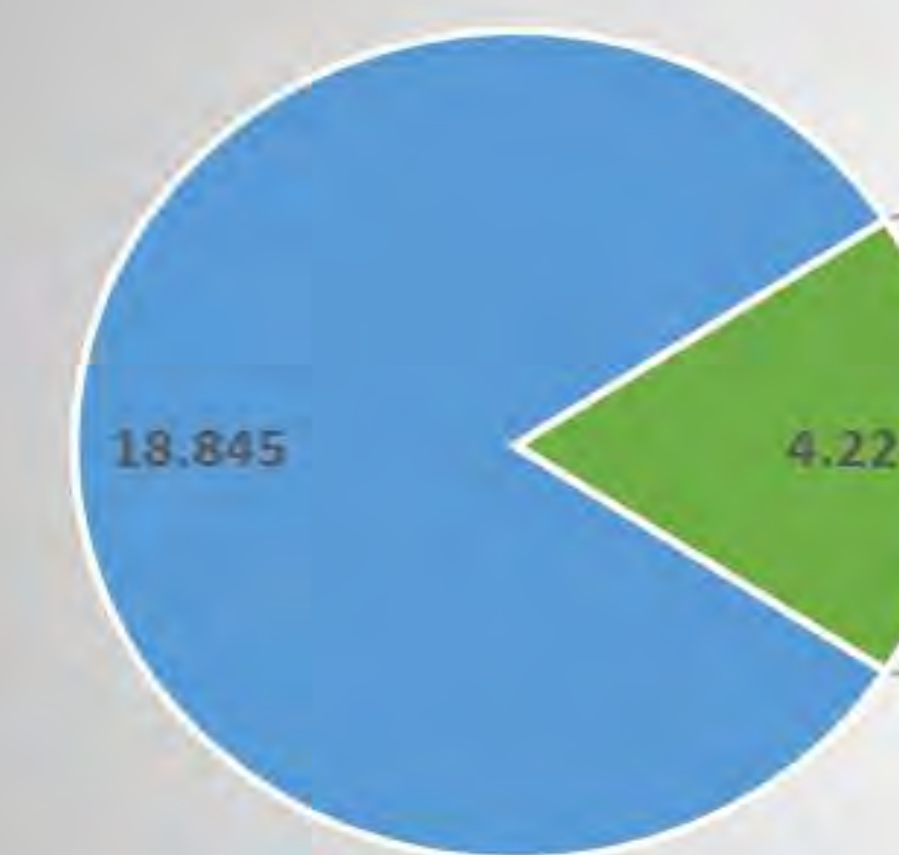
Potentially Illegal Cases

Person	Job Links
4983	2
518	3
27	4
1	5
1	6

Public Servants (total)

Public Servants in Potentially Illegal Cases

Government Agencies and Hired Enterprises Links Situation



Regular Situation

Possible Irregular Situation (only)

Possible Irregular and Potential Conflict (same time)

Possible Fraud (only)

Potential Conflict of Interest (only)

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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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Rômulo Miranda Alvim, Tribunal de Contas do DF; Vilcemar Fernandes Maia Filho, Tribunal de Contas do DF; Rafaella Bandeira Cabral Cunha, Maxtera Tecnologia Ltda.

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.

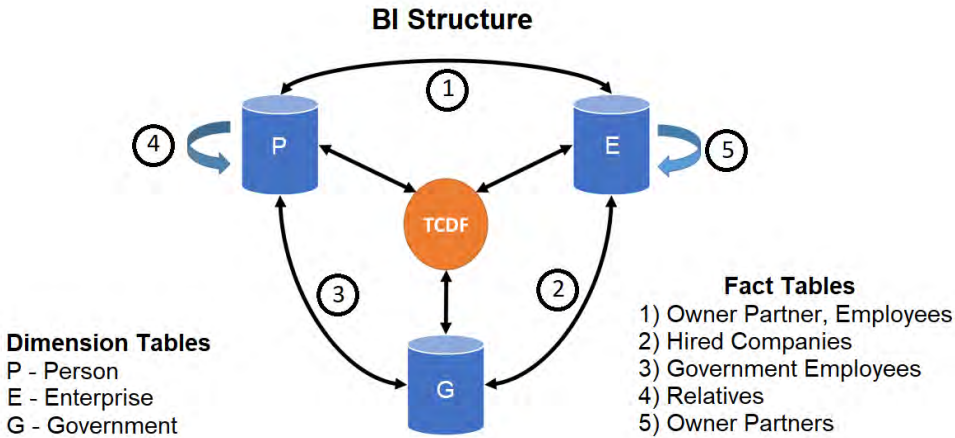


Figure 1. BI Structure

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.

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL

Cadastro da Pessoa Física

Atributos	Informações
No. do CPF	123.456.789-10
Nome	Nome do Indivíduo
Sexo	masculino
Data de Nascimento	01/01/1990
ESTRANGEIRO	não
ANO_OBITO	-

Remuneração de fonte Pessoa Governamental

Código do Órgão	Nome do Órgão	Ano da RAIS	Janeiro	Fevereiro	Março	Abril	Maio	Junho	Julho	Agosto	Setembro	Outubro	Novembro	Dezembro
510	POLICIA MILITAR DO DISTRITO FEDERAL	2017			1.566,00	1.079,52	1.473,65	1.437,39	1.494,37					

Remuneração de fonte Pessoa Jurídica

CNPJ	Razão Social	Ano da RAIS	Janeiro	Fevereiro	Março	Abril	Maio	Junho	Julho	Agosto	Setembro	Outubro	Novembro	Dezembro
12.345.678/0001-10	EMPRESA A	2015					4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00
98.765.432/0001-21	EMPRESA B	2016	4.000,00	4.000,00	4.252,17	4.252,17	4.252,17	4.910,00	4.536,00	4.536,00	4.536,00	4.536,00	4.536,00	4.536,00

Display 1. Browsing the BI Structure: Starting with Individuals Screen

¹ SAS Stored Process is a SAS program hosted in a server and described by metadata.

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL
CADASTRO DA PESSOA GOVERNAMENTAL (BASE PESSOAS)

Atributos	Informações
Código	510
Nome	POLICIA MILITAR DO DISTRITO FEDERAL
Sigla	PMDF

CNPJs VINCULADOS (BASE RFB)

CNPJ	Situação Cadastral	Razão Social	Nome Fantasia	CPF do Responsável	NOME do Responsável
00394718000371	BAIXADA	SECRETARIA DE ESTADO DE SEGURANCA PUBLICA DO DISTRITO FEDERAL	DF SSP POLICIA MILITAR DO DISTRITO FEDERAL PM	43802222415	MARCIA DE ALENCAR ARAUJO
00394718000533	BAIXADA	SECRETARIA DE ESTADO DE SEGURANCA PUBLICA DO DISTRITO FEDERAL	CENTRO DE SUPRIMENTO E MANUTENCAO DA POLICIA MILITAR D	43802222415	MARCIA DE ALENCAR ARAUJO
08942810000116	ATIVA	POLICIA MILITAR DO DISTRITO FEDERAL	POLICIA MILITAR DO DISTRITO FEDERAL	46146019187	MARCOS ANTONIO NUNES DE OLIVEIRA
09510220000130	ATIVA	FUNDO DE MODERNIZACAO, MANUTENCAO E REEQUIPAMENTO DA PMDF	FUNPM	48146019187	MARCOS ANTONIO NUNES DE OLIVEIRA

UGS VINCULADAS E TOTAL EMPENHADO POR CREDOR (BASE SIAFI)

ANO	CO UG SIAFI	CÓ CREDOR	RAZAO SOCIAL DO CREDOR	NOME DO CREDOR	TOTAL EMPENHADO
2015	170393	24.325.658/0001-25	LIG-MOBILE		14.900.000,00
2015	170393	52.145.789/0001-69	COMPANHIA DE SANEAMENTO	CAESB	10.949.396,41
2015	170393	24.325.658/0001-25	LIG-MOBILE TELECOMUNICACOES LTDA	LIG- MOBILE	4.192.613,70
2015	170393	65.895.123/0001-48	UNIAO BRASILENSE	UNIVERSIDADE BRASILIA	351.328,02
2015	170393	98.654.358/0001-47	CIA URBANIZADORA DA NOVA CAPITAL		101.968,38
2015	170393	00.100.245/0001-82	BRB BANCO DE BRASILIA SA	BRB	3.205,69

UGS VINCULADAS E TOTAL EMPENHADO (BASE SIGGO)

ANO	COD UG	NOME DA UG SIGGO	QUANT CREDORES	TOTAL EMPENHOS	MEDIA EMPENHO POR CREDOR
2017	220103	POLICIA MILITAR DO DISTRITO FEDERAL - PMDF	1.885	1.844.518.836,73	978.524,58
2016	220901	FUNDO DE SAÚDE DA POLICIA MILITAR	909	163.097.216,46	179.424,88
2015	220904	FUNDO DE MOD., MANUTENÇÃO E REEQ. DA PMDF - FUNPM	8	6.597.126,00	824.640,75

OBS: Na tabela acima, para cada código de UG, é mostrado apenas o último ano em que houve empenhos.

Display 2. Browsing the BI Structure: Destination screen when clicking on the link indicated in Display 1

TRIBUNAL DE CONTAS DO DISTRITO FEDERAL
Cadastro da Empresa Pesquisada

Atributos	Informações
CNPJ1	52.145.789/0001-69
RAZAO_SOCIAL	COMPANHIA DE SANEAMENTO
NOME_FANTASIA	CAESB
DT_SITUACAO_CADASTRAL	2005-12-12
MOTIVO_SITUACAO_CADASTRAL	00
DT_INICIO_ATIVIDADE	2005-12-12
CNAE_FISCAL	3292202
CNAE_SECUNDARIA_1	8299799
LOGRADOURO_TIPO	ALAMEDA
DT_INICIO_ATIVIDADE	2005-12-12
CNAE_FISCAL	3292202
CNAE_SECUNDARIA_1	8299799
LOGRADOURO_TIPO	ALAMEDA
CAPITAL_SOCIAL	\$18.660.008,00

Notas Empenhadas

NUM_ANO	Órgão	Código do Elemento	Nome do Elemento	Valor Total do Empenho
2016	POLICIA MILITAR DO DISTRITO FEDERAL	30	MATERIAL DE CONSUMO	19.378,56
2016	POLICIA MILITAR DO DISTRITO FEDERAL	39	OUTROS SERVIÇOS DE TERCEIROS - PESSOA JURÍDICA	169.656,40
2015	POLICIA MILITAR DO DISTRITO FEDERAL	30	MATERIAL DE CONSUMO	27.461,16
2015	POLICIA MILITAR DO DISTRITO FEDERAL	39	OUTROS SERVIÇOS DE TERCEIROS - PESSOA JURÍDICA	174.046,40
2006	ADMINISTRACAO REGIONAL DE CELANDIA	30	MATERIAL DE CONSUMO	1.350,00
2006	ADMINISTRACAO REGIONAL DE SAO SEBASTIAO	30	MATERIAL DE CONSUMO	810,00

Display 3. Browsing the BI Structure: Destination screen when clicking on the link indicated in Display 2

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 them 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.



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.

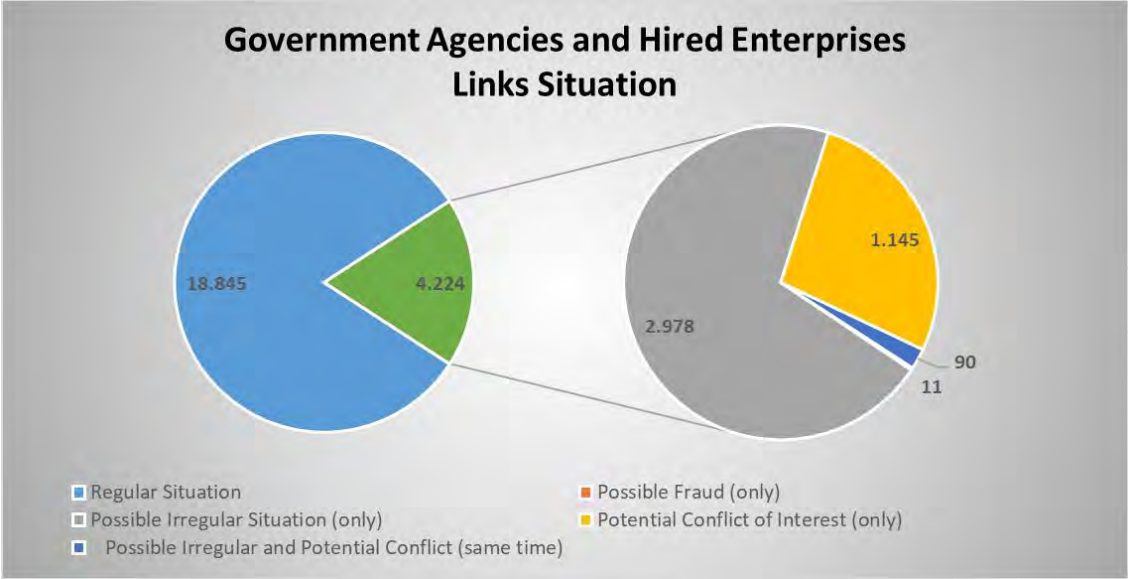


Figure 3. Links between Government Agencies and its Hired Companies

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

Your comments and questions are valued and encouraged. Contact the authors at:

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