Public officials' wealth information management: a system model proposal for signs identification of illicit enrichment

Gestão da informação patrimonial de agentes públicos: uma proposta de modelo de sistema para identificação de indícios de enriquecimento ilícito

Gestión de la información patrimonial de los funcionarios públicos: una propuesta de modelo de sistema para la identificación de señales de enriquecimiento ilícito

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Abstract: The illicit enrichment of public officials is one of the most visible consequences of corruption and is almost always its main motivation. In this context, this research aims to present a framework for the wide and permanent monitoring of the financial flows and tracing of the proceeds of wealth of public officials, allowing an increase in the effectiveness of its monitoring and more accurate identification of signs of illicit enrichment. The method used was the studying of multiple cases, and the ways used to collect the data are by interview and questionnaire. After mapping the informational subprocesses employed by CGU and CGM-SP in their heritage research work and compiling the main data classes and sources used in them, it is concluded that it is in the analysis subprocess where incompatibility of assets and financial flows is verified and that, for its realization, two other subprocesses are fundamental: the obtaining and the organization of information. Based on these assumptions, a framework was designed to follow the accumulation of wealth by public officials that, based on information declared by them and originating from verifiable sources, forms a comprehensive and computerized map of the risk of committing illicit enrichment, as well as a computerized compatibility analysis of their wealth and financial flows.

Keywords: Corruption; Illicit Enrichment; Public Officials; Management of Information; Information systems.

Resumo: O enriquecimento ilícito de agentes públicos é um dos desdobramentos mais visíveis da corrupção, além de constituir-se, quase sempre, como sua motivação principal. Neste contexto, esta pesquisa tem como objetivo geral apresentar um modelo de sistema para o acompanhamento amplo e permanente da evolução patrimonial de agentes públicos, que permita aumentar a percepção de seu monitoramento e a identificação de indícios de enriquecimento ilícito. O método utilizado foi o estudo de casos múltiplos e as formas utilizadas para coletar os dados foram a entrevista e o questionário. Após o mapeamento dos subprocessos informacionais empregados pela CGU e pela CGM-SP em seus trabalhos de investigação patrimonial e a compilação das principais classes de dados e fontes neles utilizadas, conclui-se que é no subprocesso de "análise" onde de fato se apura a ocorrência ou não de incompatibilidade patrimonial e de movimentação financeira e que, para sua realização, dois outros subprocessos são fundamentais: a "obtenção" e "a organização" de informações. A partir de tais pressupostos, foi idealizado um modelo de sistema para o acompanhamento da evolução patrimonial de agentes públicos que, a partir de informações por eles declaradas e oriundas de fontes de checagem, realize de forma ampla e informatizada mapeamento de risco de cometimento de enriquecimento ilícito e, também,

análises informatizadas de suas compatibilidades patrimonial e de movimentação financeira.

Palavras-chave: Corrupção. Enriquecimento ilícito. Agentes Públicos. Gestão da Informação. Sistemas de Informação.

Resumen: El enriquecimiento ilícito de funcionarios públicos es una de las consecuencias más visibles de la corrupción y casi siempre es su principal motivación. En este contexto, esta investigación tiene como objetivo presentar un marco para el monitoreo amplio y permanente de los flujos financieros y el rastreo del producto del patrimonio de los funcionarios públicos, que permita aumentar la efectividad de su monitoreo y una identificación más precisa de indicios de enriquecimiento ilícito. . El método utilizado fue el estudio de casos múltiples, y las formas utilizadas para recolectar los datos son por entrevista y cuestionario. Luego de mapear los subprocesos de información empleados por la CGU y la CGM-SP en sus trabajos de investigación patrimonial y recopilar las principales clases de datos y fuentes utilizadas en ellos, se concluye que es en el subproceso de análisis donde se verifica la incompatibilidad de activos y flujos financieros y que , para su realización son fundamentales otros dos subprocesos: la obtención y la organización de la información. Con base en estos supuestos, se diseñó un marco de seguimiento de la acumulación de patrimonio de los funcionarios públicos que, con base en información declarada por ellos y proveniente de fuentes verificables, conforma un mapa integral e informatizado del riesgo de cometer enriquecimiento ilícito, así como un análisis de compatibilidad computarizado de su riqueza y flujos financieros.

Palabras clave: Corrupción; Enriquecimiento Ilícito; Funcionarios públicos; Gestión de la Información; Sistemas de información.

1. INTRODUCTION

An estimate presented in 2017 by the Organization for Economic Co-operation and Development (OECD), in a report published jointly with the World Bank, describes corruption as a "global industry" worth around two trillion dollars a year (about 2% of world GDP). According to the institutions, this amount of resources embezzled through corruption is half of everything the world will need to guarantee adequate infrastructure for its citizens by 2030 (CHADE, 2017).

In Brazil, the reality of corruption is no different. A theoretical study undertaken by the Federation of Industries of the State of São Paulo (2010) indicated that, in 1990-2008, the average annual cost of corruption for the Brazilian economy ranged from 1.38% to 2.3% of the national GDP (41.5 to 69.1 billion reais in 2008 values). The extremely high cost of corruption in Brazil, the study concludes, hinders the increase in per capita income and the country's growth and competitiveness, while compromising the possibility of offering better economic and social welfare conditions to the population and improved infrastructure and a more stable business environment to companies.

In view of this global and local context, it is essential to develop mechanisms to prevent, control and fight corruption in public administration, in order to reduce its determinants and the diversion of resources in contracts involving public bodies and private entities. If from the private perspective the clearest result of such embezzlement is the undue benefit of companies and their senior management, from the public viewpoint the main consequences are the harm to society, the illegal financing of political campaigns and the undue benefit of public officials who take advantage of their positions, the so-called "illicit enrichment" (IE) as named by the international literature on the subject. In this sense, it is crucial to develop methods and techniques that aim to detect corruption, quantify embezzled amounts, provide evidence of the illegal financing of political campaigns and identify the advantages obtained by public officials.

Specifically regarding the last-mentioned goal and following the principle known in the jargon of control technicians as "follow the money," according to which it is possible to detect corruption by following the path taken by the diverted money to its final destination (SPINELLI, 2016, p.66), the confirmation of suspected cases of illicit enrichment, ac-

cording to experts in the field, involves identifying information that points to external signs of wealth and/or undue increase in assets of public officials, and comparing it in an orderly and appropriate manner with their legal income.

By such a system, if the increase of a public official's assets is disproportionate to his/her sources of legal income, it is up to him/her to prove the lawfulness of the asset increase, under penalty of being accused of committing illicit enrichment. If there is no justification for the increase, the punishments recommended by the main international conventions on corruption are dismissal from public administration, payment of fines and restitution of illegally acquired assets.

Faced with such a scenario and the search for an answer to the main question of this research, "how to improve the systematic detection of illicit enrichment of public officials in order to expand the fight against corruption in Brazil?", this work aims, based on the study of working models used by the offices of the Municipal Controller General of São Paulo (CGM-SP) and the Federal Controller General (CGU), to propose an information architecture model with a view to developing an information system to identify indications of illicit enrichment of public officials that mainly draws on information accessible to control bodies and unprotected by tax return confidentiality and uses information technology solutions for data collection, comparison and analysis.

2. THEORETICAL BACKGROUND

This study is based on two main theoretical frameworks: that of illicit enrichment, which provides elements to understand its concept and the existing instruments and techniques to evaluate the increase in assets of public officials; and that of information management, as a guideline for the adequate processing of information required for its detection and for its optimization through the use of information systems, based on the conception of an information architecture model that meets the purposes of that system.

2.1. ILLICIT ENRICHMENT

Aiming to better understand the illicit enrichment of public officials and improve its detection, this subsection discusses the general context surrounding it, namely corruption, lists the main global guidelines in the fight against it, details related Brazilian legislation and identifies asset inquiry as the adequate administrative procedure to strengthen its investigation.

2.1.1. Corruption: conceptualization, determinants and fighting strategies

Although there seems to be a common understanding of what corruption means, its conceptualization is not so simple. About thirty years ago, Brei (1995, p.64) already drew attention this difficulty, which, according to Spinelli (2016, p.34), still persists because "the term 'corruption' includes a number of behaviors and practices which, depending on a specific set of values or cultural factors, for example, may or may not be considered reprehensible from a moral or even legal point of view."

Also according to Spinelli (2016, p.42-46), studies on the factors that potentially determine the occurrence of corruption are divided into two main approaches: personalist and institutional. The former analyzes the perspective of the official who practices the act of corruption, i.e., the causes that have led or will lead him/her to commit the crime, while the latter addresses the issue from the point of view of the institutional conditions that favor or discourage the occurrence of the phenomenon.

Despite the different approaches to the determinants of corruption, in practice, the personal and institutional motivations that lead public officials to commit acts of corruption are commonly blended. In this sense, in strategic terms, one can conjecture that measures adopted to reduce and fight corruption tend to obtain better results when they are able to address both factors simultaneously.

Prominent in the search for such optimization – which can be considered to derive from Gary Becker's Rational Choice Theory – is Treisman's view (2000, p.402) that the practice of a corrupt act by a public official is usually preceded by a "cost-benefit" analysis, and that although political scientists and economists suggest that the different characteristics of the economic, political and social systems of countries may affect the expected costs of acts of corruption , the most obvious of them, in the view of the public official, is the risk of being caught and punished.

From this perspective of risk, one may conclude that the two main strategies to be adopted against corruption are to increase the possibility of its detection and to effectively punish the public official who commits it.

2.1.2. Illicit enrichment of public officials and the Brazilian legal system

The Inter-American Convention Against Corruption (1996) defined illicit enrichment as "a significant increase in the assets of a government official that he cannot reasonably explain in relation to his lawful earnings during the performance of his functions." Similarly, the United Nations Convention Against Corruption (2003) established, under Article 20, that such practice consists of the "significant increase in the assets of a public official that he or she cannot reasonably explain in relation to his or her lawful income."

Additionally, the World Bank study (2011, p.43) defines four major categories of information sources capable of detecting illicit enrichment and, therefore, serving as input for its investigation: disclosure of assets and income by the actual public officials; external indications of wealth and denunciations of illicit enrichment; suspicious transaction reports from the financial sector; and information from other investigations – specific investigations into other crimes involving public officials often produce information that tends to suggest they are guilty of illicit enrichment.

Assets and income disclosures identify a public official's key assets and liabilities and many countries extend disclosure requirements to spouses and immediate family members. Checks for external indications of wealth can be understood as inquiries into whether a public official's lifestyle is manifestly out of proportion to his or her known income.

Brazilian law addresses illicit enrichment in three main pieces of legislation: the Federal Constitution of 1988 and Law no. 8112/1990, which consider it misconduct in public office, and Law no. 8429/1990, which specifically provides sanctions applicable to public officials in cases of illicit enrichment in the exercise of a mandate, position, job or function in public administration, whether directly, indirectly or through a foundation.

The Brazilian Constitution provides as punishment for those guilty of misconduct in public office the suspension of political rights, loss of public position, freezing of assets and reimbursement to the treasury. Also in relation to punishment for misconduct in public office, Law no. 8112/1990, the so-called Single Legal Regime for Federal Civil Servants, Bodies and Foundations, provides the dismissal of public servants involved in such practice.

Law no. 8429/1992, known as the Misconduct in Public Office Law (LIA), broadly defines illicit enrichment as a kind of misconduct in public office involving the receipt of any type of undue financial benefit in the exercise of a position, mandate, function or employment in all branches of federal, state or municipal public administration, whether directly, indirectly or through a foundation, in a government-owned company or in a government-controlled company. More specifically, LIA defines twelve acts of misconduct in public office considered illicit enrichment, especially the following, for the purposes of this study: "acquiring, for oneself or for others, in the exercise of a public mandate, position, employment or function, assets of any kind whose value cannot be explained in relation to the public official's lawful increase in assets or income."

As for punishments for illicit enrichment, the following are provided in LIA: restitution of illicitly acquired assets or amounts, full compensation for damages, if any, loss of public position, suspension of political rights from eight to ten years, payment of a civil fine of up to three times the value of the asset increase and prohibition of contracting with the government or receiving tax or credit benefits or incentives, directly or indirectly, even if through a legal entity in which he/she is a majority shareholder, for a ten-year period. Such provisions also apply to persons who, despite not being public officials, induce or contribute to the practice of misconduct in public office or benefit from it in any direct or indirect way.

2.1.3. Asset inquiry and the cash flow technique

In view of the innovation introduced by Federal Decree no. 5483/2005, which created a specific procedure for investigating the assets of public officials, it is worth taking a closer look at its content. As provided in Articles 8 and 9, the competent authority, on becoming aware of well-founded reports or indications of illicit enrichment, including asset increase disproportionate to the public official's legal resources and cash assets, shall determine the esta-

blishment of an Asset Inquiry (SINPA) to investigate the facts. Such a procedure may also be instituted by CGU, and once its work is concluded, the committee in charge of its execution will submit a report on the facts found, recommending its dismissal or, if applicable, its conversion into a disciplinary administrative proceeding.

Considering the provision in Federal Decree no. 5480/2005, that CGU is responsible for investigating and correcting misconduct in the federal executive branch, and in view of its function in this role of defining, standardizing, systematizing and regulating, through the issue of statements and instructions, the procedures related to correctional activities, greater importance is given to its instructions regarding asset inquiry.

Also according to CGU (2015, p.29), regarding Complementary Federal Law no. 104/2001 and the possibility of accessing tax records, the asset inquiry is configured as a kind of "administrative process" with the goal of investigating the public official suspected of misconduct, and thus its establishment enables access to his/her tax records for purposes of analysis. Such analysis, also according to CGU (2015, p.37), consists of setting up the public official's "cash flow," deducting the respective expenses from the income in order to perform an adequate analysis of the official's assets and verify whether the remaining resources are sufficient to explain the increase in assets.

The cash flow technique consists of verifying the occurrence of "Undeclared Asset Increase" (VPD), "Disproportionate Financial Transactions" and "External Indications of Wealth." According to the CGU model (2015, p.41) reproduced below (Figure 1), the cash flow is generated through a spreadsheet containing information from various data sources whose comparisons result in "indicators" that may point to suspected undue increase of the public official's assets.

According to CGU (2015, p. 37-39), among the information used in the cash flow worksheet, the most relevant relates to the statement of assets submitted by the public official, individual income tax return (DIRPF), statement of real estate transactions (DOI), statement of information on real estate activities (DIMOB), statement of credit card transactions (DECRED), statement of information on financial transactions (DIMOF), withholding income tax return (DIRF), national register of legal entities (CNPJ), corporate income tax return (DIPJ) and also that obtained from the National Civil Aviation Agency (ANAC), public utilities, Department of Traffic (DETRAN), state and municipal finance departments, public notary offices and Port Authority.

FIGURE 1 – CASH FLOW FOR THE ANALYSIS OF PUBLIC OFFICIALS' ASSETS

FLUXO DE CAIXA
SERVIDOR: FULANO DE TAL
CPF: 123.456.789-00

Renda Total	Ano-calendário 2006	2007	2008	2009	2010	2011	2012
Órgão de lotação	120.000,00	125.000,00	130.000,00	130.000,00	135.000,00	135.000,00	150.000,00
1.1 Recebidos de Pessoas Jurídicas	**120.000,00**	**125.000,00**	**130.000,00**	**130.000,00**	**135.000,00**	**135.000,00**	**150.000,00**
1.2 Recebidos de P. Físicas / Exterior							
1.3 Rend. Isentos e não tributáveis	5.000,00	5.208,33	5.416,67	5.416,67	5.625,00	5.625,00	6.250,00
1.4 Rend. Tributação excl. / definitiva	10.000,00	10.416,67	10.833,33	10.833,33	11.250,00	11.250,00	12.500,00
1.5 Resultado Tribut. Da Atividade Rural							
1 Renda Total	**135.000,00**	**140.625,00**	**146.250,00**	**146.250,00**	**151.875,00**	**151.875,00**	**168.750,00**
2 Retenções na Fonte							
2.1 Imposto de Renda na Fonte e/ou Pago	33.000,00	34.375,00	35.750,00	35.750,00	37.125,00	37.125,00	41.250,00
2.2 Previdência Oficial	13.200,00	13.750,00	14.300,00	14.300,00	14.850,00	14.850,00	16.500,00
2 Total de Retenções na Fonte	**46.200,00**	**48.125,00**	**50.050,00**	**50.050,00**	**51.975,00**	**51.975,00**	**57.750,00**
3 Renda Líquida (1 – 2)	**88.800,00**	**92.500,00**	**96.200,00**	**96.200,00**	**99.900,00**	**99.900,00**	**111.000,00**
4 Despesas Declaradas							
Despesas médicas	1.200,00	1.300,00	1.400,00	30.000,00	1.500,00	1.500,00	1.800,00
Despesas com instrução	3.091,35	3.091,35	3.091,35	3.091,35	3.091,35	3.091,35	3.091,35
Outras despesas identificadas							
4.1 Total Pagamentos PF/PJ	**4.291,35**	**4.391,35**	**4.491,35**	**33.091,35**	**4.591,35**	**4.591,35**	**4.891,35**
4.2 Previdência Privada							
4.3 I.R. a pagar (exercício anterior)							
4 Total de Despesas Declaradas	**4.291,35**	**4.391,35**	**4.491,35**	**33.091,35**	**4.591,35**	**4.591,35**	**4.891,35**
5 Patrimônio							
5.1 Bens e Direitos – ANO ANTERIOR	450.000,00	500.000,00	555.000,00	630.000,00	700.000,00	720.000,00	720.000,00
5.2 Bens e Direitos – ANO ATUAL	500.000,00	555.000,00	630.000,00	700.000,00	720.000,00	720.000,00	760.000,00
5.3 Variação – Bens e Direitos (5.2 - 5.1)	50.000,00	55.000,00	75.000,00	70.000,00	20.000,00	-	40.000,00
5.4 Dívidas e Ônus -ANO ANTERIOR	-	30.000,00	40.000,00	30.000,00	-	-	20.000,00
5.5 Dívidas e Ônus – ANO ATUAL	30.000,00	40.000,00	30.000,00	-	-	20.000,00	15.000,00
5.6 Variação – Dívidas e Ônus (5.5 - 5.4)	30.000,00	10.000,00	- 10.000,00	- 30.000,00	-	20.000,00	- 5.000,00
5.7 Variação Patrimonial (5.3 - 5.6)	**20.000,00**	**45.000,00**	**85.000,00**	**100.000,00**	**20.000,00**	**- 20.000,00**	**45.000,00**
5 Patrimônio Líquido	**470.000,00**	**515.000,00**	**600.000,00**	**700.000,00**	**720.000,00**	**700.000,00**	**745.000,00**
6 Valor Anual Disponível para Outros Gastos (*)	**64.508,65**	**43.108,65**	**6.708,65**	**- 36.891,35**	**75.308,65**	**115.308,65**	**61.108,65**
7 Média Mensal para Outros Gastos	**5.375,72**	**3.592,39**	**559,05**	**- 3.074,28**	**6.275,72**	**9.609,05**	**5.092,39**
(*) Renda Líquida – Despesas declaradas – Variação Patrimônio Total (3 - 4 - 5.7)							
8 Movimentação Financeira							
Banco 01	160.000,00	180.000,00	65.000,00	30.000,00	-	-	-
Banco 02	-	-	135.000,00	450.000,00	110.000,00	130.000,00	165.000,00
8 Total	**160.000,00**	**180.000,00**	**200.000,00**	**480.000,00**	**110.000,00**	**130.000,00**	**165.000,00**
9 Quociente de movimentação Financeira/ Renda Total	**1,19**	**1,28**	**1,37**	**3,28**	**0,72**	**0,86**	**0,98**
10 Quociente de movimentação Financeira/ Renda Líquida	**1,80**	**1,95**	**2,08**	**4,99**	**1,10**	**1,30**	**1,49**

Source: CGU (2015, p. 41).

The information in the cash flow model shown in Figure 1 can be classified into four distinct classes: "resources," "expenditures," "asset change" and "financial transactions." "Resources" are income from legal entities and individuals and from abroad, exempt and non-taxable, subject to exclusive/definitive taxation, and profit from rural activities. "Expenditures" are withheld taxes, expenses with official social security, education and medical expenses, expenses with private pension plans and other identified expenses. In turn, "asset change" can behave both as "resources" and "expenditures," depending on the comparative result between the current and previous fiscal year: negative change in assets (arising from write-offs and/or reallocations) and positive change in liabilities (resulting from their receipts) consist of sources of funds, while positive change in assets (arising from their acquisitions and/or increases) and negative change in liabilities (resulting from their payments) are configured as expenditures. From the comparison between these three classes of information, two indicators are calculated in the cash flow: "6 – Annual Cash Assets for Other Expenses" (VADOG), "other expenses" being those not identified or declared by the public official, such as expenses with food, leisure, travel; and "7 – Monthly Average for Other Expenses," which is indicator "6" divided by the 12 (twelve) months of the year, resulting in the estimated monthly cash assets for those undeclared and unidentified expenses. In mathematical terms, VADOG is the amount resulting from the sum of all resources minus the sum of all

expenditures, and insignificant or negative values point to indications of undeclared asset increase of the public official (CGU, 2015, p.41).

Still in the cash flow model presented, the information regarding the financial transactions of the public official is divided into "official," stemming from financial institutions, and "estimated," corresponding to the income he/she received (which is assumed to have been transferred to his/her bank accounts). From the comparison between these two types of transactions, two indicators are calculated in the cash flow: "8 – Financial Transactions/Total Income Ratio"; and "9 – "Financial Transactions/Net Income Ratio" (QMFRL). In mathematical terms, the indicators are obtained by dividing the sum of all income reported by financial institutions and the sum of all resources received by the public official (in the case of index "8") or of all those resources deducted from expenditures with withheld tax and official social security, and the resulting values for those indicators that are significantly higher than 1 (one) point to the receipt of resources that are not included in his/her statements (CGU, 2015, p.42).

2.2. INFORMATION MANAGEMENT

Considering the importance of information for the detection of illicit enrichment, it is relevant, in the search for new ideas to improve the monitoring of the increase in assets of public officials, to address issues related to its conceptualization, management, procedural flow and subprocesses, and the possibility of its optimization through information systems, as well as the presentation of theoretical frameworks for planning such systems, by modelling an information architecture, which is presented in this subsection.

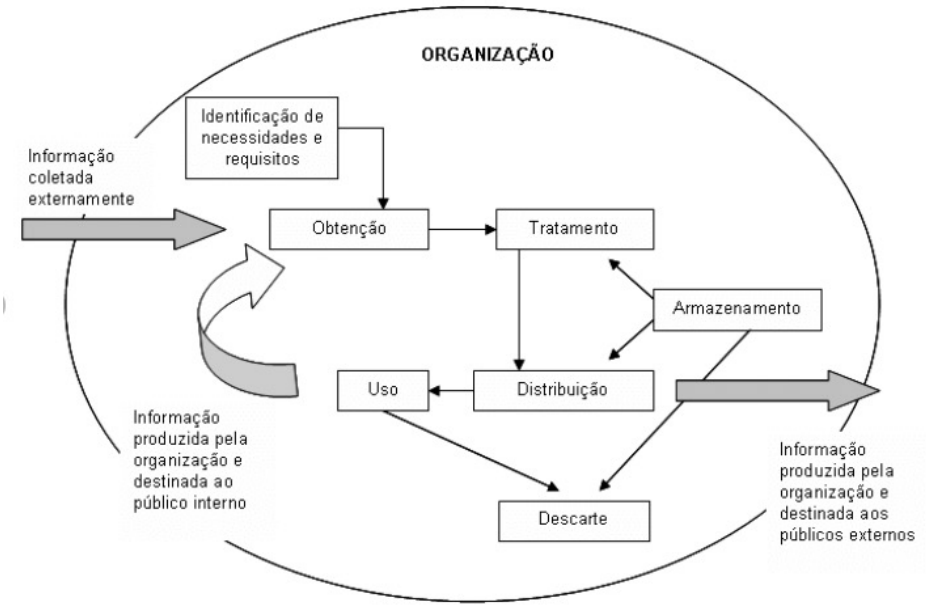
2.2.1. Information Management and the Information Process

According to Valentim (2002, p.4), information serves as basic inputs to achieve satisfactory or excellent results in the activities developed by people in the different sectors of an organization. Also according to the author, such inputs follow formal or informal flows that must be managed to obtain those results. Managing those inputs (or information in a broad sense) and their flows corresponds, according to Valentim and Teixeira (2012, p.153), "to action strategies that identify information requirements, prospecting, monitoring, analysis and value-added dissemination to its employees, facilitating the appropriation and generation of new knowledge and new information."

Also according to Valentim and Teixeira, the main goal of information management is to manage the immense amount of information coming from internal or external sources, providing access, sharing and dissemination through documents and systems, in an attempt to enable the transmission of knowledge among individuals.

Beal (2004, p.14-29), in turn, for whom information can be classified as "structured," when it follows a previously defined pattern (such as a form with filled in fields), or "unstructured," when it does not follow a defined pattern (as in the case of scientific article content), argues that it follows a flow within organizations, as shown in Figure 2, in which the activity of "identifying information needs and requirements" acts as a triggering element of the process, which can set up a continuous cycle of collection, treatment, distribution/storage and use to feed the decision-making and/or operational processes of the organization, and also leads to the provision of information to the external environment.

FIGURE 2 – INFORMATION FLOW IN ORGANIZATIONS



Fonte: Beal (2004, p.29).

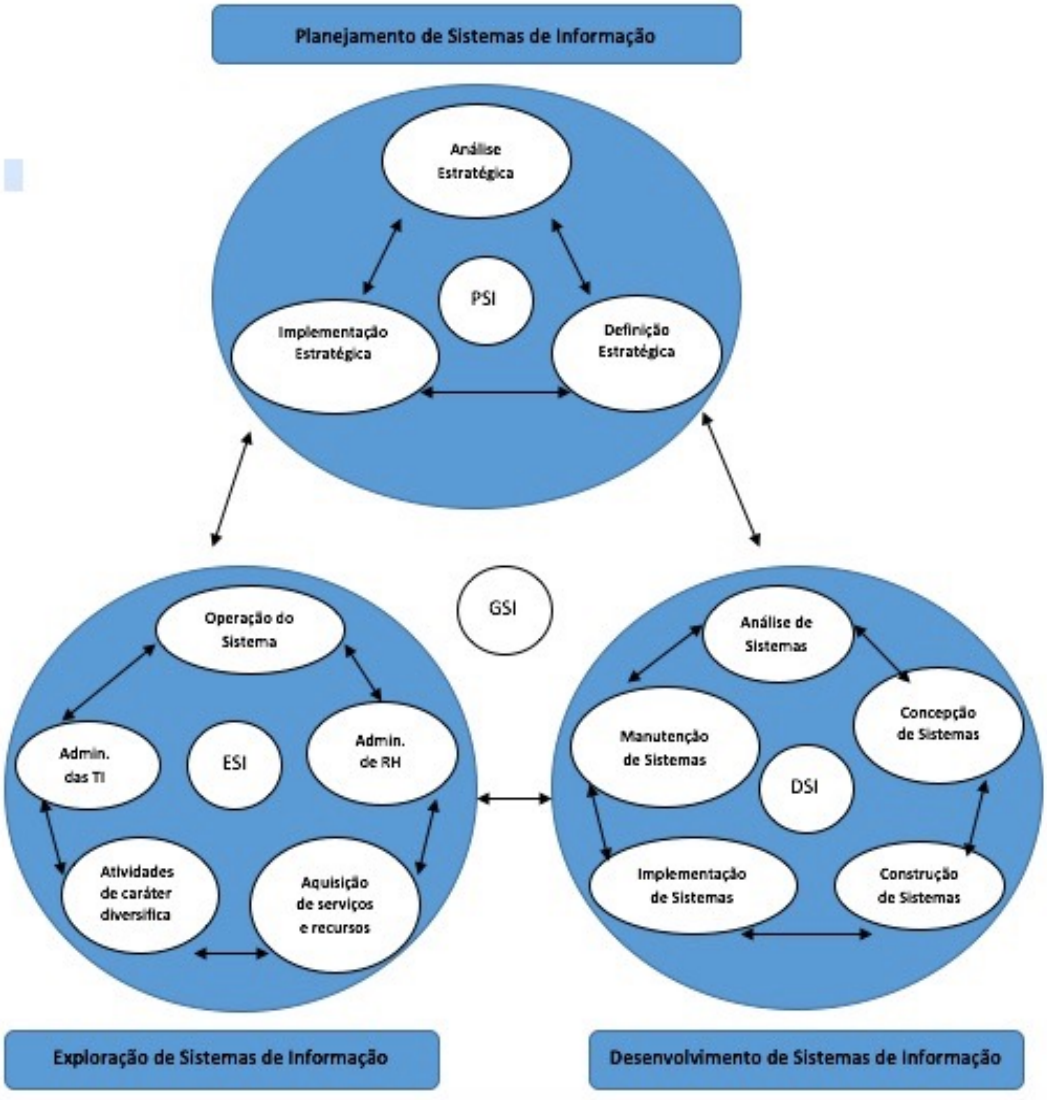
According to Tarapanoff (2006, p.23), the information cycle is a process that begins with the search for a solution to a problem, the need to obtain information about something, and proceeds through the identification of whoever generates the type of information needed, the sources and access, selection and acquisition, recording, representation, retrieval, analysis and dissemination of information, which, when used, increases individual and collective knowledge.

2.2.2. Information Systems Planning

In a definition that includes the main subprocesses of the information flow seen above, it is worth highlighting the definition by Turban et al. (2005, p.40), for whom an information system (IS) "collects, processes, stores, analyzes and disseminates information for a specific purpose." Along the same lines, Laudon and Laudon (2007, p.9) understand IS as a set of interrelated components that collect, process, store and distribute information to support the decision-making, coordination and control of an organization, also helping managers and workers analyze problems, visualize complex issues and create new products.

In a functional view of IS, Varajão (2002, p.95) argues that it comprises four main activities that make up the "Information Systems Function" (ISF): Information Systems Planning (ISP), Information Systems Development (ISD), Information Systems Exploration (ISE) and Information Systems Management (ISM). Considering that, in this model, special emphasis is given to ISP, as it is where the dISEred outcome and the processes involved in the system to be developed are outlined, it is adopted in this study because such outlining is key to the conception of an information architecture model planned as its main goal. Figure 3 reproduces the ISF model conceived by Varajão.

FIGURE 3 – ACTIVITIES OF THE INFORMATION SYSTEMS FUNCTION



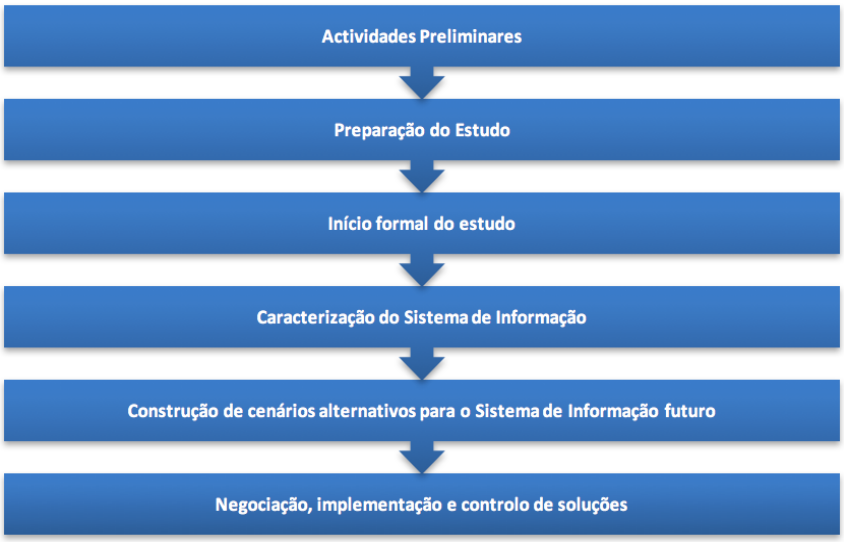
Source: Varajão (2002, p.254).

According to Varajão (2002, p.96-97) and as shown in Figure 3, ISF can be viewed as both continuous and cyclical, i.e., the activities into which it breaks down feed each other in each system generation, with strong links between them. ISP is responsible for identifying the required systems, thus preceding ISD, responsible for their development. ISE is responsible for ensuring their correct use in the best interest of the organization and ISM is responsible for managing all activities.

Regarding Information Systems Planning, Amaral and Varajão (2007, p.30) stress that the development of IS must result from a reflection on the role expected of it and the processes and resources involved in its construction, i.e., "thinking before doing seems to be a healthy attitude to meet this challenge," which would justify ISP.

Amaral and Varajão (2007, p.109) propose for information systems planning the use of a methodology called Adapted BSP, based on the Business Systems Planning methodology developed by IBM. In operational terms, according to Amaral and Varajão (2007, p.109), the study of ISP proposed by Adapted BSP is developed according to the steps shown in Figure 4:

FIGURE 4 – STEPS OF THE INFORMATION SYSTEMS PLANNING METHOD



Source: Amaral and Varajão (2007, p.110).

Among the BSP stages adapted from Amaral and Varajão, shown in the previous figure, prominent for this study is "Characterization of the Information System," as it is where the information architecture (IA) of the system to be built is developed. This stage, according to the authors, comprises the development of the following sub-steps: "definition of organizational processes," "identification of data requirements" and "definition of the information architecture."

"Organizational processes" are groups of logically related decisions or activities required to manage the organization's resources. Once they have been defined, the next step is to identify the "data requirements," which consists of defining the organization's entities, the data classes and the relationships between them. "Organizational entities" are what the organization manages, and they serve as a basis for identifying the data required for its activity, and "Data Class" is a grouping of data related to aspects (or entities) that are relevant to the organization and must be available to carry out the organization's activities (AMARAL;VARAJÃO, 2007, p.131-137).

Following the identification of the data classes, the relationships between the data classes and the processes must be established. Such relationships constitute the Information Architecture, which is developed through the processes/data classes matrix, listing the processes along the vertical axis and the "data classes" along the horizontal axis. Next, a "C" should be placed at the intersection of the process line with the data class column, which indicates that only one process can create a certain data class. Finally, a "U" (for "uses") is written in the intersection cell of each process with each data class that it uses (AMARAL;VARAJÃO, 2007, p.141-148). The result of this modeling work can be seen in Figure 5.

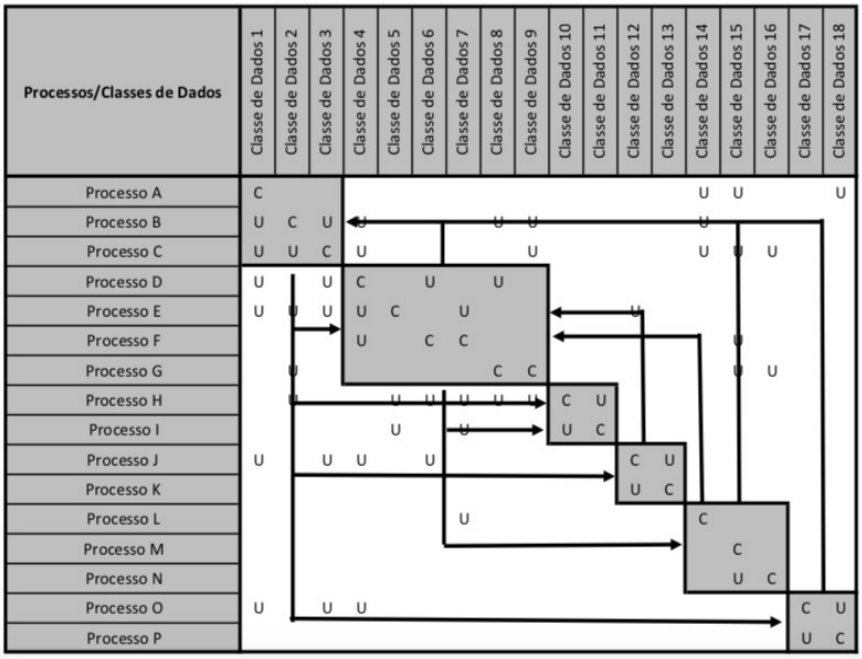
FIGURE 5 – PROCESSES/DATA CLASSES MATRIX

Processos/Classes de Dados	Classe de Dados 1	Classe de Dados 2	Classe de Dados 3	Classe de Dados 4	Classe de Dados 5	Classe de Dados 6	Classe de Dados 7	Classe de Dados 8	Classe de Dados 9	Classe de Dados 10	Classe de Dados 11	Classe de Dados 12	Classe de Dados 13	Classe de Dados 14	Classe de Dados 15	Classe de Dados 16	Classe de Dados 17	Classe de Dados 18
Processo A	C													U	U			U
Processo B	U	C	U	U				U	U					U				
Processo C	U	U	C	U					U					U	U	U		
Processo D	U		U	C		U		U										
Processo E	U	U	U	U	C		U					U						
Processo F				U		C	C								U			
Processo G		U						C	C						U	U		
Processo H		U			U	U	U	U	U	C	U							
Processo I					U		U			U	C							
Processo J	U		U	U		U						C	U					
Processo K												U	C					
Processo L							U							C				
Processo M															C			
Processo N															U	C		
Processo O	U		U	U													C	U
Processo P																	U	C

Source: Amaral and Varajão (2007, p.143).

The next modeling step consists of defining the IA flow diagram, grouping the closely related processes and data classes and indicating how the data relate to each other, as seen in the Figure 6.

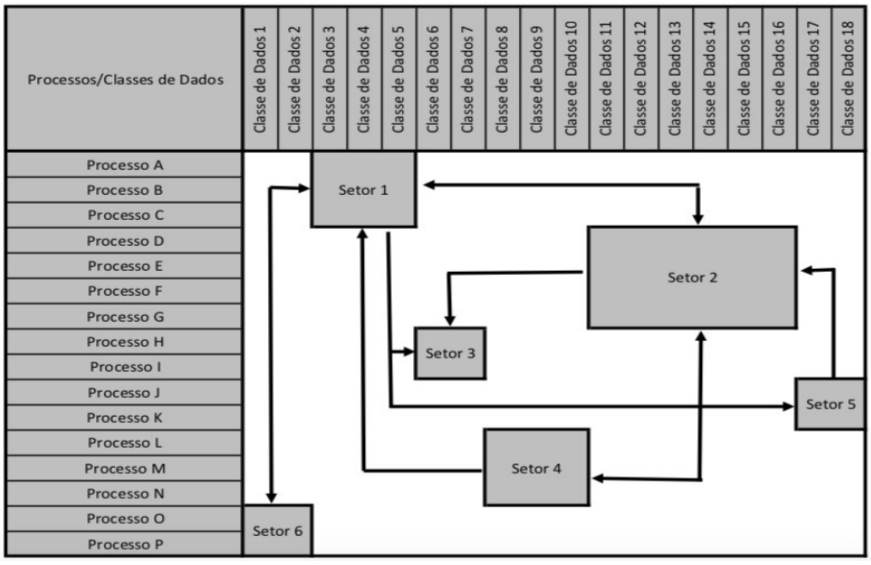
FIGURE 6 - PROCESSES/DATA CLASSES MATRIX (DATA FLOW)



Source: Amaral and Varajão (2007, p.146).

For the final presentation of the matrix, it is convenient to simplify the flow diagram, removing, as shown below, the "Cs" and "Us," using flows in both directions and moving the process groups and data classes for better readability, as shown in Figure 7.

FIGURE 7 – INFORMATION ARCHITECTURE MATRIX



Source: Amaral and Varajão (2007, p.147).

3. METHODOLOGY

Given the main goal of this study, which is to dISEgn an information architecture model with a view to developing an information system to detect indications of illicit enrichment of public officials, it is based on applied research, since it "aims to generate knowledge for practical application, geared towards solving specific problems," according to the definition by Gerhardt and Silveira (2009, p.35).

As for the objectives, the study is classified as exploratory, since, according to Prodanov and Freitas (2013, p. 51 and 52), it aims to provide more information on the investigated subject, enabling its definition and outline, i.e., facilitating the delimitation of the research subject, guiding the setting of objectives and the formulation of hypotheses or discovering a new type of approach to the matter. Also according to the authors, exploratory research usually involves bibliographic research, interviews with people who have had practical experiences with the researched issue and analysis of examples that encourage understanding. The bibliographic research focused on two main themes: "Illicit Enrichment" and "Information Management."

Lastly, in terms of the approach to the problem, the research is classified as qualitative, as it does not use statistical data as the core of the analysis process, and therefore does not have the priority of listing or measuring units.

In order to achieve its overall goal, the study used the Information Systems Planning methodology called Adapted BSP, conceived by Amaral and Varajão, specifically with regard to "Characterization of the Information System," as well as the working model adopted by CGU to investigate the increase in assets of public officials and its improved version by CGM-SP for analysis.

Considering that, according to the Adapted BSP methodology of Amaral and Varajão, "Characterization of the Information System" is developed through the sub-steps of defining "processes," identifying "data requirements" ("organizational entities" and "data classes") and developing the "information architecture" (using its "processes x data classes" ma-

trix), the information required for the identification of these sub-steps was obtained from the following cases-units:

Definition of "processes": Offices of the Federal Controller General and the Municipal Controller General of São Paulo, the object of study in CGU being the processes involved in its working model to investigate the increase in assets of public officials and that in CGM-SP its improvement of the CGU model (creation and operation of a system to collect statements of assets from municipal public officers).

Identification of "data requirements" ("organizational units" and "data classes"): CGU, CGM-SP and control bodies that also carry out investigations into the increase in assets of public officials. Data collection with CGU and CGM-SP to identify the "organizational units" involved in the work and the "data classes" (and their sources) used was conducted at the same time as the interviews with them to map their working processes.

Following the identification of the working "processes" and "data requirements" in the researched models, the essential processes for the operation of the study's expected information system were selected and, as a result of its "planning," its "information architecture" was developed.

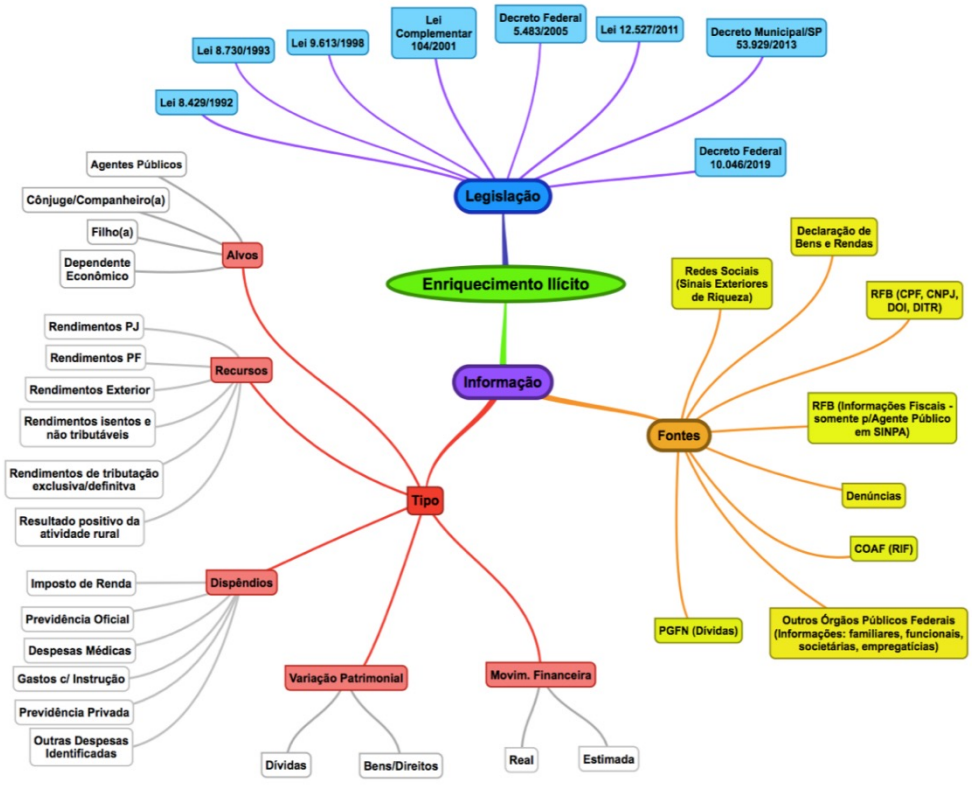
4. RESEARCH RESULTS

This subsection features the research results, highlighting the main elements contained in the theoretical background, compiling the data classes used in the investigation works and, lastly, detailing the intended system model, with the dISEgn of the information architecture.

4.1. MAIN ELEMENTS EXTRACTED FROM THE THEORETICAL BACKGROUND

In the search to systemize a model to identify indications of illicit enrichment of public officials, it is possible to split the theoretical background related to "Illicit Enrichment" into two core areas and group the related elements in each one. The first, "Legislation," consists of the Brazilian regulations that govern the matter. The second, "Information," based on the possibilities admitted by "Legislation," aims to compile a minimum set of "types" required to analyze the increase in assets of public officials and the "sources" where they can be obtained. The mind map in Figure 8 features the main elements contained in each of the two core areas:

FIGURE 8 – MIND MAP ON ILLICIT ENRICHMENT



Source: authors (2019).

As for the analysis of the theoretical background regarding "Information Management," more specifically on "Information Process," whether information management is based on a process made up of parts through which the information flows and whether it plays a key role in identifying the illicit enrichment of public officials, the following sub-processes, if truly well applied, may help improve the work of investigating the assets of public officials:

A) Information requirements

Despite the need to detect illicit enrichment in government branches at all levels, it is worth noting, as seen in the legislation on the subject, that the possibility of analyzing increase in assets is only provided for public officials of the federal executive branch, by the Office of the Federal Controller General, and for senior officials and occupants of elective positions and positions of trust of the direct and indirect administration and foundations of government branches at all levels, by the Accounting Courts.

B) Information gathering

Once the need for information to identify illicit enrichment has been established, this type of work necessarily begins by identifying the "targets" to be investigated, i.e., the public officials who must undergo asset monitoring, in addition to their professional attributes, such as length of service, position and sector.

BISEdes the need to identify "targets" (public officials and their "dependents"), it is also necessary to gather the following information and link it to whom it belongs: "resources," "expenditures," "assets," "liabilities" and "financial transactions."

Regarding the capture of such information, according to the understanding of Beal (2004, p. 31), it can stem from any kind of media or format and from internal or external sources. Despite the possibility of capturing information in different types of formats, only structured formats will be considered for the development of the information architecture model intended by the study.

Regarding sources of information, as Laws no. 8429/1992 and 8.730/1993 require public officials to submit statements of their and their dependents' assets, such documents are internal and basic sources for the work of asset investigation. However, since the information contained therein has a "self-declaratory" nature, it is essential to obtain information from external sources to "verify" the occurrence of falsehood and/or omissions in the statements, such as: register of deeds; state traffic departments records, for identification of vehicles; national registry of legal entities, to detect companies linked to public officials; national taxpayers registry, to obtain the address and parentage of public officials; employment relationship records; internet and social media, to identify lifestyle and external indications of wealth. Due to their "declaratory" nature, denunciations stemming from external sources and suggesting external indications of wealth or suspicion of illicit enrichment of public officials must also be checked against sources to verify their veracity.

Still regarding the gathering of information and specifically in relation to access to its sources, it can be classified into two types: available in "databases," when related to several individuals, such as the Public Officials Asset Registration System (SISPATRI) of the Municipal Government of São Paulo, and provided in Decree no. 8789/2016 and shared through formal agreements with the entities that hold it; or when made available/identified in specific cases, such as tax records of formally investigated public officials shared by the Brazilian Revenue Service (RFB).

C) Information storage

If, according to Beal, the preservation of organizational information requires a number of activities and precautions to maintain the integrity and availability of existing data and information, this should also be a requirement when analyzing the increase in assets of public officials. In addition, since asset information is related to their private lives, its storage must be as secure as possible to prevent undue access.

D) Information processing

Following Beal's understanding of information processing as a more comprehensive activity that includes sub-steps, among them "organization" and "analysis," once the asset information is obtained, it must be organized for easier use and analysis. Regarding the organization of asset information, this has been partly made easier at federal level by Decree no. 5483/2005 and in the city of São Paulo by Decree no. 53929/2013, which require its internal and primary sources, the asset statements submitted by public officials, to follow standards, whether in a specific format or according to the RFB template (in cases where public officials authorize access to their income tax return), or also in the case of the city of São Paulo, the template contained in SISPATRI. Regarding information obtained from external sources, given the probability of it stemming from different kinds of media and formats, it should be organized according to minimum standards of convergence to facilitate comparison with the information provided by public officers.

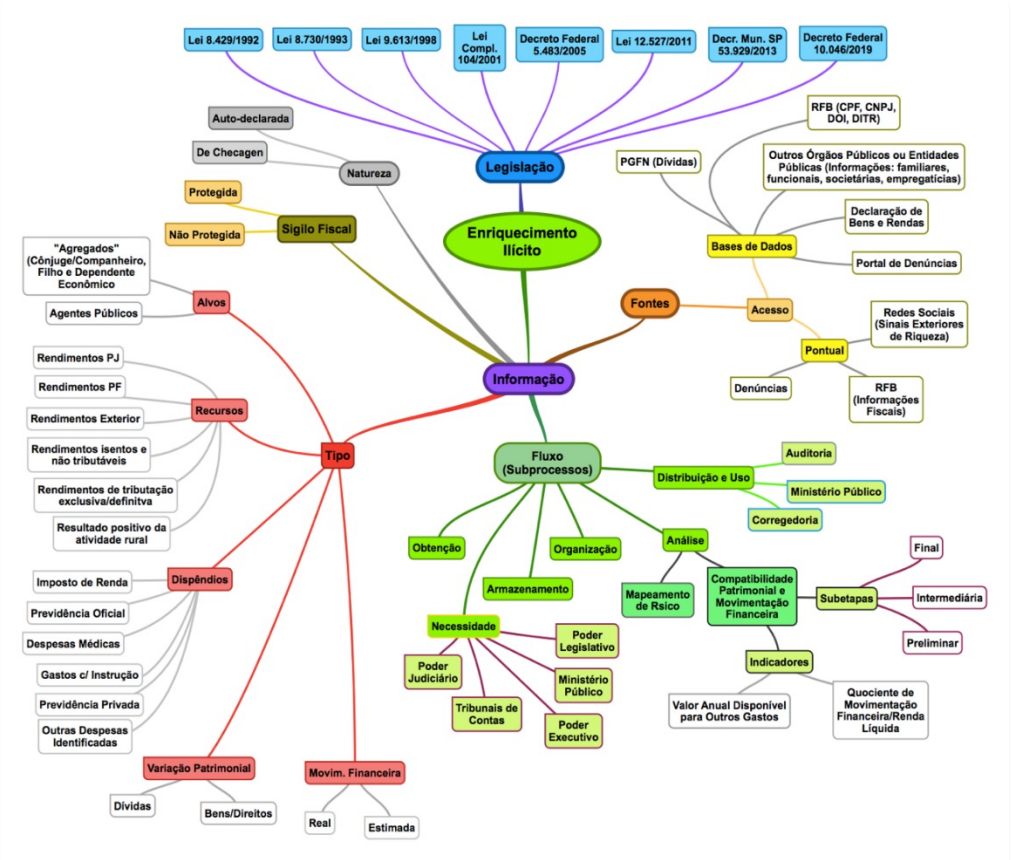
As for the analysis of asset information, it has two main goals: to map the risk of illicit enrichment by public officials and, having selected critical cases, to verify the legality of their assets and financial transactions.

E) Information distribution and use

If, according to Beal, the distribution step consists of forwarding the required information to those who need it, suspected cases of illicit enrichment arising from the use and analysis of asset information must be brought to the attention of the responsible entities for the institution of administrative and judicial proceedings in order to investigate them and, once confirmed, apply the appropriate penalties to the public officials involved.

The mind map below updates Figure 8, adding to the "Information" area the main elements arising from the information subprocesses and cash flow:

FIGURE 9 – UPDATED MIND MAP ON ILLICIT ENRICHMENT



Source: Authors (2019.

4.2. PROPOSAL OF A SYSTEM MODEL TO IDENTIFY SIGNS OF ILLICIT ENRICHMENT OF PUBLIC OFFICIALS

Based on the main elements extracted from the theoretical background, it is possible to outline the following goals to be achieved with the computerized system to be developed from the proposed information architecture:

1) To undertake a comprehensive and computerized mapping of the risk of illicit enrichment by public officials, based on "declared," "self-declared" and "verification" information and databases unprotected by tax return confidentiality and their comparison;

2) To undertake comprehensive and also specific computerized analyses of the legality of the assets and financial transactions of public officials, using "declared," "self-declared" and "verification" information and databases, protected and unprotected by tax return confidentiality, and their comparison.

In order to achieve these goals and the consequent development of the system, the identification of targets and the collection and organization of the data classes related to them play a key role for being the initial condition to undertake the asset investigation. The subtypes considered for the "target" data class were "public official" and his/her "dependents," namely "spouse/partner," "children" and "economic dependent," due to the natural risk that they are benefiting directly or indirectly from illicit enrichment and/or contributing to its concealment. In turn, the subtypes of the "resources," "expenditures," "asset changes" and "financial transactions" are shown in Tables 1 to 4.

TABLE 1 – "RESOURCES" DATA CLASS SOURCES BY SUBTYPE

RESOURCES	SOURCE	KIND	ACCESS	TAX RET. CONF.
(+) Income from Legal Entities	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	CIVIL SERVANTS REGISTRY (HR System)	Verification	Database	No
	RAIS	Verification	Database	No
	CNIS	Verification	Database	No
	CDT	Verification	Specific case	No
	DEFIS	Verification	Specific case	Yes
	ECD	Verification	Specific case	Yes
(+) Income from individuals	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
(+) Income from overseas	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
(+) Nontaxable and exempt income	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	SIAFI (Travel Expenses)	Verification	Database	No
(+) Income subject to exclusive/ conclusive taxation	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
(+) Profit from rural activities	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No

Source: Authors (2019).

TABLE 2 - "EXPENDITURES" DATA CLASS SOURCES BY SUBTYPE

EXPENDITURES	SOURCE	KIND	ACCESS	TAX RET. CONF.
(-) Withholding and/or paid income tax	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	CIVIL SERVANTS REGISTRY (HR System)	Verification	Database	No
	DIRF	Verification	Specific case	Yes
(-) Official social security expenses	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	CIVIL SERVANTS REGISTRY (HR System)	Verification	Database	No
(-) Medical expenses	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
(-) Education expenses	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
(-) Other proven expenses	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	WATER UTILITIES	Verification	Database	No
	SOCIAL MEDIA	Declaratory	Specific case	No
	CDT	Verification	Specific case	No
	DENUNCIATION	Declaratory	Specific case and	No
			Database	
	DECRED	Verification	Specific case	Yes
	NFe	Verification	Specific case	Yes
(-) Private pension plan expenses	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	DIMOF and e-Finances	Verification	Specific case	Yes
(-) Income tax paid (Previous Fiscal Year)	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No

Source: Authors (2019).

TABLE 3 - "ASSET CHANGE" DATA CLASS SOURCES BY SUBTYPE

ASSET CHANGE	SOURCE	KIND	ACCESS	TAX RET. CONF.
(-) Increase (+) Decrease in Assets (Current Fiscal Year – Previous Fiscal Year)	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	DOI	Verification	Database Specific case	No Yes
	ANAC	Verification	Database	No
	NACIONAL REGISTER OF LEGAL ENTITIES	Verification	Database	No
	MUNICIPAL REAL ESTATE REGISTRY - IPTU	Verification	Database	No
	WATER UTILITY	Verification	Database	No
	ARISP	Verification	Specific case	No
	CENSEC	Verification	Specific case	No
	CDT	Verification	Specific case	No
	BOARD OF TRADE	Verification	Specific case	No
	PORT AUTHORITY	Verification	Specific case	No
	SOCIAL MEDIA	Declaratory	Specific case	No
	DENUNCIATION	Declaratory	Specific case and Database	No
	DITR	Verification	Specific case	Yes
	DIMOB	Verification	Specific case	Yes
(-) Decrease (+) Increase in Liabilities (Current Fiscal Year – Previous Fiscal Year)	ASSET STATEMENT	Self-Declaratory	Specific case	No
	SISPATRI	Self-Declaratory	Database	No
	CDT	Verification	Specific case	No

Source: Authors (2019).

TABLE 4 - "OFFICIAL FINANCIAL TRANSACTIONS" DATA CLASS SOURCES BY SUBTYPE

OFFICIAL FINANCIAL TRANSACTIONS	SOURCE	KIND	ACCESS	TAX RET. CONF.
(+)Total yearly amount in transactions with financial institutions	DIMOF and e-Finances	Verification	Specific case	Yes
	BANK STATEMENTS	Verification	Specific case	Yes

Source: Authors (2019).

The processes and activities established to achieve the goals outlined for the system can be grouped into four main areas: 1- capture of the "targets," "resources," "expenditures," "asset change" and "official financial transactions" data classes; 2 - analysis of the legality of the targets' assets, based on the comparison between their "resources," "expenditures" and "asset change" and the organization and calculation of the result in the standard established by VADOG; 3 - analysis of the financial transactions of specific public officials, based on the comparison between their "estimated financial transactions" and "official financial transactions" and calculation of the result according to the standard established by the QMFRL; and 4 – Risk mapping. Table 5 below presents in a "menu of ideas" a synthISEs of processes that are understood to be part of each of those main areas:

TABLE 5 - MENU OF IDEAS OF GUIDING PROCESSES FOR BUILDING THE SYSTEM TO IDENTIFY INDICATIONS OF ILLICIT ENRICHMENT

CAPTURE OF DATA CLASSES	ANALYSIS OF ASSET LEGALITY	ANALYSIS OF FINANCIAL TRANSACTIONS	RISK MAPPING
Identifying public officials subject to asset investigation and capturing information about them (position, workplace, length of service, address).	Comparing and identifying divergences between "Resources," "Expenditures" and "Asset Change" data obtained from "self-declared" sources and "verification" sources unprotected by tax return confidentiality, for all public officials and their "dependents"	Organizing and calculating in an automated way, for public officials under specific investigation, "Resources" and "Expenditures" data obtained from "self-declared" sources and "verification" sources protected or unprotected by tax return confidentiality, in the standard for established for "Estimated Financial Transactions"	Automatically identifying public officials with asset statements with omitted assets, undervalued and assets and expenditures, or non-existent or overvalued resources, belonging to them and/ or their dependents.
Automatically identifying spouse/partner, children and other dependents of public officials subject to asset investigation	Organizing and calculating VADOG in an automated way for all public officials and their "dependents" based on "Resources," "Expenditures" and "Asset Change" data obtained from "self-declared" sources and "verification" sources unprotected by tax return confidentiality,	Determining the "Official Financial Transactions" of public officials under specific investigation based on information protected by tax return confidentiality	Automatically identifying public officials whose VADOG is considered critical following comparison between "self-declared" sources and "verification sources, unprotected by tax return confidentiality
Capturing "Resources," "Expenditures" and "Asset Change" data belonging to all public officials and their "dependents" from "self-declared" sources unprotected by tax return confidentiality and from "verification" sources protected or unprotected by tax return confidentiality	Comparing and identifying divergences between "Resources," "Expenditures" and "Asset Change" data obtained from "self-declared" sources and "verification" sources protected or unprotected by tax return confidentiality, for public officials under specific investigation and their dependents	Automatically calculating QMFRL for public officials under specific investigation, based on comparison between "Estimated Financial Transactions" and "Official Financial Transactions"	Automatically identifying public officials whose statements of assets and/ or resources are considered suspicious, and which, by their nature, do not allow confirmation against "verification" sources unprotected by tax return confidentiality

CAPTURE OF DATA CLASSES	ANALYSIS OF ASSET LEGALITY	ANALYSIS OF FINANCIAL TRANSACTIONS	RISK MAPPING
Obtaining information related to "Official Financial Transactions" from "verification" source protected by tax return confidentiality, of public officials under specific investigation	Organizing and calculating VADOG in an automated way for public officials under specific investigation and their dependents based on "Resources," "Expenditures" and "Asset Change" data obtained from "self-declared" sources and "verification" sources protected or unprotected by tax return confidentiality	X	Automatically identifying public officials named in a denunciation, representation and/or investigation report, as well as those facing correctional proceedings, occupying positions considered sensitive and/or showing external signs of wealth
Inserting and adjusting, when necessary, specific information regarding "resources," "expenditures," "asset change" and "financial transactions," such as cases that require an appraisal of explanations submitted by public officials regarding the inconsistencies detected about him/her			Mapping the risk of illicit enrichment based on the aggregation of previous criticality indicators
	Enabling the preparation of individualized reports, containing conclusions from analyses on the legality of the assets and financial transactions of public officials		Selecting the public officials identified as showing greater risk of illicit enrichment for more in-depth investigation of their assets.

Source: Authors (2019).

4.6.1. Proposed information architecture model

As seen in the theoretical background, the Information Architecture proposed by the BSP model of Amaral and Varajão consists of identifying the relationships between the researched work processes, the organizational units involved in them and the data classes used or created by them.

The activities intended for the proposed system to execute were grouped into four main processes:

- **Capture of Data Classes:** capturing "targets" in different information sources; capturing "resources," "expenditures," "asset change" and "liability change" related to "targets" in different information sources; capturing "official financial transactions" of specific public officials in information sources protected by tax return confidentiality;
- **Analysis of Asset Legality:** comparing "resources," "expenditures," "asset change" and "liability change" related to "targets" obtained from different sources of information; calculating the VADOG indicator for the "targets";
- **Analysis of Financial Transactions:** comparing "estimated financial transactions (net income)" and "official financial transactions" related to specific public officials obtained from different sources of information; calculating the QMFRL indicator for specific public officials;
- **Risk Mapping:** identifying public officials who failed to submit asset statements; identifying public officials occupying positions considered sensitive; identifying public officials denounced for corruption, illicit enrichment and/or external indications of wealth; identifying public officials facing correctional proceedings related to possible acts of corruption and/or illicit enrichment; identifying public officials whose statements of assets and/or resources are considered suspect; identifying public officials with divergences and/or omissions identified when comparing the information provided by them with that contained in "verification" sources; identifying public officials whose VADOG is considered critical; mapping risk of illicit enrichment based on the aggregation of the above-mentioned criticality indicators.

As for the data classes, the system, as detailed in Tables 1 to 4, will use five distinct classes to achieve its goals: "targets," "resources," "expenditures," "asset

change (assets/liabilities)" and "financial transactions." In addition to those, it is possible to conclude, from the objectives outlined for the system, that it creates three other data classes: VADOG, QMFRL and illicit enrichment risk mapping.

In turn, regarding the organizational units involved in the operationalization of the system, given that its processes are restricted in terms of the information process to the capture, organization and analysis (including comparison) of information related to the actual technical asset investigation, and that, as mapped in the CGU and CGM-SP models, such activities are exclusive to their asset investigation units, the system proposed here will be for the exclusive use of this type of unit.

The table below presents the proposed information architecture model, detailing the "use" and "creation" relationships of data classes by the activities belonging to the processes planned for the system.

QUADRO 31 - ARQUITETURA DA INFORMAÇÃO DO SISTEMA PROPOSTO

PROCESS/DATA CLASSES		TARGETS	RESOURCES	EXPENDITURES	ASSET CHANGE (ASSETS/ LIABILITIES)	FINANCIAL TRANSACTIONS	VADOG	QMFRL	ILLICIT ENRICHMENT RISK MAP
Capture of Data Classes	Capturing "targets"	U							
	Capturing "resources," "expenditures" and "asset change" of "targets"	U	U	U	U				
	Capturing "official financial transactions" of specific public officials	U				U			
Analysis of Asset Lgality	Comparing "resources," "expenditures" and "asset change" of "targets"	U	U	U	U				
	Calculating the VADOG indicator for "targets"	U	U	U	U		C		
Analysis of Financial Legality	Comparing "estimated financial transactions" and "official financial transactions"	U	U	U	U	U			
	Calculating the QMFRL indicator for specific public officials	U	U	U	U	U		C	
Risk Mapping	Identifying public officials who failed to submit asset statements	U							
	Identifying public officials occupying positions considered sensitive	U							
	Identifying public officials denounced for illicit enrichment	U	U	U	U				
	Identifying public officials facing correctional proceedings related to illicit enrichment	U	U	U	U				
	Identifying public officials with external indications of wealth	U	U	U	U				
	Identifying public officials whose statements of assets and/or resources are considered suspect	U	U		U				
	Identifying public officials with divergences of values and/or omissions of assets in their statements	U	U	U	U				
	Identifying public officials whose VADOG is considered critical	U					U		
	Mapping risk of illicit enrichment based on the aggregation of the abovementioned criticality indicators	U	U	U	U		U		C

Source: Authors (2019).

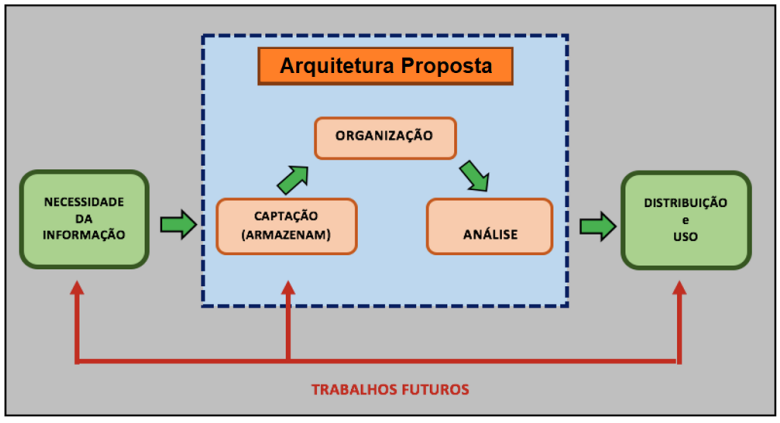
5. CONCLUSIONS

The overall goal of this study is to propose an information architecture model for Brazilian control bodies to identify indications of illicit enrichment of public officials. Considering that the information architecture was modeled, it is concluded that said goal was achieved.

In spite of the fact that the main pillar of the fight against illicit enrichment is, according to the model defended in this research, systemic monitoring of the increase in assets of public officials, three other aspects are relevant and complementary to this fight: enhancing the capture of information that enables the increasing detection of disproportionate assets; distributing and using the results of the identified indications of illicit enrichment; and expanding the current situation of asset investigation in Brazil.

In terms of information process management, the main pillar on which this research was developed, it is possible to conclude, as shown in the figure below, that the proposed system focused heavily on its sub-processes of "collection/capture," "organization" and (especially) "analysis" of information, suggesting for further research the exploration of the three other sub-processes herein described, namely "information requirements," "capture (increase)" and "distribution and use."

FIGURE 32 - SUGGESTIONS FOR FUTURE WORK ON ILLICIT ENRICHMENT FROM THE PERSPECTIVE OF THE INFORMATION PROCESS



Source: Authors (2021).

Regarding "information requirements" about assets, considering that this research points to a scenario of extreme scarcity of systemic studies on asset investigation in Brazil, it is suggested that future studies undertake a more accurate mapping of this situation, in addition to exploring the minimum conditions required by the control units for their implementation and the difficulty to obtain them.

As for the sub-process of "capturing" information, considering that the implementation of a system of broad and permanent monitoring of the increase in assets of public officials is expected to result in improved mechanisms to dissimulate undue wealth by those who acquire it, it is suggested that future research explore information sources and mechanisms that enable a timely and more accurate detection of indications of disproportionate assets, especially the so-called "external signs of wealth."

With regard to the sub-process of "distribution and use" of the information produced in asset investigations, it is suggested that future studies explore its degree of accuracy based on the results of the disciplinary proceedings arising from it; examine its impacts on the work of correctional departments and prosecution services; and map the level of use of the detection of cases of illicit enrichment as input for initiatives of control and/or investigation of the work units and/or professional activities of those who committed it.

Lastly, although it is obvious that the system modeled herein did not account for all details and nuances of detecting indications of illicit enrichment

(usually only known in practical cases of asset investigation), thus meriting the close attention and contribution of specialists in the areas of asset investigation and information systems, its conception, for being supported by a theoretical background related to the methodology of analysis of asset legibility and the mapping of the processes and "data classes" used in this type of work, attests to the importance of this research for studies focused on both corruption and information management.

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