

## **A Model for Electronic Supervision**

### **Modelo de fiscalización electrónica**

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#### **ABSTRACT**

**Aim:** To propose and validate a theoretical model for electronic supervision to be used in the process of supervision by the General Administration of the Federal Fiscal Auditing from the Tax Administration Service, in Mexico, in order to predict, prevent, detect, correct, and check the lack of compliance of taxpayer obligations, using forensic auditing tools and techniques. The model proposed (made by the authors under the name of KAF), is made of four elements: instruments, phases, approaches, and effects. Their interaction and functionality are explained through opinions. The phases proposed are in keeping with the audit process; the special instruments can be applied without the occurrence of tax evasion, or the presence in court.

**Methods:** Quantitative research and descriptive approach with a non-experimental design. A number of surveys were applied to collect data; the validation of the model was based on expert opinion and the concordance coefficient.

**Results:** the concordance coefficient from judges was .96 (sig < 0.05), which indicated the level in which the items in the questionnaire related to the coherence of the responses given by the experts when analyzing the information obtained.

**Conclusions:** The main contribution of this study was the proposal of an electronic supervision model made of four elements: instruments, phases, approaches, and effects, to be integrated in the supervision process of the General Administration of the Federal Fiscal Audit applied to individual administrations of fiscal audit, which was validated through expert opinion. The KAF model for electronic supervision can be used in the public and private sectors; it promotes higher taxpayer risk perception derived from the lack of compliance with fiscal obligations.

**Key words:** forensic auditing, forensic auditing tools and techniques, supervision process, audit model and tax administrations.

## RESUMEN

**Objetivo:** proponer y validar un modelo teórico de fiscalización electrónica para ser integrado al proceso de fiscalización de la Administración General de Auditoría Fiscal Federal del Servicio de Administración Tributaria en México, a fin de predecir, prevenir, detectar, corregir y comprobar el incumplimiento de obligaciones fiscales de los contribuyentes, usando herramientas y técnicas forenses de auditoría. El modelo propuesto (creación de los autores, quienes lo nombraron KAF) se compone de cuatro elementos: instrumentos, fases, enfoques y efectos; su interacción y funcionalidad se explica a través de criterios; las fases propuestas se alinean a las del proceso de auditoría y los instrumentos especializados pueden aplicarse sin mediar un delito fiscal o llegar a tribunales.

**Métodos:** investigación de enfoque cuantitativo y alcance descriptivo con diseño no experimental. Se emplearon encuestas para la recopilación de datos, la validación del modelo fue con criterio de expertos y haciendo uso del coeficiente de concordancia.

**Resultados:** se obtuvo el coeficiente de concordancia entre jueces ,96 (sig < 0,05), lo que indica el grado en que los elementos del cuestionario se relacionan con la coherencia en las respuestas otorgadas por los expertos al analizar la información obtenida.

**Conclusiones:** La principal aportación del presente estudio fue proponer un modelo de fiscalización electrónica con cuatro elementos: instrumentos, fases, enfoques y efectos para integrarse en el proceso de fiscalización de la Administración General de Auditoría Fiscal Federal aplicado en las administraciones desconcentradas de auditoría fiscal; mismo que fue validado por criterios de expertos. El modelo KAF de fiscalización electrónica puede ser utilizado tanto en el sector público como en el privado y propicia el incremento de la percepción del riesgo en los contribuyentes por incumplimiento en las obligaciones fiscales.

**Palabras clave:** auditoría forense, herramientas y técnicas forenses de auditoría, proceso de fiscalización, modelo de auditoría y administraciones tributaria

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## INTRODUCTION

Tax administrations are in charge of several functions, including tax assessment. It is understood –according to OCDE (2009, p.110)– that the term tax assessment refers to a “compendium of all the activities performed habitually by the bodies of the tax administration to verify proper taxpayer communication of their fiscal obligations”. Increasing efficacy, and stimulating the reduction of informal economic practices,<sup>1</sup> has

been recommended by the Organization for Cooperation and Economic Development in Mexico (OCDE). This body has expressed their concern over the impact of human resources use within tax administration agencies of member states, whose expenses on the staff required are above 70%, on average. It is noteworthy that in the last decade, an average of 30% of this resource has been used in inspection, investigation, and other assessing activities<sup>2</sup> or in audits, and supervisions. Hence, the contribution of such activities to collection and compliance rates is relevant. This trend has been prevalent since 2019. Accordingly, it is necessary to rely on competent, professional, productive, and adaptable personnel in human resources planning in most administrations (OCDE, 2011; 2019).

As a way to increase tax income, the Service of Tax Administration (SAT, in Spanish) has established several different strategic goals, such as including auditing mechanisms under modern technological schemes; increasing risk perception as a result of fiscal obligations; employing highly specialized staff with a preventive and proactive approach, based on fiscal planning; the capacity of timely detection of illegal practices, evasive and elusive behaviors, the lack of compliance; implementing efficient and robust technological tools to interact and exchange information; strengthening units of fiscal intelligence; and so forth (Service of Tax Administration, 2014). Some of these goals are completely reachable through supervision<sup>3</sup>, which is within the powers of some federal government bodies, such as the General Administration of Federal Fiscal Auditing (AGAFF, in Spanish) from SAT, a decentralized body belonging to the Department of Economy and Public Credit (SHCP, in Spanish).

In order to measure the efficacy of supervision by AGAFF, several indexes are determined, including indicator “Efficacy of supervision to other taxpayers”.<sup>4</sup> According to SHCP (2019), the first semester of 2019 revealed 69% fulfillment of the goal set (105.8%). However, considering that this index is obtained by dividing supervision events or reviewing substantive methods with collected figures equal or higher than 50 000 pesos at the end of a year –that is, tax irregularities, or omissions, that led to lack of compliance with fiscal obligations, were found–, by the total of events supervised, or reviews of completed substantive methods corresponding to the same period. The significance of institutional efficacy becomes questionable when variables

“active taxpayer” and “supervision events” are included in goal fulfillment outcome by AGAFF, in relation to the plan.

Upon analyzing SAT information between 2012 and 2019, from the total of active taxpayers, only 0.265 8%, 0.266 8%, 0.243%, 0.141 6%, 0.158 9%, 0.210 4%, 0.088 2%, and 0.088 4% have been supervised, respectively (SAT, 2015; 2017; 2019). The outcome reveals a problem associated to the level of AGAFF efficacy in Mexico. Accordingly, the aim of this paper was to validate the KAF<sup>5</sup> Model for Electronic Supervision, which can be integrated to the supervision process of AGAFF, in order to predict, prevent, detect, correct, and assess compliance with taxpayer obligations. This model suggests a novel use of forensic auditing tools and techniques, without the need of occurrence of tax violation, thus offering an opportunity for the evidence found to be conclusive against taxpayers in court. In addition to improving audit procedures, the supervision process of AGAFF implemented in decentralized administrations of fiscal auditing (ADAF), and the efficacy of this body.

In that sense, the empirical experience of the Higher Audit of the Mexican Federation (ASF), a supervising body that performs forensic audits to assess the public account, certifies feasibility of the proposal of investigation in order to integrate forensic auditing tools and techniques to the supervision process. The statistical data of ASF evidence a rise in the number of denunciation reports of events, starting in 2009, when the forensic audits were implemented. The analysis of these reports in the 2003-2009 period revealed a significant increase in the number of denunciations filed during the last year, 34 in comparison to the total observed in the 2003-2008 period, summing 24. At that time, forensic audits were nonexistent, a trend that has prevailed, showing the efficacy of the supervising body in detecting flaws that not necessarily lead to offense (Higher Audit of the Federation, 2020a).

## **DEVELOPMENT**

### **Forensic audit with a supervision approach**

Several theories about forensic audit reveal information that was not regarded as contrary doctrines, but show a theoretical void that surrounds its application, tools, and techniques.<sup>6</sup>Castro and Cano (2003, p. 1) say it deals with “discovering, diffusing, and testifying on fraud and violations while holding public and private positions”, whereas Estupiñán (2015) recognizes it as a special investigation in which fraud or confidence abuse situations are solved, and the experience of public accountants is taken to legal scrutiny. Moreover, the proposal of Badillo (2008) is framed as an audit to prevent and detect financial fraud, whereas Maldonado (2008) notes that it is the one that seeks prevention and study of corruption events.

The above shows that the purpose of forensic audit is to present events of fraud, economic crime, and corruption events to legal courts. Following collective agreement on the etymology of the term, the forensic feature in audit is acquired when the information and evidence collected are evaluated for presentation as proof before a court of law, which grants a public character. Hence, forensic tools and techniques incorporate this quality when applied in audit or tax investigation that focuses on revealing fiscal and economic crimes resulting from the investigation, verification, and inquiry of compliance with provisions established in legal norms, whose evidence is submitted before a court.

The proposal made by Lollet (2012) is innovating and significant, since besides highlighting the importance of the opinion and information submitted as evidence in court by a group of experts with knowledge of criminal investigation techniques, finances, business or legal processes –different from Latin American authors like Castro and Cano (2003), Estupiñán (2015), Badillo (2008), and Maldonado (2008)–, offers new perspectives on the implementation of forensic audit, by considering that the resulting analysis can serve to settle disputes of different origins, without the need to resort to due legal process for implementation. Additionally, the proposal of Buchahin (2015) backs the perspective seeking implementation in the public sector to position forensic audit in comprehensive process review, to check irregular behaviors in handling public funds, and the examination of inappropriate public management events. This coincides with Castro and Cano (2003), who noted that it was initially used for the enforcement of public functions.

These perspectives are materialized within the Mexican legislation in identifying the concept of forensic audit in Article 26, section I, of the Interior Ruling of the Higher Audit of the Federation (RIASF, in Spanish), adopted in 2020. It showed the utilization of forensic tools and techniques, to detect events or omissions that might involve some kind of irregularity or illicit behavior, and to submit valid and sufficient proofs of the conclusions derived from the findings and irregularities detected using forensic auditing technology and tools (Higher Audit of the Federation, 2020b).

The existence of the concept of forensic audit in RIASF permits to analyze the feasibility of the integration of regulation in section I, Article 26, in terms of tax assessment by AGAFF, as a supplementary application of a common federal right in Article 5 of the Fiscal Code of the Federation (CFF, in Spanish), adopted in 2020, provided that it does not contradict the nature of tax provisions, which is non-existent, because it coincides with processes, events, and evidence that the very same tax authority must follow as well. The nature of electronic verification in the model is inspired by the tax provisions established in the CFF adopted in 2020, in relation to present use of electronic means by taxpayers to comply with them, and to implement verification by tax authorities (Honorable Congress of the Union, 2020).

In turn, the proposal of Lollet (2012), which does not necessarily takes forensic audit results to courts of law, as well as those that corroborate their implementation in public bodies, as Buchahin (2015), and Castro and Cano (2003), whose proposals are theoretical, paving the way for the creation of a model capable of adapting to the supervision process of a public body, like AGAFF, as applied by ADAF, using forensic auditing tools and techniques, though fiscal crime is nonexistent, since AGAFF is an administrative authority with the power to supervise taxpayers, physical and non-physical people who do not necessarily commit tax crime. This means that not all the reviews conducted by ADAF involve the corroboration of tax crime, ending in due process. However, some certainty of the efficacy of the supervision process is required, along with proof of requested evidence, submitted or not, as exhibit before a court.

### **KAF model for electronic supervision**

The KAF model for electronic supervision, besides being innovating in relation to forensic auditing tools and techniques to predict, prevent, detect, correct, and assess

the lack of compliance with fiscal obligations, can also be integrated to the supervision process conducted by AGAFF, and run in ADAF, from supervision planning, the initiation of tax assessment, implementation, to the conclusion of fiscal audit. The model suggests the interaction of four elements: instruments, phases, approaches, and effects (Amezcuca, 2016; Amezcuca, Palos, and Ramírez, 2016). Furthermore, it relies on the following criteria: instruments involve the utilization of forensic auditing tools or techniques without the need to go to court so they can be used, an innovating feature of the model which is not considered in the theoretical approach. Today, forensic audit is implemented only when tax crime is committed, and reaches the court. The three phases suggested in the model: planning, development, and report, are in concert with the supervision process of fiscal audit established in CFF adopted in 2020 –it comprises planning and programming supervision actions, practicing, or implementing supervision actions under tax assessment, and conclusion (Honorable Congress of the Union, 2020)–, as the phases within the Mexican auditing standards: planning, implementation, and termination of the audit process (Commission on Audit Norms and Assurance, 2019).

For their part, the five approaches suggested are created according to the instruments selected to conduct planned audit activities and procedures in every phase; the presence of one or several approaches of a phase, or throughout the three phases, can occur simultaneously and repeatedly. It is worth noting that the purpose of forensic audit focuses mainly on preventing and detecting fraud or economic crime. They are included in the KAF model for electronic supervision, along with prevention and detection, three additional approaches: predictive, corrective, and assessing.

The predictive and preventive approaches appeared before the beginning of tax assessment; however, the detective, corrective, and assessing approaches appeared before and during the execution of tax assessment. Likewise, an innovating element in the model is the predictive approach, which is not included in forensic or traditional audit. Finally, there are the effects that separate and align approaches, which generate actions that materialize those effects, replicating through the three phases of the supervision process. Fig. 1 shows the interaction of elements that integrate the model.



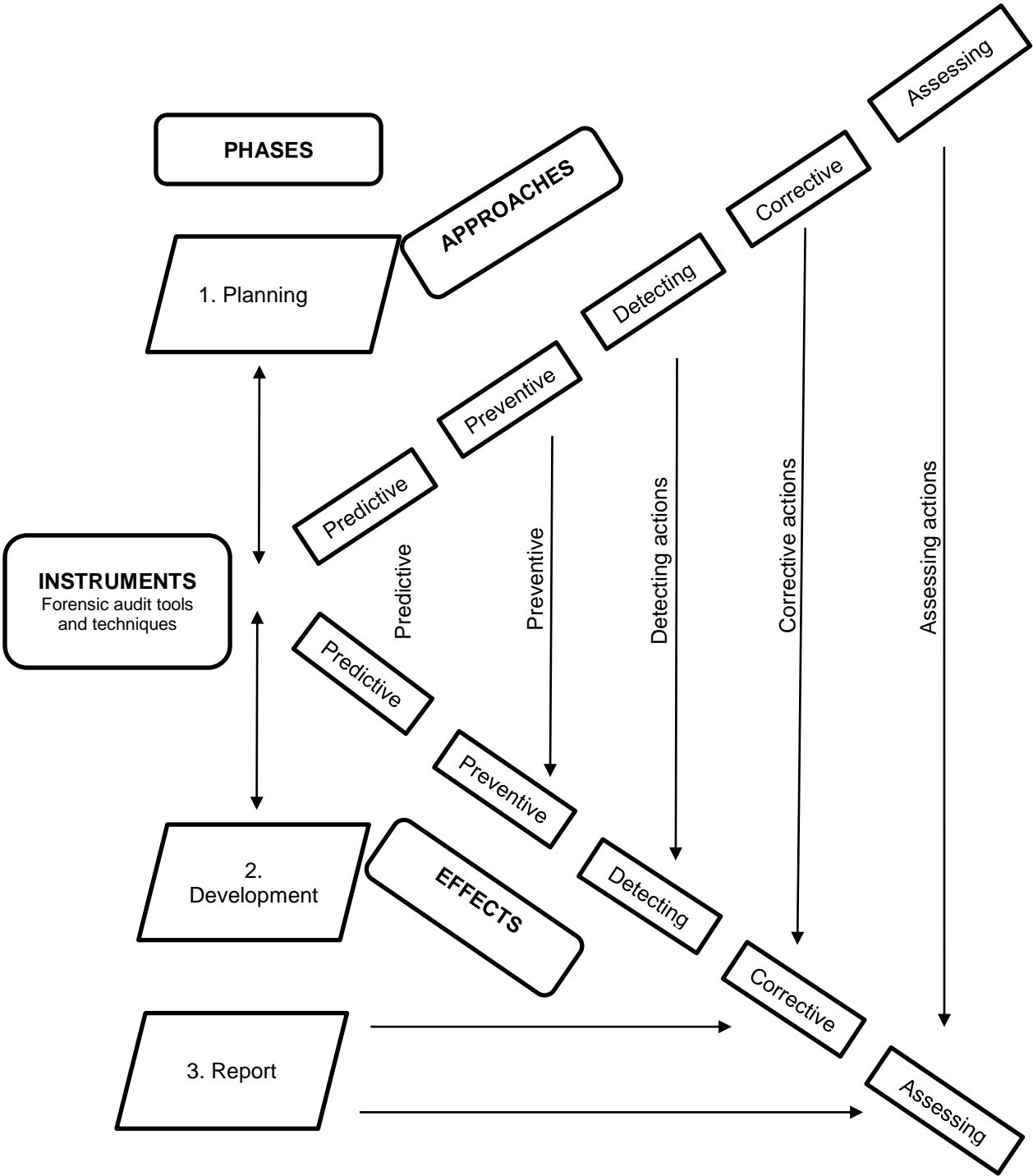


Fig. 1. KAF model for electronic supervision  
Source: Made by the authors

Instruments are tools or forensic auditing techniques chosen for implementation in every phase of the KAF model for electronic supervision. They offer broader audit procedures, as well as greater depth of the evidence collected, because they are specialized tools or techniques that besides speeding up reviewing and verification of compliance with fiscal obligations, provide fiscal authorities with an investigative side, and can be used during the planning and research phases.

The model proposed has three phases:

Phase 1. Planning. Premises are established in relation to taxpayer behavior in terms of appropriate compliance with fiscal obligations to determine their risk level, based on the information and reports requested by the supervision body, since tax assessment has not started yet. Accordingly, the premises stated may be mistaken; when this situation occurs, it can be dealt with during the development phase. Planning includes aspects like taxpayer selection, audit background, scope, review period –may correspond to fiscal actions, which last twelve months or less in Mexico, if it coincides with a fiscal period–. The staff is assigned, procedures and activities are planned, depending on the premises stated in relation to current presumable inconsistencies, irregularities, or omissions, by defining taxes, items, and aspects that will be verified. In this phase, development and report are set up, and the presence of predictive, preventive, corrective, and assessing approaches and effects, is possible.

In using forensic tools or techniques, the participation of specialized personnel is recommended in this field, to collaborate with the official in charge of the audit, or the training of tax auditors to implement them. While planning, taxpayer behavior in some tax administrations is classified according to conducts and easy-to-detect information, which are the “due record as taxpayer, timely statement filing, correct and full statement, and prompt payment” (Inter American Center of Tax Administrations, 2013, p. 5).

Phase 2. Development. Implementation of audit using forensic tools and techniques. This phase offers the opportunity of confirming or refusing the premises stated in the planning phase, when the taxpayer was classified into a risk level, and new tax irregularities and omissions can be detected. Four steps are suggested in this phase: I. Analysis of data or information stored in devices and electronic media, which record taxpayer transactions or operations, such as accounting records; II. Verification of the

result of the analysis. Irregularities or omissions that involve the lack of compliance with fiscal obligations, as well as operations that do not lead to observations; III. Quantification of irregularities for disclosure. Likewise, quantification is made of operations that do not derive into observations, and IV. Gathering and preservation of physical or digital documentary evidence of irregularities or omissions detected, which led to the lack of compliance with fiscal obligations, as for the evidence that backs audit procedures applied, which might consist in invoices issued by the taxpayer, financial statements of bank accounts, or information, and documents obtained from third parties. The evidence is gathered and stored safely by the authority to be used as strong evidence against a taxpayer, and that can be irrefutable in a court of law.

During this phase, some planning is made; the premises stated are analyzed and contrasted with the information filed by the taxpayer, which may be used to make new proposals of procedures and audit analysis. A partial report is made, so that taxpayers can self-correct their fiscal situation fully or partially, when the results of audit are given before the final resolution concerning the tax credit. Furthermore, the preventive, detective, corrective, and assessing approaches can be applied after initiating tax assessment on the taxpayer.

Phase 3. Report. The results of the fiscal audit or supervision action are issued, including the approaches and corrective and assessing effects, once irregularities or omissions causing some lack of compliance with fiscal obligations by the taxpayer have been identified. The quantity of contributions omitted, accessories, and sentences are known. The evidence of physical or digital audit can be used to demonstrate them clearly and unequivocally. There is also knowledge of possible tax crime by the taxpayer. The above is presented to the taxpayer, thus materializing the corrective effect and approach, if taxpayers self-correct their fiscal situation during the fiscal audit or supervision action, by paying fully or partially all the contributions omitted, and their accessories. If correction is made partially, or no correction action is made, a resolution determining the tax credit is issued, including the possibility of suing in court.

The proposals regarding the number of phases of forensic audit are diverse. In Latin America, Funes and Nájera (2010) acknowledge four stages: problem planning or statement, implementation of work and research, communication of results, and filing of

the accounting report. In turn, Badillo (2008) identifies them as: planning, field work, communication of results, and case monitoring.

Following a US perspective, Vona (2011) suggests four phases or steps, named: evaluation, identification, response, and conclusion. Meanwhile, Singleton, and Singleton (2010) identify

(...) six steps in fraud investigation: acquiring every detail and documents available regarding the allegation, evaluating the accusation based on the documents available, evaluating the corporate setting in relation to the person in particular, asking if a fraud theory can develop at that stage (Are there reason and opportunity?), determining if the evidence available makes sense (Does it meet the test of business reality?), and communicating the details and state of fraud to all the parties. (p. 11)

Additionally, the KAF model for electronic supervision embodies five approaches: predictive, preventive, detective, corrective, and assessing, which are presented simultaneously or alternately during the three phases, before the selection and implementation of forensic auditing tools and techniques, with their respective procedures. Moreover, a single forensic tool or technique usually includes any of the approaches suggested, depending on the phase in which they are implemented, and whether there are tax inconsistencies, irregularities, or omissions.

Predictive approach. Speculations are made, or premises related to the lack of compliance with fiscal obligations are presented, according to information gathered by the supervision body, which implicitly involves the presence of inconsistencies, irregularities, or omissions that lead to lack of compliance with fiscal obligations during the planning phase, before the beginning of tax assessment actions. Some tax administrations specialize in the use of prediction models, such as the methodology of random dissuasive messages, based on data mining techniques, especially during the stage of taxpayer risk selection and establishment, before tax assessment actions, but not during the stage of development or implementation of supervision (Inter American Center of Tax Administrations, 2014). The predictive approach is strengthened by the proposal of Silverstone *et al.* (2012), who used prediction to design the possibility of anticipating illegal actions, based on metadata, which are defined as a component of

data that describe them through analysis of every manual or digital transaction, possibly setting patterns for the activity.

Preventive approach. Inconsistencies, irregularities, or omissions that cause the lack of compliance with fiscal obligations are prevented, so that they can be corrected without the necessity of implementing tax assessment during the planning phase. Should lack of fiscal compliance occur during supervision in the development phase, the preventive element grants the auditor the capacity of preventing fiscal inconsistencies, irregularities, or omissions detected from replicating in prior or posterior reviewing periods. The taxpayer is given the choice of self-correcting their fiscal situation without the need of tax assessment.

The preventive approach is implemented during the investigation of fraud to evaluate “the systems of internal control, financial policies, and accounting procedures before crime is detected” (Silverstone *et al.*, 2012, p. 14). Dutta (2013, p. 35) identifies it as “preventive internal control with the purpose of preventing errors from happening”. Prevention and detection are recognized as part of classic approaches to cut down on crime committed by the staff of a company, embezzlement of funds, fraud, and prevention of fraud, based on various actions to “mitigate fraud risk” (Singleton and Singleton, 2010, p. 13).

Detective approach. Irregularities or omissions that cause lack of compliance with fiscal obligations are detected. It is, by excellence, the ideal tool used as a deterrence of actions that lead to the lack of compliance; it is closely associated with tax assessment tools, since after detection of fiscal lack of compliance, the tax auditor must have back up evidence of documents or digital audit, and therefore, the extent of the omission by the lack of compliance. It is also linked to the predictive approach, which contributes with premises on taxpayer behavior during the planning phase.

It takes place during the implementation of supervision in the development phase, in which the premises stated during the planning phase are assessed or disproved before supervision. Meanwhile, the initiation of tax assessment actions takes place during the phase of development, as a substantial approach of forensic auditing tools and techniques, since it offers comprehensive tax and accounting information filed by the taxpayer. More into this approach, and from an internal control perspective, Dutta (2013)

works on the concept detailing that detection controls help unveil already-committed errors; that is, it identifies irregularities that cause the lack of compliance with fiscal obligations.

Likewise, the detective<sup>7</sup> and preventive approaches are recognized as classic, based on several actions to “detect any form of fraud that might occur” (Singleton and Singleton, 2010, p. 13). It discourages actions intended to cause the lack of fiscal compliance, also facilitating the efficiency of audit procedures, and supervision. Besides, it builds taxpayer awareness on the risks of falling into lack of fiscal compliance, by inhibiting actions that may cause them to do so.

Corrective approach. Its main feature is the capacity to allow for compensation for the lack of compliance with fiscal obligations in any of the three phases suggested in the model, when taxpayers self-correct their fiscal situation, by ensuring their fiscal obligations properly, including full payment of contributions and accessories. In that sense, Dutta (2013, p. 35) claimed that “the corrective controls correct errors made”.

Assessing approach. It involves gathering or collecting documentary or digital evidence that proves due compliance with fiscal obligations, as well as the lack of compliance. The other approaches suggested in the model relate to the assessing approach, particularly the detective approach; However, it can be presented in any of the three phases, with a pivotal role in the phase of development, because during supervision, evidence from the audit is requested; if necessary, it is shown to the taxpayer so they can solve or clarify any information request by the supervision body. The approach becomes evident during the reporting phase, when inconsistencies, irregularities, or omissions are shown to the taxpayer, along with documentary or digital evidence, which is relevant in determining the tax credit, as they can be used as evidence before a court of law, demonstrating the importance of due and accurate tax assessment.

In the previous KAF model for electronic supervision, the approaches mentioned previously produce five effects: predictive, preventive, detective, corrective, and assessing, which are generated by actions in the same sense. Thus, the predictive, preventive, detective, corrective, and assessing actions become a means to materialize their implicit effects. Hence, these actions are not considered just another element of the model.

**Predictive effect.** It is caused by the predictive approach, generating actions implemented by the supervision body to establish premises on the compliance of fiscal obligations by the taxpayer during the planning phase, before the initiation of tax assessment. The results expected are, the solution of fiscal inconsistencies, irregularities, or omissions, and total self-correction by the taxpayer.

**Preventive effect.** It is caused by the preventive approach, generating actions implemented by the supervision body to prevent the lack of compliance with fiscal obligations by the taxpayer before the initiation of tax assessment in the planning phase, while conducting supervision, and before issuing the tax credit resolution, during the development phase. It also prevents the risk of not self-correcting the tax situation in different periods from the reviewing period, or by the one asked to correct their tax condition, in order to anticipate spontaneous self-correction without the mediation of tax assessment actions.

**Detective effect.** It is caused by the detective approach, generating actions implemented by the supervision body resulting in inconsistencies, irregularities, or omissions that involve the lack of compliance with fiscal obligations by the taxpayer, before supervision, during the development phase.

**Corrective effect.** It is caused by the corrective approach, generating actions implemented by the supervision body to encourage the taxpayer to correct inconsistencies, irregularities, or omissions that lead to the lack of compliance with fiscal obligations detected and corroborated before the initiation of the tax assessment phase, while conducting supervision, or before issuing the tax credit report. As a result, taxpayers self-correct their tax situation. Therefore, it can be found in the three phases.

**Assessing effect.** It is caused by the tax assessment approach, generating actions implemented by the supervision body to assess –using physical or digital documents obtained by the same body, provided by the taxpayer or third parties associated– inconsistencies, irregularities, or omissions that lead to the lack of compliance with fiscal obligations detected, resulting from audit, which must be clear to the taxpayer, and undeniable evidence to be submitted to a judge. It occurs in the three phases.

## **Method**

The investigation relied on a quantitative approach and descriptive analysis based on a non-experimental design. The technique used for data collection was the survey, whereas the validation of the KAF model for electronic supervision was based on expert judgment. A 14-item questionnaire was designed; the response format applied was based on the five-choice Renis Likert scale, with frequency levels for scale one: totally disagree, disagree, neither agree nor disagree, agree, and totally agree; scale two: never, rarely, sometimes, almost always, always.

The questions were open, multiple choice, dichotomous; the answers including the choice: *other* or *why?* to verify that not all affirmative answers go in the same direction, and to urge experts to think deeper in order to provide coherence in their answers. The purpose was to offer a broader spectrum for qualitative analysis that yielded more information. A total of 13 tax auditors (master's degree or bachelor's degree) participated in expert judgment. They had been selected following poly-stage sampling (reasoned selection), since it was one supervision process established in the current CFF, and therefore, implemented in the 67 ADAF belonging to AGAFF across the national territory, representing the whole conglomerate, acting experts, and former officials in six different ADAF. Their experience is greater than 10 years, and less than 15, since this institution is part of SAT, which was founded in 1997, 23 years ago. Accordingly, the average experience is 14.77 years, having performed fiscal audit activities in five of the six operational areas: programming, house calls, office, reports, or review of documents from public accountants, as well as returns or compensations. Additionally, they have held positions in the four levels: administrators, deputy administrators, heads of departments, and auditors, most of whom have held posts in more than one jurisdiction, which altogether, demonstrate their broad experience. The identity of experts, and their institution were not revealed to respect confidentiality.

The survey was applied online, using the Lime Service study platform to prepare, implement, and assess the surveys, under the license of the South University Center at the University of Guadalajara. The instructions to fill the survey were included, reiterating the confidentiality of the information supplied, and a detailed explanation of the model suggested. The collection of empirical evidence was made by each expert, gathering all the individual characteristics of opinions given in the surveys through



variables: ADAF they belong to, sex, post, working area, years of work experience, viability of the model to identify the lack of compliance with fiscal obligations by the taxpayer, and the usefulness of forensic tools and techniques in the process of supervision run by ADAF. The answers were codified, using a scoring system, and the data obtained were processed through SPSS, v. 24, for further analysis.

### **Results and discussion**

The validation of the model was by expert opinion, to evaluate the viability of integrating the KAF model for electronic supervision within the supervision process of AGAFF, which is implemented in ADAF to predict, prevent, detect, correct, and assess the lack of compliance with fiscal obligations by taxpayers, using the tools and techniques of forensic audit.

Upon the analysis of responses, the concordance coefficient among judges was obtained .96 (sig < 0.05), indicating the degree to which the elements in the questionnaire relate to the coherence of the answers given by the experts.

The result was that 92.30% of the experts considered that the forensic auditing tools and techniques are useful to conduct auditing activities, and during the supervision process of AGAFF. When the experts were asked about the reason of their responses, they noted that they could use accurate data and reports of taxpayer operations filed that offer elements to determine audits or reviews, observe irregularities before supervision, detect omissions, and identify taxpayers in arrears. It is an important tool for anyone conducting audits, since the procedures can be done more promptly, and with a very little margin of error, thus facilitating their work, and simplifying complicated procedures. It would also offer results that help with reviews, to investigate possible inappropriate taxpayer behaviors; the model meets the requisites, and can be used by AGAFF and the state governments.

All the experts (100%) noted that the model contributes to the detection of lack of compliance with fiscal obligations depending on the model's elements: instruments (forensic auditing tools and techniques), approaches (predictive, preventive, detective, corrective, and assessing), phases (planning, development, and reports), and effects (predictive, preventive, detective, corrective, and assessing). When asked about their reasons, the experts noted that it is a practical and reliable tool that will enable them to

follow up fiscal obligations, learn specific data of operations made to identify irregularities, tax omissions, as well as related obligations, and to know about appropriate behaviors or lack of compliance; they will be reviewed for assessment, using less time conducting audits with ensuing better results.

Finally, when the experts were asked about their opinion on the model suggested, 92.30% considered that this tool will help improve the process of supervision, enabling the implementation of supervision, with more specific audit processes, greater accuracy in the detection of omissions and inconsistencies, and a low error margin. It will contribute to higher control, and will minimize the work load of auditors. In that sense, one expert recommended considering factors time and types of procedures of fiscal audits when integrating the model; whereas another expert suggested training the staff in the utilization of forensic tools and techniques to be considered in future investigations, since these aspects are linked to the implementation of audit. It meant that experts recognized that the elements suggested in the KAF model for electronic supervision, such as instruments, approaches, phases, and effects, and the utilization of forensic auditing tools and techniques can be reliable in the prediction, prevention, detection, correction, and assessment of lack of compliance with fiscal obligations by taxpayers, and therefore, it could be integrated to the supervision process of AGAFF implemented in ADAF. Further studies are recommended to conduct in-depth analysis on the effectiveness of the model for the expected purpose.

## **CONCLUSIONS**

The main contribution of this study was the proposal of a model for electronic supervision containing four elements: instruments, phases, approaches, and effects, to be integrated in the process of supervision of AGAFF conducted by ADAF –because of the analogy of its phases to the phases of audit and supervision conducted by such body, which has been established in CFF– using forensic audit tools and techniques without reaching a court of law. That is, without assuming, pursuing, or constituting fiscal

crime, which allows for greater scope and extent of auditing procedures, as well as the collection of robust evidence.

The results achieved through expert opinion enabled the validation of the KAF model for electronic supervision, which is capable of predicting, preventing, detecting, correcting, and assessing the lack of compliance with taxpayer obligations.

The experts considered that the utilization of forensic auditing tools and techniques is useful to speed up auditing procedures, reduce the margin of error in detecting irregularities or omissions, and to investigate possible inappropriate taxpayer behaviors. Likewise, they validated the elements and criteria of the model, explaining that it is a reliable tool that will help improve and facilitate the process of supervision, and specific procedures of audit with a lower margin of error and greater control. The model must contribute to a reduction of the work load of auditors, and the identification of the lack of compliance with fiscal obligations. Besides, it meets the usage requisites by AGAFF.

The KAF model for electronic supervision can be used both in the public and private sectors; it ensures an increase of taxpayer risk perception due to the lack of compliance with fiscal obligations. Further research should go over tax laws that provide greater feasibility to the implementation of forensic auditing tools and techniques as an instrument of supervision of taxpayers, and the analysis of indicators to measure the efficacy or effectiveness of supervising bodies, by adding new variables.

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### **Conflict of interest and conflict of ethics statement**

The authors declare that this manuscript is original, and has not been submitted to another journal. We are responsible for the content published in this paper, and certify the existence of no plagiarism, or interest or ethical conflicts.

### **Authorship statement:**

Martha Karina Amezcua Luján. Conceptualization (leader), redaction – original draft (equal participation), research, methodology.

Felipe Santoyo Telles. Conceptualization (support), data curation, formal analysis, redaction – proofreading and editing, methodology, validation.

### **NOTES**

<sup>1</sup> 57% of the staff maintain informal working relations, and most of the small companies still operate in the informal sector. In Mexico, the government has begun to deal with this issue by creating a new fiscal regime for micro and small companies, seeking the formalization of labor. The new fiscal regime for small companies, Regime of Fiscal Incorporation (RIF, in Spanish), enforced in January 2014 considers substantially reduced obligations, individually, of social security and value added, as well as special taxes during the first decade of being in effect, in order to stimulate informal companies to formalize their condition, and start paying taxes (OCDE, 2015).

<sup>2</sup> The definition of activities of inspection, investigation, and other checking functions in the questionnaire comprise the “staff in charge of activities associated to checking (through visits to taxpayer facilities, interviews in the offices of the administration, or written actions), of the information written in the taxpayer statement, in relation to all the taxes administered by the tax administration body” (OCDE, 2009, p. 91).

<sup>3</sup> To Adam and Becerril (1996), supervision is the action by means of which government actions are evaluated and reviewed, considering the veracity, reasonability, and observance of the law. The definition covers all the important aspects of supervision: evaluation and review. Supervision is linked to a strengthening of federal income, and monitors correct use of public income, and the compliance of fiscal obligations that individuals should abide by. Additionally, the proposal of Buchahin (2015, p.50) defines it as “inspecting people physically and morally, entities and/or their activities to check if they pay taxes, or examine, control, or criticize the actions made by others”, which permits to infer that the term supervision can accept diverse elements or activities, not only in relation to rendering of accounts.

<sup>4</sup> Indicator I. Struggle against fiscal evasion and elusion, “Efficacy of supervision on other taxpayers”, according to the Annual Program of Continuous Improvement by SAT(2019) (Art.21), referring to the number of reviews of terminated substantive methods with figures collected equal or higher than 50 000 pesos, divided by the total reviews of terminated substantive method reviews, multiplied by 100, all

implemented by AGAFF. Last access: July 17, 2020. See [http://omawww.sat.gob.mx/cifras\\_sat/Documents/PAMC\\_2019\\_04.pdf](http://omawww.sat.gob.mx/cifras_sat/Documents/PAMC_2019_04.pdf)

<sup>5</sup> Acronym KAF of the model refer to three elements: the conjunction of its geometry (K shaped), and the initials of the term forensic audit, as well as the initials of its creators, also the authors of this paper: Karina and Felipe.

<sup>6</sup> Some forensic techniques suggested by authors are timelines, analysis of visual investigative analysis (VIA), and inferential analysis (Silverstone, Sheetz, Pedneault, and Rudewicz, 2012). Likewise, the utilization of tools like data mining and statistical methods, such as normal distribution, binomial, uniform, exponential analyzed, statistical sampling, regression, correlation, and others (Dutta, 2013), along with the implementation of fraud trees, the method of probabilities, red flags, fraud detection model, and cybernetic forensic investigation, presented by Singleton and Singleton (2010). In criminal science, dactiloscopia is identified as part of lofoscopy (Arenas, 2013). As to the utilization of electronic means of forensic research, Lázaro (2013) refers to the forensic analysis of systems, timelines, networks and the Internet, recycling bin, electronic mail, search for characters, digital imagery, or forensic computing (Arenas, 2013). Finally, bodies like ACFE (2016) also unveil the utilization of various forensic tools and techniques, some already mentioned by the authors mentioned above, such as, fraud tree, red flags, research tips, interview (kinetic interview technique, cognitive interview technique, questioning techniques, and others), document review based on the intervention of specialized forensic laboratories, forensic experts in the analysis of graphology, data mining, visual analysis, cloud research, forensic investigation of mobile devices, digital forensic research, and others [See all the information in the Manual of Fraud Examiners sections 1.2021,1.201,1.233, 2.455,3.224,3.226, 3.311,3.315, 3.301, 3.321, 3.703, 3.739, 3.801, 3.830, 3.835, 3.841] (Association of Certified Fraud Examiners, 2016).

<sup>7</sup> ACFE (2016), in a global study of fraud, in 2016, reported that the most commonly used method of fraud detection is denouncement or information retrieved using several mechanisms, such as denouncing lines, electronic mail, and online forms, mainly coming from employees, customers, suppliers, anonymous sources, and so on, followed by internal audit (Association of Certified Fraud Examiners, 2016).