

THE E-EXTRACTOR TOOL FOR RISK AND FRAUD PREVENTION

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ABSTRACT

The fraud risk management methodology is used by private sector organizations very successfully to curb deviations and minimize vulnerabilities.

In the public organizations the main reference is the Fraud Risk Management Guide published in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In Brazil, the Risk Management methodology in public organizations recommended by the TCU - Brazilian Court of Audit. The TCE-MS adopted the methodology of Fraud Risk Management in 2013 and implemented it in association with an Information Technology platform and it started at the end of 2016 the project called E-EXTRACTOR that combines the extraction of data of the data base from all cities hall with the Artificial Intelligence (Analytics by SAS®), BI tool and the Risk Management of Frauds with the objective of achieving effectiveness in its actions fulfilling in this way its constitutional role.

Keywords: Risk, Fraud, Effectiveness, Extraction.

INTRODUCTION

The Risk

The term Risk has its origin in the Latin term *Risicu* or *Riscu* which means to dare. Risk management in models designed in the 21st century considers two parameters: the probability of the adverse event occurring and the impact if this event occurs.

The analysis of scenarios focusing on the probability of an event occurring has a proven track record since 1654. According to Bernstein (2009) [3] the theory of probability was originated in results of studies presented by mathematicians Blaise Pascal and Pierre Fermat.

Large companies that operate in activities that require a high level of operational security adopt risk management as a way of knowing and analyzing threats and vulnerabilities in their operation. The biggest users of risk management since the last century are the companies that operate with investment in the stock market, oil, nuclear activities and, finally, aviation.

The first legislation dealing with risk management methodology in public institutions was published in 2004 by Her Majesty's Stationery Office. The publication was named: Orange Book - Risk Management - Principles and Concepts [7]. In 2009, this entity published the Structure of Risk Management Assessment [6].

In 2009, the International Organization for Standardization (ISO) published the first version of ISO 31000 [10] under the theme Risk Management - Principles and Guidance. The focus of this publication covered public and private areas. According to ISO 31000 (2009) [10]

risk is the uncertainty in the objectives. In the same year the Her Majesty's Stationery Office published another document called the Risk Management Assessment Framework.

In line with ISO 31000, the International Civil Aviation Organization (ICAO) published in 2009 the second edition of DOC 9859 - SMM - Operational Safety Management Manual. According to the ICAO (2009) [8] risk is the assessment of the consequences of a hazard, expressed in terms of probability and severity.

The International Organization of Supreme Audit Institutions (INTOSAI) published in 2009 the first guide to risk management for public auditing entities that in Brazil are known as Audit Courts (TCE – Tribunal de Contas do Estado). The document INTOSAI GOV 9130 [9] was entitled: Guidelines for Internal Control Standards for the Public Sector - Information on Risk Management Entity.

The TCU - Court of Audit of the Union, in Brazil, follows the documents issued by INTOSAI and adopts actions and recommendations of risk management in its reports and judgments. In 2012 the TCU published the report 011.745 / 2012-5 that deals with risk management and controls in entities of the indirect federal administration.

The Fraud

The term Fraud has its origin in the Latin term Fraus which means damage, fraud. The concept of fraud is associated with fraud, which is a crime against property or property of others.

In a historical analysis it is possible to find evidence of the practice of fraud, for example, in the code of Hamurabi, a set of laws created by King Hammurabi of the first dynasty of Babylon in the eighteenth-century BC, there is in law 265 the definition of various types of fraud and their respective punishments.

In Egyptian civilization, 500 BC, there is also evidence of fraud. Some mummies of sacred animals, when rigged, contained only sticks and cotton with nothing else inside.

In 2013, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) [4] published The Guide to Risk Management and Fraud and this became the methodological framework for Fraud Management in public institutions.

COSO (2013) [4] defines fraud as any intentional act or omission intended to deceive others, resulting in a victim suffering a loss and / or a felon obtaining a gain.

THE MANAGEMENT OF RISK AND FRAUDS IN SUPREME AUDIT INSTITUTIONS

In Brazil the Audit Courts are increasingly seeking to achieve effectiveness in their mission and vision. In all actions the relentless search for effectiveness is notorious.

ISO 31000 (2009) [10] emphasizes that risk management when implemented and maintained according to the standard allows an organization to:

- ✓ Improve operational effectiveness;
- ✓ Increase the likelihood of achieving the objectives;
- ✓ Encourage proactive management;
- ✓ Improve the identification of opportunities and threats;
- ✓ Improve governance and controls.

In this way, properly implemented risk management is essential for the Audit Courts to fulfill their mission and to achieve effectiveness in their actions, fulfilling their constitutional role.

The TCE-MS - Court of Audit of the State of Mato Grosso do Sul initiated the implementation of risk management in 2013 and in 2016 published the Risk Management Manual and Policy.

Risk Management Process

The risk management process adopted and standardized by TCE-MS in its Risk Management Manual [11] is in line with the one recommended by INTOSAI and ISO 31000 and is composed of the following steps: Establishment of the risk context; Risk assessment process (subdivided into risk identification, analysis and assessment); Treatment of risks; Communication and consultation; Monitoring and critical analysis.

In line with that recommended by INTOSAI, the TCE-MS adopts the Risk Matrix with the parameters of: Probability and Severity according to the scales of Figure 1 and Figure 2.

PROBABILITY		
LEVEL	DESCRIPTION	FREQUENCY
5	Very High	Frequent
4	High	Likely
3	Medium	Possible
2	Low	Unlikely
1	Very Low	Rare

Figure 1. Probability Scale (RM Manual – TCE MS, 2016)

SEVERITY		
LEVEL	DESCRIPTION	FREQUENCY
A	Very High	Extreme
B	High	Serious
C	Medium	Moderate
D	Low	Weak
E	Very Low	Irrelevant

Figure 2. Severity Scale (RM Manual – TCE MS, 2016)

The intersection of Probability scales with Severity scales is presented through the Risk Matrix, Figure 3, and allows to classify the risks of each of the action fronts chosen by the TCE-MS.

PROBABILIDADE DO RISCO	SEVERIDADE DO RISCO				
	Extremo A	Grave B	Moderado C	Fraco D	Irrelevante E
Frequente 5	5A	5B	5C	5D	5E
Provável 4	4A	4B	4C	4D	4E
Possível 3	3A	3B	3C	3D	3E
Improvável 2	2A	2B	2C	2D	2E
Raro 1	1A	1B	1C	1D	1E

Figure 3. Risk Matrix (RM Manual – TCE MS, 2016)

Fraud Management Process

The fraud management process adopted in the TCE-MS is in line with the one recommended by COSO.

The COSO in 2013 published 17 principles and 5 mandatory components for the Internal Control of Organizations. This publication is adopted by the United States federal government through its Standards for Internal Controls in the Federal Government.

The Eighth Principle deals specifically with fraud: "The Organization considers the potential for fraud in its risk assessment to achieve its objectives"

In this context the GAO - Government Accountability Office, the American organization with functions like the TCU in Brazil, based on the Eighth Principle and the Fraud Risk Management Guide, published the Risk and Fraud Management Framework in Federal Programs [4].

The components and principles of Fraud Management recommended by COSO (2013) [4] and adopted by the GAO are Fraud Risk Governance; Fraud Risk Assessment; Fraud control activity; Corrective Action and Fraud Investigation; Monitoring Activity and Fraud Risk Management.

DATA EXTRACTION AND FRAUD RISK MANAGEMENT

The TCE-MS started the pilot project called E-EXTRATOR at the end of 2016 to extract data directly from the many different databases of 79 cities hall in the same time.

The methodology presented in Figure 4 consists of:

- 1-Extract the data directly from the database of the jurisdiction (city hall and governments organizations) through a TCE-MS server installed in the data center of the city hall and governments organizations;
- 2-Mining this data;
- 3-Filtering them through Artificial Intelligence (SAS®);
- 4-Prioritize them through the Risk Matrix (SAS®);

- 5-Identify evidence of fraud (SAS®);
- 6-Make available to the auditors of TCE-MS the indicators that are presented on the BI screen (SAS®) for analysis and decision making;
- 7-Provide management and governance indicators for public managers (mayors and managers) in a web portal aimed at them. This is a great pioneering innovation where the TCE-MS will be the first external control organization in Brazil to provide directly to public managers BI screens with management and governance indicators.

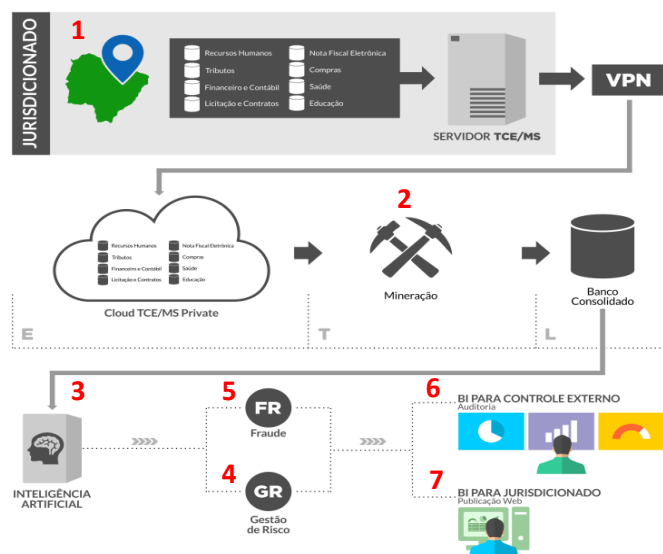


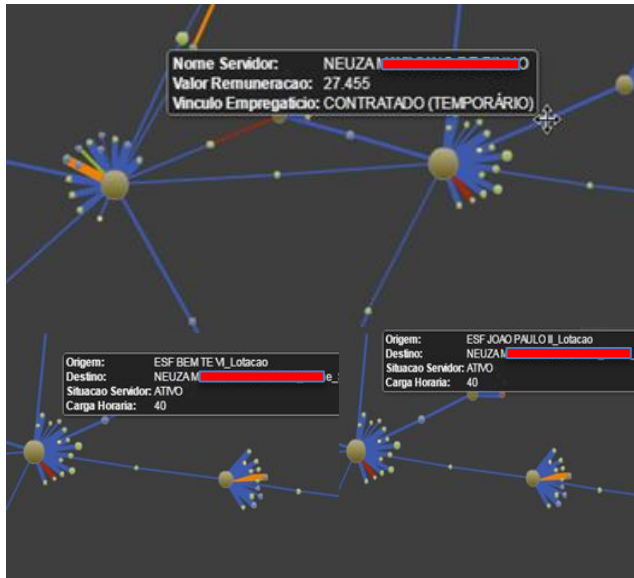
Figure 4 – Methodology (E-EXTRATOR – TCE MS, 2016).

The E-Extractor enables, in addition to the automated collection of the data of the public organizations, the automated collection and at the same time of different databases, such as: electronic invoice database; Ministry of Education database and other databases according to the established front of performance.

The integrated E-Extractor with BI enables the auditor to view the transformed data into information for analysis and decision making in an organized way. With Artificial Intelligence and BI the auditor will see the analysis on the screen and, after prioritization by Risk Management and Fraud, the analysis will present all the risks and indications of existing fraud.

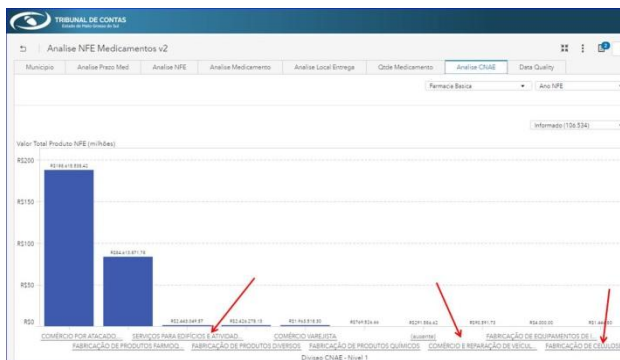
The Fraud Module screen demonstrates the information extracted by the E-Extractor directly from the jurisdiction's transparency portal, filtered by Artificial Intelligence with previously established rules and with Fraud identified in a timely manner.

In the screen presented in Display 1, the municipal public official, Neuza, has a temporary contract with the city hall, she realizes a monthly salary of R\$ 27,455.00, works 40 hours a week in the family health unit called Bem Te Vi and another 40 hours a week in the family health unit called João family Paulo, that is, works 80 hours a week, 320 hours a month.



Display 1 – Screen of the Artificial Intelligence and Fraud Module(SAS®) (E-EXTRATOR – TCE MS, 2017).

Display 2 shows the information extracted only from the Electronic Invoice database (NFe), the information was classified by the Artificial Intelligence (SAS®) in the topic of drug spending and the Fraud identified the companies that do not have CNAE (National Code of Economic Activities) intended supply of medicines. In other words, companies that provided drugs and issued NFe were not authorized for this economic activity.



Display 2 – Screen of the Artificial Intelligence and Fraud Module (SAS®) (E-EXTRATOR – TCE MS, 2017).

The activities listed on the display above are: Building Services and Landscape Activities; Trade and Repair of Vehicles; Manufacture of Pulp. None of the three are drug trade. In 2017 and 2018 The TCE-MS were developed 110 Dashboards to visualize data extractions from the E-EXTRATOR in the following themes:

1. EDUCATIONAL EXPENSES
2. EXPENSES WITH MEDICINES
3. MONITORING THE DATA BANK
4. CONTRACTS

5. TRANSPARENCY PORTAL
6. INDICATORS OF HEALTH
7. EXPENSES WITH MEDICINES
8. NEURAL NETWORK

CONCLUSION

COSO [4] recommends in its fraud risk management guide that all organizations are at risk of fraud and it is impossible to eliminate all frauds from all organizations. However, implementing the principles contained in the COSO publication will maximize the likelihood that fraud will be avoided or detected in a timely manner. It will also create a strong fraud backtracking effect.

The methodology adopted by the TCE-MS combines the fraud risk management process with solutions by SAS[®], allowing the collection of internal and external information and analyze them quickly

With the adoption of risk management and fraud risk management, the TCE-MS improves its effective performance. The E-Extractor pilot project associated to the BI platform, Artificial Intelligence SAS[®] and the risk and fraud management methodology provide the user with the information displayed on the screens with the analysis already performed by the system, which is enough to make the decision according to the strategy adopted.

Concluding, the objective of the project is to help the TCE-MS to achieve effectiveness in their actions, thus fulfilling their constitutional role, which is to judge the accounts of governments and mayors, and with this, priority for the better application of public resources.

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