Determinants adoption of computer-assisted auditing tools (CAATs)

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Determinants Adoption of Computer Assisted Auditing Tools (CAATs)

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Abstract

During the last fifteen years, several studies on technology acceptance have been pursued, and several new models have been proposed. This paper presents a theoretical background on individual acceptance of Computer-assisted Audit Tools (CAATs) in the context of statutory auditors of a European country. The adoption of technologies in auditing is considered an important factor for efficiency increasing and effectiveness of auditing work. This study identifies the adoption determinants of CAATs; and develops a CAATs, adoption model. Quantitative research was carried out and operationalized by a survey to statutory auditors. Findings indicate that the perceived usefulness of CAATs, the effort expectancy, the facilitating conditions, and the number of auditors are the main drivers of the adoption and use of CAATs. This research presents significant contributions impacting the various stakeholders: Statutory Auditors, Statutory Auditors Firms, Institutes of Statutory Auditors, and Academy.

Keywords

Adoption Model, Computer-assisted Audit Tools, CAATs, Statutory Auditors, Adoption Theory.

1. Introduction

From 2005 to 2020, the produced data volume by companies and citizens is expected to grow by a factor of 300, 5200 gigabytes/human. On the other hand, the digital universe will double every two years (Gantz & Reinsel, 2012). Data volume, variety, and complexity of the audit clients have risen significantly in recent years. Those events lead to severe difficulties and challenges to the auditors' work. Financial auditing is an important activity in all the fields of the economy. European Statutory Auditors are external financial auditors; they aim to provide certification of financial information produced by organizations under the supervision of chartered accountants. The usage of information systems (IS) is of most importance to pursue an adequate monitorization by auditing; the authors believe the adoption of computer-assisted tools for auditing needs further research (Byrnes et al., 2015; Mansor, 2016; Lins, Schneider & Sunyaev, 2016). In this context, it is important to identify the main adoption determinants of CAAT's.

The main goal of this research article is to understand the factors that influence CAATs (Computer-assisted Audit Tools) adoption, its usage and the possible link between CAATs' usage and potential individual benefits. The use of Computer-assisted Audit Tools and Techniques in auditors' work is referenced as relevant to potentially increase the efficiency and effectiveness of auditing (Byrnes et al., 2012; Curtis & Payne, 2008; ISACA, 2008). Professional bodies and regulators suggest the relevance of IT and CAATs in the context of financial auditing. During the last fifteen years, several studies on CAATs' individual acceptance among auditors have been carried out. Some researchers analyzed auditors' acceptance of generalized audit software (GAS) (Braun & Davis, 2003) and the use of GAS by UK external auditors (Ahmi, 2012). The use of Information Technology (IT) and the perceived importance of a diverse group of auditors – the Big 4, regional, and local firms (Janvrin, Bierstaker, & Lowe, 2008) were also subject to study. The technology acceptance and budgeting theories were also used to understand why Computer-assisted audit techniques are underutilized in public accounting (Curtis & Payne, 2008) and the reason why voluntary technology use is low among financial auditing (Curtis & Payne, 2014). Various researchers believe that organizational factors influence CAATs' acceptance. However, studies on the professional bodies' influence on their acceptance are rarely available, until now, despite that limitation being recognized by the literature. The statutory auditors' association guidelines of professional bodies, concerning their members can be relevant to CAATs' acceptance, especially when the CAATs' topic is a concern of the legal body (the "advice" of the legal body can influence individual technology acceptance).

Additionally, it is recognized that social impact is less relevant than performance expectancy and facilitating conditions. However, peers' influence was not studied as a construct, and they may influence an individual's decision. We found in the literature some studies on CAAT's adoption from an individual level (Katamaba et al., 2017; Ramen et al., 2015; Zainol et al., 2017), although there is still pertinent to conduct more in-depth studies in this area, especially regarding the adoption and use of CAATs in the financial field.

The primary motivation for this research is to improve knowledge of the adoption determinants and use of information technologies in financial auditing. Our study contributes to understanding the central adoption determinants of CAATs, we propose a theoretical model and empirically tested with professionals of financial auditing. This study's contributions support the main CAAT's adoption determinants. We found that the perceived usefulness of CAATs, the effort expectancy, the facilitating conditions, and the number of auditors are the adoption drivers of CAATs.

The study is structured in six sections. The second section presents the theoretical background of information technology adoption in the auditing profession. The third section proposes a research model based on the literature. The fourth section describes the way the empirical study was conducted. Section fifth presents the results of the study. Section sixth discusses those results, and the last section concludes the study.

2. Information Technology in Auditing: A Theoretical Background

Computer-assisted Audit Tools, CAATs, can be defined as any use of technology to support in the completion of an audit. The *"(broad) definition would include automated working papers and traditional word processing applications*" (Braun & Davis, 2003, p. 726), or can be stated as "*the use of certain software that can be used by the auditor to perform audits and to achieve the goals of auditing*" (Sayana, 2003, p. 1). The use of distinct designations to mean IT on Auditing/IT Tools and Techniques on Auditing is present in the guidance provided by authoritative bodies to improve the efficacy and efficiency of auditing procedures. The paradigm is still changing: new approaches are awakening interest, like Generalized Audit Software, GAS, usage on Web 2.0, using collaborative approaches and several different profiles to improve software usage (Gehrke & Wolf, 2010). One of the first references found to the term "computer-assisted audit techniques" is from 1974 (AICPA, 1979b). Since there has been a great increase in the use of computer-based financial systems (AICPA, 1984), in which stated that auditors must consider other aspects beyond internal controls and should take into consideration the whole picture, of the effects of computer processing. Since then, many new tools have been released. Lovata (1988) states that the impact on the auditing environment due to the increase in information technology is significant, and Generalized Audit Software (GAS), is one of the several tools examined in the study (Cash, Bailey, & Whinston, 1977), and recognized as the most commonly used computer-assisted audit techniques (Lovata, 1988). It emphasizes three features of GAS use across three levels of a firm's structure: environmental factors to initial use, costs and benefits of GAS and the perceived effect of microcomputers on GAS utilization. The cost-benefit of GAS was studied since an AICPA recommendation on Computer-assisted Audit Techniques (AICPA, 1979b). The term of "Computer Assisted Audit Tools and Techniques" was preceded by other designations linked to the idea of doing auditing using computerized tools: "Computer Audit Software," "Computer Audit Packages" and "Electronic Data Processing," EDP. Terms like "EDP Auditing" or "Computer Auditing" can be presented as an "umbrella *definition, the Auditing of information systems in a computerized environment*" (Ma, 1989, p. 2). The Auditing System was popular at the time (Haskins & Sells, 1968; Neumann, 1977; Canadian Institute of Chartered Accountants, 1967). Despite the success of the software, many auditors have still kept their auditing around the computer (Byrnes et al., 2012). However, while it is common to find the term "Computer Assisted Audit Tools and Techniques" in the most recent research, there are still references nowadays to "Computer Audit Software" as in reflections on what is the most adequate software package for classroom use, where two commercial packages, IDEA and ACL, are assessed from pedagogical and functional angles. Guidelines for classroom instructors are provided: syllabi orientation, support slides, exercises and review and exam questions (Weidenmier & Herron, 2004). In this paper, authors also use the reference to "Generalized Audit Software" to classify IDEA and ACL. A lower number of contributions referred by Yang & Guan (2004), there are relevant contributions from the authoritative bodies on the internal controls standards in financial audits related to IT auditing evolution namely the AICPA standards SAS No. 3, SAS No. 48 (AICPA, 1984) and SAS No. 94 (*The effect of information technology on the auditor's consideration of internal control in a financial statement audit*). SAS No. 104 to No. 111, "Risk Assessment Standards," were also related to the AICPA efforts to standardize IT auditing (Janvrin, Bierstaker, & Lowe, 2009). Nowadays, all the SAS were suppressed by the clarified SAS No. 122 to 128, current on June 1, 2013 (AICPA, 2014) (ASB, 2011). In AICPA Computer-

Assisted Audit Techniques (AICPA, 1979b, p. 2) the techniques are presented and categorized as: "*Generalized Audit Software, Test Data, including use of an integrated test facility and program tracing, Review of Program Logic, Program Comparisons, Utility programs, Specialized audit programs, Timesharing Programs, Additional Techniques*" (AICPA, 1979b, p. 2). Those techniques were associated with four global Audit Processes, namely: a review of the system of internal accounting control, tests of compliance and substantive procedures which included tests of details of transactions and balances and audit review. According to Janvrin, Lowe, et al.,(2008), auditors accepted the CAATs, but more recent studies Debreceny, Gray, Ng, Lee, & Yau (2005) and Curtis & Payne, (2008) suggest that CAATs' acceptance is shallow, varying according to the companies and depends on the size of the company. CAATs' use is accepted nowadays in data analysis mainly because the tools increase proficiency, especially when auditors' need to process large amounts of data or analyse complex links among data (Kramer, 2003). Also, other researchers have discussed these last research conclusions (Dowling, 2008; Rowe, 2008). Curtis and Payne (2008) utilized the Unified Theory of Acceptance and Use of Technology (UTAUT) to study ITs' acceptance among auditors (Curtis & Payne, 2008). They concluded that, among experienced auditors, there are connections between new ITs' acceptance and company's influence by the use of long-term budget and software assessment periods, and thus by the feedback of the superiors by their approval of specific software. In this research, authors compare the firm's intervention or its absence: the auditors' individual characteristics such as the risk involved, and the effect of budget pressure can also decide on certain types of software implementation and acceptance. The contact with CAATs that auditors are having during their formal coursework could be relevant to mitigate the individual characteristics, difficulties and resistances previously referred. Regarding an organization of CAATs' acceptance research by countries, it is possible to clarify that there are more contributions from countries that adopt a legal system with the common law than the ones that use code law. Common law countries are the ones who adopted a legal system with origins in English law, and are more protective of their investors than the ones who follow civil law, which had its origins in Roman Law and are associated with a stronger influence from the government and regulation (LaPorta, Lopez-de-Silanes, & Shleifer, 2008). These authors also published a map including a common classification of countries' legal origins that was used as a reference to categorize each of the research studies analyzed: common law and code law. Mahzan & Lymer, (2014) reorganized their "Theoretical View of Studying Motivations for Successful CAATs Adoption", by using an approach that can be regarded as close to UTAUT, but includes "Motivation" instead of Behavioural Intention and Experience (novice versus expert users). In UTAUT model, Voluntariness, representing "*the extent to which the adoption choice is one over which the chooser has the power to reject*" (Mahzan & Lymer, 2014, p. 332), act as moderators of the relationship between Social Influence and motivation (voluntariness) and on EE, FC and SI, and motivation (Experience). Kim et al. (2009) adopted the technology acceptance model (TAM), in the context of internal auditors work. TAM variables and technology features (mentioned in section 2.3.3) and complexity of the tools were tested in conjunction with Organizational factors, Social Factors and Individual Factors. Organizational Factors include support and training (both can be internal or external to the organization) and management support (Kim et al., 2009). Social Factors stand for Internalization and Image representing peoples' influence on IT users, including internalization and image (Kim et al., 2009). Individual Factors comprehend job relevance, output quality and results demonstration; therefore,

cognitive factors related to individual expectations (Kim et al., 2009). They concluded that internal auditors accept basic technology features (as database queries and sampling) but not the advanced features (as classification, regression and digital analysis), which are related to the need of a specific background. As the complexity of the features increases, perceived ease of use decreases. Perceived usefulness has more influence regarding basic features and perceived ease of use had a higher impact on acceptance when advanced features were used. Ahmi, (2012) projected a Research Model for Generalized Audit Software (GAS) utilization based on the motivations and limitations that auditors identify and that lead them to the use or to not use GAS. The dimensions included: "firm size" as a part of demographic characteristics and to understand the relation between the firm size and GAS' use; "experience in computerized auditing" defined by the number of years of experience. "IT skills" defined as very good, good, adequate, basic, very basic. "Organizational influence": top management support, IT support, IT audit expertise in the organization (these three can be named as UTAUT facilitating conditions), internal and external training (expertise in the firm and external to the firm), implementing and maintaining GAS. As well as resources to use GAS, top management pressure, performance pressure, audit engagement are studied in the literature. "Client factor" as the strength of a client's internal control systems; complexity of clients IT environment, complexity of business environment, clients concern on data security, client business size and support by clients IT staff; "audit engagement allocation": relates to workloads, time and financial budget for the audit engagement; and "perceived usefulness" value and usefulness of GAS in auditing. Based on empirical work, the author also suggests guidelines to improve GAS use.

3. CAAT IT Adoption: dimensions and their relationships

The primary purpose of the present model is to explain the determinants of CAATs' usage intention and CATTs' usage by statutory auditors, as well as their perceived individual impact. Table 1 presents the theoretical dimensions based on the adoption theory. After defining all the dimensions relevant to map statutory auditors' acceptance and use of CAATs, the research hypotheses are presented ahead. Figure 1 represents the proposed adoption model.

Statutory Auditors are members of professional organizations. They operate in the market using a set of standards which can be defined internationally or nationally. These rules are voted upon and defined by several groups of experts in the auditing fields. Several studies mention peers competitive pressure refers to the way other statutory auditors adopt CAATs (besides those that work in the same firm) (Rosli et al., 2012) and group influence on auditing. Rosli et al., (2012, p. 7) has hypothesized this relation, stating that: "competitive pressure positively affects audit firms' intention to adopt Computer-assisted audit tools and techniques."

Table 1. CAATs Acceptance Research by juridical system and country

Constructs	Concepts	Authors
Perceived usefulness	Corresponds to individual performance and perceived utility as a result of using CAATs.	Davis, (1989b)
Effort Expectancy	The degree of ease that auditors perceive when using CAATs in their auditing tasks.	Davis, (1989b) Venkatesh & Morris,(2000) Venkatesh et al., (2003) Janvrin, Lowe, et al., (2008) Curtis & Payne, (2014) Ramen et al. (2015) Zainol (2017)
Peers Influence	The degree to which other peers for Audit adoption influence the decision of using CAATs.	Taylor & Todd, (1995b) Chau & Hu, (2002) Rosli et al., (2012)
Social Influence	The degree to which an individual perceives that other people are important to him/her and believe or he/she should use CAATs	Venkatesh & Davis, (2000) Venkatesh et al., (2003) Janvrin, Lowe, et al., (2008) Kim et al., (2009) Zainol (2017)
Facilitating Conditions	The degree to which an individual perceives that organizational and technical infrastructure exist and support the use of CAATs	Venkatesh et al., (2003) Mahzan & Lymer, (2008) Janvrin, Lowe, et al., (2008) Mahzan & Lymer, (2014) Mansor (2016) Zainol (2017)
Firm Influence	The degree to which the firm acts as an influence on the use of CAATs, both by the general support and by senior management support to the use of CAATs.	Iacovou et al., (1995) Rosli et al., (2012)
Individual Impact	The degree of perception of performance the user can get if he/she is using CAATs	DeLone & McLean, (1992) Iacovou et al., (1995) Sedera et al., (2004) Gable et al., (2008) Urbach, Smolnik, & Riempp, (2010b)
Number of Auditors Influence	Number of auditors working on statutory auditors' firm	Zhu et al., (2003) Debreceny, Gray, et al., (2005) Curtis & Payne, (2008)
Number of Collaborators Influence	Number of collaborators working in a statutory auditors' firm	Zhu et al., (2003) Debreceny, Gray, et al., (2005) Curtis & Payne, (2008)
Number of Statutory Auditors Influence (NumCert)	Number of statutory auditors working in statutory auditors' firm	Zhu et al., (2003) Debreceny, Gray, et al., (2005) Curtis & Payne, (2008)
IntentionToUseCAATs	The intention to use any CAAT to execute auditing techniques/tasks. It corresponds to the agreement of the users to the intention to use.	Janvrin, Bierstaker, et al., (2008) Janvrin et al., (2009) Urbach & Müller, (2012) Mahzan & Lymer, (2014) Zainol (2017)
UseCAATs	The agreement to the effective use of any CAAT to execute auditing techniques/tasks.	Janvrin, Bierstaker, et al., (2008) Janvrin et al., (2009) Mahzan & Lymer, (2014)

Regarding the influence of standards compliance (in the present research the focus will be only on ISAs), the hypothesis raised by Rosli et al., (2012, p. 7) was "*Professional accounting body standards positively affect audit firm's intention to use Computer-assisted audit tools*." The authors cited Professional Accounting bodies include The American Institute of Certified Public Accountants (AICPA), The International Federation of Accountants (IFAC), ISACA and The Malaysian Institute of Accountants since that research was done in Malaysia. Hypotheses regarding peers influence, with reference to peers as members of other firms, so in a context of competitive pressure, was studied by Zhu et al., (2003), in e-business adoption 8 distinct European countries were compared, to discover if

firms facing higher competitive pressure are more likely to adopt e-business or not. Taylor & Todd (1995b) studied the peer's influence effect on social influence and behavioral intention. Therefore, we hypothesize that:

H1: Peers have a positive impact on Social Influence

Number of Auditors in the firm represents the relevance of auditing work in the firm. Since social influence only can be verified when there are several groups and these groups also influence technology adoption, and individualism/collectivism can help to foresee the ease of changes (Hofstede, 2001). Thus, this hypothesis establishes a positive relationship between the number of auditors and their influence on the decisions inside the organization, thus their impact on Social Influence. Therefore, we hypothesize that:

H2: Number of Auditors in the firm has a positive impact on Social Influence

The number of collaborators determine the size of the firm. If there is encouragement on the use of technology, collaborators tend to use it (Curtis & Payne, 2008). However, competitive pressure, from "what others are doing in other firms" can also determine what collaborators decide to influence the organization in the decision to software acquisition and use of specific tools and technologies. Then:

H3: Number of collaborators in the firm has a positive impact on Social Influence

Social Influence is positively related to intention to use technology (Venkatesh et al., 2003). Previous research has focused on the effect of the subjective norm of intention to use: this effect will be direct and positive if system use is mandatory (Venkatesh & Davis, 2000). In the context of intention to use CAATs, several authors have hypothesized this relation: on external auditors as "Social influence positively affects intention to use CAATs" (Rosli et al., 2012) and on internal auditors "Social Influence is positively associated with intention to use (Curtis & Payne, 2014). So:

H4: Social Influence has a positive impact on the intention to use CAATs

Perceived usefulness has been regularly mentioned as having a positive effect on the intention to use technology. Davis (1993) demonstrated the significant effect of perceived usefulness of attitude towards perceived ease of use, and Chau & Hu, (2002) attested that perceived usefulness positively affects the intensity of intention to use specific systems (telemedicine). Curtis & Payne (2014) demonstrated that Performance Expectancy was positively related to intention to use (voluntarily) audit software. Then:

H5. Perceived Usefulness has a positive impact on the intention to use CAATs

Perceived ease of use and its relation with the intention to use technology was previously studied and it was concluded that PEOU is a significant secondary determinant of people's intentions to use computers (Davis et al., 1989). PEOU will have a significant positive effect on attitude toward using controlling by PU (Davis, 1993). Effort Expectancy was confirmed as a significant determinant of Intention to use technology (Venkatesh et al., 2003). About CAATs acceptance, Payne and Curtis (2008) examined senior auditors' behavioural intention to use CAATs on audit engagement (budget information and hours of work until getting into the use of a specific software) and

concluded that the constructs Performance Expectancy, Effort Expectancy and Facilitating Conditions (Venkatesh et al., 2003) were positively related to the intention to adopt a software for substantive testing. This relation was also hypothesized in the context of external auditors "Effort expectancy positively affects external auditors' intention to use CAATs" (Rosli et al., 2012). Segars & Grover (1993) demonstrated both the relations between Perceived Ease Of Use and Perceived Usefulness and Individual Impact. Many studies present evidence that the use of CAATs will improve individual productivity (Moorthy et al., 2011; Janvrin et al., 2009; Janvrin, Lowe, et al., 2008). The more the use of CAATs is perceived as easy to use, the more it will improve personal productivity. Therefore, the hypothesis is:

H6a: Effort Expectancy has a positive impact on the intention to use CAATs.

H6b: Effort Expectancy has a positive impact on the perceived Individual Impact.

Venkatesh et al., (2003) demonstrated that facilitating conditions were a predictor of use of an Information Technology and that the effect is stronger for older and less experienced users. Venkatesh et al. (2012) proved that facilitating conditions could affect both the intention to use and on use behaviour. As well as, those relations are moderated by age, experience, and gender. Meaning that older users are expected to need more organizational support when they need to learn how to operate with new technology, men are usually more open to making an effort to learn to use a new system, women tend more to rely on facilitating conditions, and experienced users are less dependent on support. Janvrin et al., (2008) results proved performance expectancy and facilitating conditions as predictors of use of CAATs, and previous training on CAATs can act as a facilitating condition (Janvrin et al., 2009) while Mahzan & Lymer, (2008) present facilitating conditions as a motivation to CAATs use and included it in a pre-adoption phase in conjunction with performance expectancy. Later, the same researchers, mention auditors' skills and knowledge and external facilitating conditions as included in the facilitating condition construct and also mentioned the importance of training and, finally, in one of the 10 cases that were analyzed in their research, firms mentioned that a pre-requisite for selection was previous knowledge on GAS. Therefore, we hypothesize that:

H7: Facilitating Conditions have a positive impact on the use of CAATs.

The number of statutory auditors usually reflects the type and complexity of IT the clients that are accepted, and that can lead to CAATs usage (Bierstaker et al., 2013). Firms with higher numbers of statutory auditors have the more technical competence to drive audits. Bierstaker et al., (2013) mention that it is possible that the Big 4 might have incentives to use CAATs and they emphasize the need for future research to understand CAATs' usage limitations for smaller firms. Also, mostly big statutory auditors' firms, mainly the ones that operate as multinationals, have strategies concerning the software that can be utilized in their companies. Therefore, the intention to use a tool might not be a decision from the collaborators but the top management. However, the more useful they perceived, the more willing they are to have the intention to use it.

On the other hand, if the statutory auditors' firm has a low number of statutory auditors, it is possible that the perceived usefulness of CAATs on the intention to use it in auditing can be lower (when compared with more prominent firms) since there is less influence of clients IT complexity. The number of statutory auditors reflects the degree of expertise of the firm. The higher the number, the higher the expertise of the firm and then the intention to use CAATs can be a consequence of that scenario (Janvrin et al., 2009). In general, larger firms are more likely to adopt the technology (Zhu et al., 2003).

Regarding the context of statutory auditors' firms, it is possible to induce, from previous research that, if the number of statutory auditors is high, the IT complexity of the clients is also higher than in other firms (Bierstaker et al., 2013), and the expertise and technical skills to solve the problems, so they are likely to use CAATs. In big statutory auditors' firms (multinational and national), the decision to use CAATs is defined strategically. In some situations, some tools are explicitly developed by the company and, in others, some of those that were developed by the company are adopted by software houses as stated by key experts. The positive effect of an auditor's firm size on the use of CAATs has already been established (Rosli et al., 2012) and also the significant differences in the use of GAS (Ahmi, 2012). Therefore, we hypothesize that:

H8a: Number of Statutory Auditors will moderate the effect of Perceived Usefulness on Intention to use CAATs, such that to a higher number of Statutory Auditors the effect is stronger in the impact on Perceived Usefulness and Intention to use CAATs

H8b: Number of Statutory Auditors has a positive impact on the Intention to use CAATs

H8c: Number of Statutory Auditors will moderate the effect of Intention to use CAATs on Use, such that the effect of the relationship between Intention to use CAATs and the use of CAATs will be stronger

H8d: Number of Statutory Auditors has a positive impact on the use of CAATs

Behavioral intention to use a system and its relation to use is presented recurrently in the literature (Davis et al., 1989; Venkatesh & Davis, 1996). Davis (1993, p. 478) demonstrates that "a*ttitude toward using has a significant positive impact on actual system use*" and Venkatesh et al., (2003) also confirmed that behavioral intention has a significant positive influence on system use. Regarding CAATs' context, several authors have studied this relation (Mahzan & Lymer, 2008; Mahzan & Lymer, 2014; Janvrin et al., 2009; Curtis & Payne, 2014). Therefore, we hypothesize that:

H9: Intention to use CAATs has a positive impact on the use of CAATs

The relation between the use and the individual impact was proposed by DeLone & McLean (1992). Igbaria & Tan (1997) also confirmed that system use has a direct effect on Individual Impact as an essential driver of IS success. Iivari, (2005) tested the hypothesis of actual use predicts the individual impact, based on the conviction that if the system has no use, there will not be any individual impact and that if there is the continued use of a system, a higher

impact will be expected. Urbach et al., (2010b) studied an employee portal use and its positive influence on individual impact to the users. As known so far, this relation was not documented in the context of CAATs use. However, it is highly probable that this relationship also exists in this research context. Therefore, we hypothesize that:

H10: The use of CAATs positively influences the perceived Individual Impact

Firm Influence represented the senior and general support to the use of a particular system or technology and was confirmed as having a positive impact on the use of CAATs (Kim et al., 2009). However, higher levels of firm influence may lead to the perception that uses is mandatory, and so the relation between intention and use can be weaker. Firm Influence was established as having a positive impact on the use of CAATs (Kim et al., 2009). Rosli et al. (2012) also hypothesized top management as a positive influence on firms decision to adopt CAATs. Use of CAATs is being hypothesised as having a positive influence on Individual Impact. However, if the firm influence increases, then, due to possible mandatory use of technology, the relationship between use and the individual impact would be weaker since the effect of CAATs use will be similar to all the collaborators of the firm. Concerning general organizations' support to the use of a specific technology or system, small organizations are mentioned as less prepared to get the strategic benefits of the technology, since they usually do not possess all the needed resources (Iacovou et al., 1995). However, if firms' partners are supporting and promoting the use of CAATs, auditors are likely to use it (Curtis & Payne, 2008), so they also realize the individual impact they might achieve. Therefore, we hypothesize that:

H11a: Firm Influence will moderate the effect of Intention to use CAATs on Use, such that the effect will be weaker with higher levels of Firm Influence

H11b: Firm Influence has a positive impact on the use of CAATs

H11c: Firm Influence will moderate the effect of Use of CAATs on Individual Impact, such that the effect will be weaker with higher levels of Firm Influence

H11d: Firm Influence positively influences the perceived Individual Impact

Figure 1 presents the research model for adoption determinants of computer-assisted audit tools.

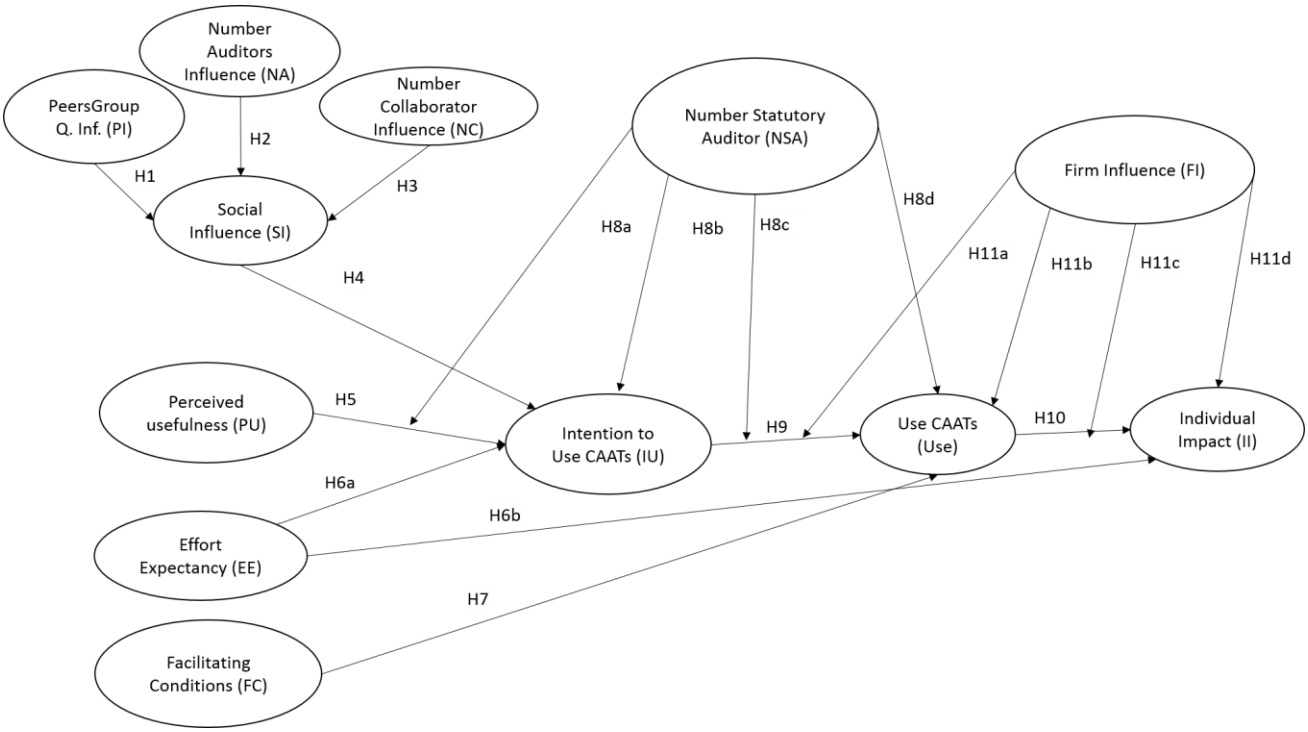

Figure 1 -Statutory Auditors' Acceptance Model on CAATs' Research model

4. Empirical Study

4.1. Methodology and Data collection

In this study, we adopted a quantitative approach to validate the research model (Figure 1) empirically. We used the structural equation modelling/ partial least squares (SEM/PLS) (Hair, Sarsted, Ringle & Mena, 2012; Ringle, Sarstedt & Straub, 2012). SEM/PLS is considered in the literature, to be adequate for validating measurement and structural causal models. PLS minimizes residual variances of endogenous latent variables, as well as it is appropriate to non-normal distributions (Hair et al., 2012). This method consists of two data analysis phases. The first phase of SEM/PLS is to validate the reliability and consistency of the measurement items (measurement model). The second phase of PLS analyses the structural relationship between the latent variables, assessing the significance of the proposed hypothesis (structural model). To measure the theoretical dimensions, we used validated scales as a base to construct the questionnaire (Appendix A). In this study, we conducted a survey to collect data from statutory auditors. In this research, a 7-point Likert Scale was utilized, where answers are: (1) Strongly disagree, (2) Disagree, (3) Somewhat Disagree, (4) Undecided, (5) Somewhat Agree, (6) Agree and (7) Strongly agree. This decision was made by the literature review, using validated scales, to further result in comparison. The survey was conducted in a European Country, and the questionnaire was distributed electronically to all the Statutory Auditors, the respondents correspond to 9% of the total of the country, the sample corresponds to

all valid and complete questionnaires. Table 2 characterizes the sample according to gender, age interval, and their academic background area.

Table 2. Sample characterization

Individual characteristics		%
Gender	Male	71.3
	Female	28.7
	Total	100.0
Age group	less than 39 years	37.6
	40 to 49 years	29.4
	50 to 59 years	14.7
	60 and more	18.3
	Total	100.0
Academic degree area	Management	45.8
	Accounting	10.3
	Economics	27.1
	Auditing	15.0
	Finance	1.9
	Total	100.0

4.2. Measurement model results

The measurement model specifies how dimensions are measured. The model evaluation was conducted by assessing the internal consistency reliability and the traditional criterion for measuring internal consistency. The Cronbach´s alpha, which assumes that all indicators are equally reliable, meaning that all indicators of a construct produce a consistent outcome under consistent conditions (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012), should be above 0.70 to be considered reliable. (Table 3). Results indicate that all constructs are higher than 0.70; this means that all constructs of the model are equally reliable. We measure indicator reliability, for guaranteeing that all the outer loadings are statistically significant, results should be all above 0.708 (Hair, Hult, Ringle & Sarstedt, 2012). The thumb rule means that indicators which are between 0.40 and 0.70, should be considered for removal from the model. In this model, the indicators were tested, and measurements were made to guarantee that the content validity. Items FC4, PU3, Use04, Use05, Use06, and Use07 were maintained in the model, although they are below 0.7, we tested their removal, and found that it did not contribute to an increase in the average variance extracted (AVE) (Hair et al., 2014), for that reason they were kept in the measurement model. The AVE is the measure that indicates the convergent validity of items. AVE value should be over 0.50, which indicates that, on average, the construct explains more than half of the variance of its indicators, and as Table 3 shows all indicators, codified in the second column (see Appendix A), are above 0.50 in AVE. Discriminant validity measures were computed to infer that a construct is distinct from other constructs (Appendix B). Discriminant validity was assessed through the cross-loadings criterion and inter-construct correlation (Appendix B). All indicators met the quality criterion.

Table 3 Measurement model results

Latent Variables	Indicators	Loadings	AVE	Composite Reliability	Cronbach's Alpha	Discriminant Validity?
Effort Expectancy (EE)	EE1	0.836	0.736	0.917	0.882	Yes
	EE2	0.892				
	EE3	0.818				
	EE4	0.882				
Facilitator Conditions	FC1	0.854	0.554	0.817	0.700	Yes
	FC2	0.877				
	FC3	0.793				
	FC4	0.299				
Firm Influence (FI)	FI1	0.882	0.775	0.873	0.710	Yes
	FI2	0.878				
Individual Impact (II)	II1	0.948	0.895	0.945	0.883	Yes
	II2	0.944				
Intention to Use (IU)	IU02	0.784	0.715	0.976	0.973	Yes
	IU03	0.721				
	IU04	0.832				
	IU06	0.806				
	IU07	0.883				
	IU08	0.857				
	IU09	0.824				
	IU12	0.869				
	IU13	0.872				
	IU14	0.884				
	IU16	0.897				
	IU17	0.892				
	IU18	0.746				
	IU19	0.893				
	IU20	0.852				
	IU21	0.895				
Number of Auditors (NA)	NA1	1.000	1.000	1.000	1.000	Yes
Number of Collaborators (NC)	NC1	1.000	1.000	1.000	1.000	Yes
Number of Statutory Auditors (NSA)	NSA1	1.000	1.000	1.000	1.000	Yes
Peer Influence (PI)	PI1	0.970	0.901	0.948	0.892	Yes
	PI2	0.974				
Perceived Usefulness (PU)	PU1	0.916	0.600	1.808	2.808	Yes
	PU2	0.922				
	PU3	0.331				
Social Influence (SI)	SI1	0.970	0.945	0.971	0.941	Yes
	SI2	0.974				
CAATs´ Use (Use)	Use04	0.627	0.520	0.941	0.933	Yes
	Use05	0.583				
	Use06	0.589				
	Use07	0.604				
	Use08	0.707				
	Use09	0.727				
	Use12	0.693				
	Use13	0.745				
	Use14	0.794				
	Use16	0.795				
	Use17	0.810				
	Use18	0.742				
	Use19	0.774				
	Use20	0.804				
	Use21	0.759				

4.3. Structural Model Results

The second phase of PLS method defines that after the measurement model assessment, the structural model should be validated, by computing the bootstrapping technique, which consists of a resampling technique drawing a large number of subsamples retrieved from the original observations, form this study we used 2000 subsamples. Table 4 presents the results of T-values and p-values. Results indicate that the supported hypotheses are H1, H2, H5, H6b,

H7, H8b, H9, H11b. Although these were supported, some of the hypothesis revealed were not supported by the empirical results, such as H3, H4, H6aH8a, H8c, H8d, H10, H11a, H11c, and H11d, to a significance level of 0.05. The H3 is supported on the borderline.

Table 4 Structural model results

		Path Coef.	p-Value		f^2	Support	Effect size
H1	**PI->SI**	0.417	0.000	***	0.200	Yes	medium effect
H2	**NA->SI**	0.434	0.006	**	0.119	Yes	small effect
H3	**NC->SI**	-0.290	0.054	NS	0.057	No	n.a.
H4	**SI->IU**	0.024	0.675	NS	0.004	No	n.a.
H5	**PU->IU**	0.803	0.000	***	2.472	Yes	large effect
H6a	**EE->IU**	-0.032	0.604	NS	0.004	No	n.a.
H6b	**EE->II**	0.342	0.004	**	0.109	Yes	small effect
H7	**FC->Use**	0.200	0.048	*	0.056	Yes	small effect
H8a	**PU*NSA->IU**	-0.141	0.134	NS	0.057	No	n.a.
H8b	**NSA->IU**	0.148	0.041	*	0.079	Yes	small effect
H8c	**NSA*IU->Use**	0.117	0.353	NS	0.009	No	n.a.
H8d	**NSA->Use**	-0.027	0.801	NS	0.017	No	n.a.
H9	**IU->Use**	0.477	0.000	***	0.468	Yes	large effect
H10	**Use->II**	0.089	0.340	NS	0.066	No	n.a.
H11a	**FI*IU->Use**	-0.412	0.103	NS	0.303	No	n.a.
H11b	**FI->Use**	0.312	0.001	***	0.468	Yes	large effect
H11C	**FI*Use->II**	-0.234	0.320	NS	0.070	No	n.a.
H11d	**FI->II**	0.124	0.271	NS	0.076	No	n.a.

Note: * Significant for p<0.050; ** significant for p<0.010; and *** significant for p<0.001
n.a.- not applicable
NS- Non Significant

Almost all the constructs have a small size effect, except H1 and H11a, which have a medium size effect. The results indicate that H5 and H11b have a large effect. This means that perceived usefulness has a large effect on the intention to use CAATs (H5). In what concerns firms influence, these also have a large effect on the use of CAATs (H11b).

Figure 2 depicts the research model results. Peers group influence (PI) and the number of auditors (NA) have a positive impact on social influence (SI), correspondently β=0.417 and β=0.434. On the other hand, the number of collaborators (NC) has a negative impact on the social influence (SI), with a β=-0.290, although this influence has a small size effect (f^2=0.057) and it is also not supported. Social influence (SI) has a positive impact on the intention to use (IU), β=0.024, but the effect of SI on IU is a small effect, compared to other variables of the model. Results

demonstrate that perceived usefulness (PU) has a positive impact on the intention to use (IU), β=0.803, and this positive impact has a large effect on the intention of CAATs use (f^2=2.472). Effort expectancy (EE) on the other hand has a negative impact on intention (β=-0.032), but on the other, it has a positive impact on the perceived individual impact of the CAATs usage (II) with a β=0.342. Facilitating conditions (FC) have a positive impact on the use of CAATs (Use), β=0.200, and the H7 is supported although it has a small effect on the use of CAATs (Use).

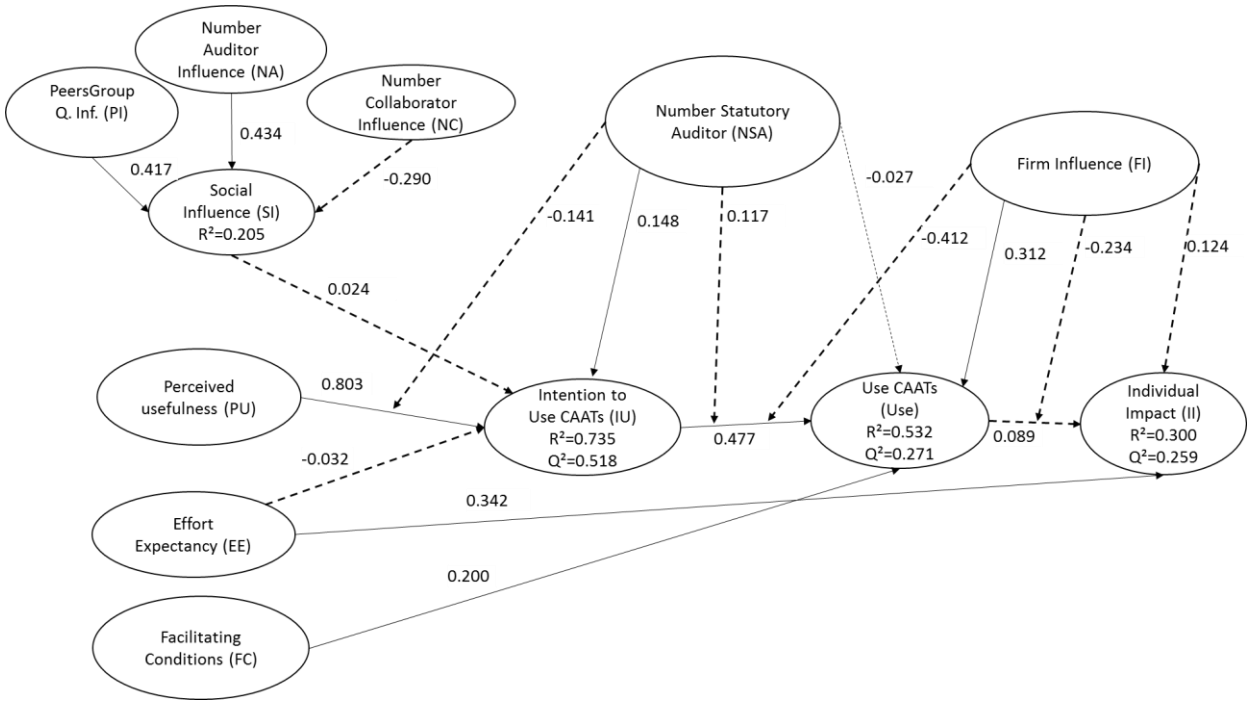

Figure 2 Research model results

The Number of Statutory Auditors (NSA) does not have a moderating effect on Perceived Usefulness (PU) or Intention to use CAATs (IU). The higher number of Statutory Auditors does not affect the relationship between Perceived Usefulness and Intention to use CAATs, as long as the t value of 1.509, corresponds to a significance level higher than 0.05. The moderate effect of the number of Statutory Auditors on the relationship between Intention to Use (IU) and Use of CAATs (Use) is not statistically supported, as long as the significance level of the corresponding path value (0.117) is higher than 0.05. The Number of Statutory Auditors (NSA) has a positive impact on the Intention to use CAATs (IU), as long as β=0.148 and has a significant level of 0.004. As long as it has an f^2 = 0.057, the effect of NSA on IU is a small effect. The Number of Statutory Auditors (NSA) has a negative impact on the use of CAATs (Use). However, the value estimated is not significant. So H8d is not supported. Intention to use CAATs (IU) has a positive impact on the use of CAATs (Use). The estimated value is 0.477 (β). This value is significant for p<.001, and the f^2 show that Intention to use CAATs (IU) has a large effect on the use of CAATs (Use). The H10 is not supported. It means that we cannot say that the use of CAATs (Use) positively influences the perceived Individual Impact (II), as long as the significance level is higher than 0.05.H11a is not supported. Firm Influence (FI) does not moderate the effect of Intention to use CAATs on Use. B=-0.412 would

suggest that the effect would be weaker with higher levels of Firm Influence. However, the path value is not significant. The same result was obtained to H11c. This hypothesis is not supported. β=-0.234, which would suggest that the effect would be weaker with higher levels of Firm Influence (FI). However, the path value is not significant. H11d is not supported. The Firm Influence does not positively influence the perceived Individual Impact, as long as the estimated β value is not significant. H11b is supported. It means that firm Influence (FI) has a positive impact on the use of CAATs (Use). The estimated β=0.124 and has a p-value (significance level) smaller than 0.001. The last step of the structural model assessment procedures for reflective models is the blindfolding and the predictive relevance (Q^2), according to the Stone-Geisser test (Geisse, 1974; Stone, 1974). A blindfolding test can only be applied to endogenous constructs that have a reflective measurement model. Positive Q^2 indicates the model's predictive relevance on a construct (Urbach & Ahlemann, 2010). In the adoption and use the structural model of CAATs, results of Q^2 for the intention of use (IU), use of CAATs (Use) and individual impact (II) are 0.518, 0.271 and 0.259, correspondingly. Therefore, and since the structural model has all $Q^2>0$, this means that the adoption and use of CAATs has a predictive relevance.

5. Discussion

Auditors reveal high intention to use CAATT and high use of CAATs. The hypotheses defined, eight were supported, and ten were not. On the hypotheses that were supported, there are 3 large effects (Perceived Usefulness on Intention to use CAATs, Intention to use CAATs on CAATs Use and Firm Influence on CAATs Use), 1 medium effect (Peers Influence on Social Influence) and 4 small effects (Number of Auditors on Social Influence, Number of Statutory Auditors on the Intention to use CAATs, Facilitating Conditions on the Use of CAATs and Effort Expectancy on the Individual Impact). Another significant conclusion about this new acceptance model is its predictive nature: regarding the results obtained, it is possible to state that this model predicts individual intention to use CAATs. This hypothesis H1 represents the effect of Peers Influence on Social Influence. Regarding the influence of other statutory auditors, mentioned by Rosli et al., (2013) like competitive pressure, concluded that the competitors did not influence the decision to adopt a CAATT and mostly the results revealed that auditors were not aware of the scenario of CAATs' use in other firms. Peers influence belong to the group of individuals that influence behavior. In other words, peers influence is part of the subjective norm (Venkatesh & Davis, 2000). The study results reveal that peer influence has a positive impact on social influence (β=0.417). However, social influence is not a direct determinant of CAATS' intention to use. In H2 it was hypothesized that the number of auditors, which represents the relevance of auditing work in the statutory auditors' firm, influenced Social Influence. Similar results were obtained in findings on the impact of individualism/collectivism on technology adoption (Hofstede, 2001; Venkatesh & Davis, 2000). The findings in H2 were supported. Therefore, it was confirmed that the number of auditors has an impact on Social Influence. Regarding the intention to use CAATs (H4), several authors have hypothesized this relation: on external auditors (Rosli et al., 2012) and internal auditors (Curtis & Payne, 2014) (Bierstaker et al., 2013). Bierstaker et al., (2013) didn't confirm social influence effect on the intention to use and suggested that personal preferences and social influence are more relevant in contexts of individual technological

options. Perceived Usefulness is significantly related to Intention to Use (H5), e. g. the more a CAATT is perceived as a driver of efficacy and efficiency, the more intention to use the auditors reveal. The model results have a β=0.803, which is a better finding than Venkatesh & Davis (1996), where results were β=0.76. Intention to use CAATs is explained in 73.5% and is explained mainly by perceived usefulness. Results are better than Venkatesh &Davis (2000) with R^2=0.37. On CAATs' acceptance, Kim et al., (2009) concluded that if the features used are basic, perceived usefulness has more impact on intention to use CAATs. Therefore, the survey results demonstrated that statutory auditors are using simpler CAATs so, both the findings of Kim et al. (2009) are confirmed in this study. The effect of Effort Expectancy on Intention to use (H6) was not supported by model results (β=-0.032). Similar results were obtained by (Bierstaker et al., 2013; Zainol et al., 2017) that concluded that effort expectancy had a negative impact on intention (β=-0.01). In Kim et al. (2009), this hypothesis was supported but only when complex features (of CAATs) were taken. Effort Expectancy has a positive impact on the perceived Individual Impact (H6b). although the effect is small (β=0.342). Venkatesh & Davis (1996) had an inferior result on that path (β=0.14). Janvrin, Lowe, et al., (2008) mention that adequate training should be provided to auditors to increase their perception of ease associated to a CAATT and that strategies to promote CAATs should be followed when people are using less (or are not using). Facilitating Conditions have a positive impact on the use of CAATs (H7) which can make it easier to use CAATs, as auditors have the resources, knowledge, and support necessary to use CAATs and by including a new indicator on formal training courses during pre-graduate, master's or intensive courses and their influence. The effect of facilitating conditions on CAATs' use was statistically supported (β=0.200) but has a small effect. This effect was previously present in many studies as in Venkatesh et al., (2003). Bierstaker et al., (2013) also concluded that facilitating conditions and performance expectancy are more important than personal or social variables (similar conclusions to those now obtained) and that the effect of those variables is higher for auditors that belong to the Big 4. The number of statutory auditors will moderate the effect of Perceived Usefulness on Intention to use CAATs (H8a), this was not supported, and that might indicate that since there is a direct and strong effect of Perceived Usefulness on Intention to use CAATs, and a small effect of Number of Statutory auditors in intention to use, then there was no effect from Number of Statutory Auditors. Different results were obtained by Janvrin et al. (2008). The number of Statutory Auditors has a positive impact on the Intention to use CAATs (H8b). This was confirmed. Similar results were obtained by Janvrin et al. (2009). The number of Statutory Auditors will moderate the effect of Intention to use CAATs on CAATs' use (H8c) such that the effect of the relationship between Intention to use CAATs and the use of CAATs will be stronger. This hypothesis was not supported, this can be a result of the strong effect that other constructs are having, as the direct effect of intention to use a CAAT in the use of a CAAT and the small but significant effect that the number of statutory auditors have on intention to use. The number of Statutory Auditors (H8d) has a positive impact on the use of CAATs Number of Statutory Auditors has a positive impact on the use of CAATs. If the number of Statutory Auditors is taken in line with the dimension of the audit firm, previous research has demonstrated the positive effects of firm size on the use of CAATs (Rosli et al., 2012) and the use of GAS (Ahmi, 2012). However, in the present results, the number of statutory auditors influence on the use of CAATs was not supported. The number of statutory auditors' effect on CAATs' use was not supported. Several authors reported the connection between Intention to use CAATs and

CAATs use (H9) as an important influence on CAATs' use (Mahzan & Lymer, 2008; Mahzan & Lymer, 2014; Janvrin et al., 2009; Curtis & Payne, 2014). The study results demonstrated that intention has a significant positive impact on CAATs use (β=0.477). The use of IT and its effect on Individual Impact were previously studied by DeLone & McLean (1992). Urbach et al., (2010b) studied an employee portal use and its positive influence on individual impact to the users. Igbaria & Tan (1997) have demonstrated that system use has a direct effect on Individual Impact and, therefore, on IS success. Actual use as a predictor of the individual impact of IS was presented by Iivari, (2005). The hypothesis (H10) was not supported, and this might suggest that auditors don't have individual expectations as a consequence of CAATTTs' use. H11a was not confirmed, and another author suggests differently (Kin et al., 2009). As mentioned before, Firm Influence has a strong and direct effect on CAATs' use and Intention to use also has a strong and direct effect on CAATs use, so, it is likely that the effect was not relevant as a moderator also. However, Firm Influence has a positive impact on the use (H11b) of CAATs and H7: Facilitating Conditions have a positive impact on the use of CAATs. Firm influence represents the effect of the support of the firm and top management on the use of CAATs (β=0.312). Regarding both firm influence and facilitating conditions it is possible to state that, if firms define that the use of CAATs is relevant to the statutory auditors' firm, they will create facilitating conditions (as the ones mentioned in the previous paragraph) to promote this use. Mahzan & Lymer (2008) mentioned that, in the context of internal auditors, the decision to/not to adopt CAATs might be defined by the Head of Internal Auditor fellow auditors. The influence of the firm in CAATs use is stronger (f^2=0.468) than the effect of facilitating conditions, and that can indicate that there can be situations where the use of CAATs is mandatory. Results did not confirm that Firm Influence will moderate the effect of Use of CAATs on Individual Impact, such that the effect will be weaker with higher levels of Firm Influence (H11c). Firm Influence positively influences the perceived Individual Impact (H11d) this was not confirmed either. This suggests that the firm influence is likely to act as an effect on a global use but does not focus on individual outcomes which are in line with Bierstaker et al., (2013) results in that suggest that in the audit context there are more relevant factors than personal or social variables. Results did not support firm Influence effect on perceived Individual Impact.

To summarise, results demonstrate that the most important effect on intention to use is Perceived usefulness: the more a CAAT is perceived as useful, the more the intention to use it is revealed. The number of statutory auditors also affects positively (but with a small effect) the intention to use CAATs. On the use of CAATs, the most significant effects are the ones from Intention to use, a path that was confirmed as significant in previous research and that it is also supported here, and Firm Influence also has a strong effect on CAATs use and also facilitating conditions. These effects contributed to a R^2 = 0.735 on Intention to use and R^2 = 0.532 on CAATs' use. Therefore, the constructs explain 73.5% of the variance of Intention to use and 53.2% of the variance of CAATs' use. The endogenous dependent variables´ relationship demonstrates that intention to use CAATs (Q^2=0.518) is a consequence of perceived usefulness. If auditors have the intention to use CAAT's, then it is more than likely to affect the adoption of this technology (CAATs' use) (Q^2=0.271). Auditors are likely to perceive individual impacts in their everyday work, when CAATs are easy to use, or when effort expectancy is low (Q^2=0.259). Results, then demonstrate that the structural model has a predictive relevance, as Q^2 is positive in all latent variables (Hair et

al.,2012). Results indicate CAAT's main adoption determinants are Effort Expectancy (EE), Facilitating Conditions (FC), Intention to use CAAT's (IU), as well as the Number of Statutory Auditor (NSA), and Firm Influence (FI).

6. Conclusions and implications of the study

Many contributions to CAATs' research have been developed in the last decade. This study contributes to the topic of Computer-assisted audit tools and techniques. In 2013 and 2014, several new studies were published, and many contributions are emphasizing relevant questions about Computer-assisted audit tools and techniques from countries that had no prior tradition on this research topic. Several previous studies on acceptance of computer-assisted audit tools and techniques have been developed. Nevertheless, the model proposed includes constructs existent in several previous studies but were never presented or validated as a whole. These constructs represent new contributions to the research community. Since they include constructs such as Facilitating Conditions, Peers' Influence (which includes the influence of the other statutory auditors and the professional body), Firm Influence (the degree of commitment of top management and auditing firm support), the influence of the number of auditors and the number of statutory auditors in a firm and the expected Individual Impact. A CAATs acceptance model was developed and validated. The validated model brings enlightenment to the area.

Results demonstrate that Firm Influence, number of Statutory Auditors' influence are determinant to the adoption of CAATs. The model explains 53 % of CAATs' use, depending directly on facilitating conditions (medium effect), from the intention to use (large effects), and from firm influence (large effects). The most important constructs on the intention to use are Perceived Usefulness (large effect) and Number of Statutory Auditors (medium effect). The only construct, which explains 30% of individual impacts is Effort Expectancy (small effects). This model has predictive characteristics, so it is possible to predict in a hypothetical situation what will be the intention to use a CAATT or its actual use.

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Appendix A: Questionnaire

Constructs	Code	Indicators	Source
Facilitating Conditions	FC1	I have the resources necessary to use CAATTs	Venkatesh et al., (2003)
	FC2	I have the knowledge necessary to use CAATTs	
	FC3	I have support of a person or a group of persons to use CAATTs	
	FC4	Individual formal training on CAATTs during graduation, master or intensive courses is influent on my interest on IT usage for Audit purposes	
Perceived Usefulness	PU1	Obtain evidence on controls' efficacy	Davis (1989)
	PU2	Execute analytical procedures to aid the auditor judgment	
	PU3	I find computer assisted auditing techniques (CAATTs) useful in my job	
Effort Expectancy	EE1	My interaction with CAATTs is clear and understandable	Venkatesh et al., (2003)
	EE2	It is easy for me to become skilful at using CAATTs	
	EE3	I find CAATTs easy to use	
	EE4	Learning to operate CAATTs is easy for me	
Peers Influence	PI1	The advices about Information Technologies for Audit purposes from Portuguese Institute of Statutory Auditors influence positively my CAATTs future acceptance	Pedrosa & Costa (2014)
	PI2	My peers (other Portuguese Institute of Statutory Auditors members) behaviour on CAATTs influences positively my CAATTs future acceptance	
Social Influence	SI1	People who influence my behaviour think that I should use CAATTs	Venkatesh et al., (2003)
	SI2	People who are important to me think that I should use CAATTs	
Firm Influence	FI1	Our firm senior managers have been helpful in the use of CAATTs	Venkatesh et al., (2003)
	FI2	In general, our firm has supported the use of CAATTs	
Individual Impact	II1	Using CAATTs enables me to accomplish tasks more quickly	Urbach et al., (2010a)
	II2	Using CAATTs increases my productivity	
Number of Auditors Influence	NAI	Number of Auditors in the firm	
Number of Collaborators Influence	NCI	Number of Collaborators in the firm	Zhu et al., (2003)
Number of Statutory Auditors Influence)	NSAI	Number of Statutory Auditors in the firm	
Intention To Use CAATTs	IU01	Identify and assess the risks of material misstatement due to fraud	Pedrosa & Costa (2014)
	IU02	Identify unusual or unexpected relationship or transactions	
	IU03	Determine the materiality level	
	IU04	Prepare working papers (Planning procedures)	
	IU05	Obtain evidence about control effectiveness	
	IU06	Obtain sufficient appropriate audit evidence regarding the assessed risks of material misstatement, through designing and implementing appropriate responses to those risks (ISA 330)	
	IU07	Performing substantive analytical procedures to identify unusual or unexpected revenue relationships or transactions	
	IU08	Select sample transactions from electronic files which match predetermined parameters or criteria	
	IU09	Use large populations to electronically test a repetitive calculation or other process	
	IU10	Execute analytical substantive procedures	
	IU11	Obtain sufficient appropriate audit evidence regarding the appropriateness of management's use of the going concern assumption in the preparation of the financial statements	
	IU12	Extract specific records such as payments more than a specified amount or transactions before a given date	
	IU13	Extract top or bottom records in a database	
	IU14	Identify missing and duplicate records	

Constructs	Code	Indicators	Source
	IU15	Identify possible fraud (using Benford's Law)	
	IU16	Select sample transactions from electronic files which match predetermined parameters or criteria	
	IU17	Sort transactions with specific characteristics	
	IU18	Test an entire population instead of a sample	
	IU19	Recalculate (add up) the total monetary amount of records in a fi le (such as inventory) and check extensions such as pricing	
	IU20	Stratify, summarize, and age information	
	IU21	Match data across files	
Use CAATTs	Use01	Identify and assess the risks of material misstatement due to fraud	Pedrosa & Costa (2014)
	Use02	Identify unusual or unexpected relationship or transactions	
	Use03	Determine the materiality level	
	Use04	Prepare working papers (Planning procedures)	
	Use05	Obtain evidence about control effectiveness	
	Use06	Obtain sufficient appropriate audit evidence regarding the assessed risks of material misstatement, through designing and implementing appropriate responses to those risks (ISA 330)	
	Use07	Performing substantive analytical procedures to identify unusual or unexpected revenue relationships or transactions	
	Use08	Select sample transactions from electronic files which match predetermined parameters or criteria	
	Use09	Use large populations to electronically test a repetitive calculation or other process	
	Use10	Execute analytical substantive procedures	
	Use11	Obtain sufficient appropriate audit evidence regarding the appropriateness of management’s use of the going concern assumption in the preparation of the financial statements	
	Use12	Extract specific records such as payments more than a specified amount or transactions before a given date	
	Use13	Extract top or bottom records in a database	
	Use14	Identify missing and duplicate records	
	Use15	Identify possible fraud (using Benford's Law)	
	Use16	Select sample transactions from electronic files which match predetermined parameters or criteria	
	Use17	Sort transactions with specific characteristics	
	Use18	Test an entire population instead of a sample	
	Use19	Recalculate (add up) the total monetary amount of records in a fi le (such as inventory) and check extensions such as pricing	
	Use20	Stratify, summarize, and age information	
	Use21	Match data across files	

Appendix B: Discriminant validity

	EE	FC	FI	II	IU	NSA	NA	NC	PU	PI	SI	Use
Effort Expectancy (EE)	1.000											
Facilitating Conditions (FC)	0.663	1.000										
Firm Influence (FI)	0.482	0.493	1.000									
Individual Impacts (II)	0.489	0.403	0.314	1.000								
Intention to Use (IU)	0.104	0.108	0.089	0.125	1.000							
Number of Statutory Auditors (NSA)	0.190	0.301	0.259	0.010	0.233	1.000						
Number of Auditors (NA)	0.145	0.220	0.092	-0.009	0.171	0.778	1.000					
Number of Collaborators (NC)	0.104	0.074	-0.094	-0.015	0.031	0.221	0.674	1.000				
Perceived Usefulness (PU)	0.156	0.127	0.216	0.073	0.844	0.187	0.110	0.021	1.000			
Peer Influence (PI)	0.130	0.098	0.122	0.064	-0.033	-0.253	-0.272	-0.111	0.062	1.000		
Social Influence (SI)	0.343	0.380	0.383	0.328	0.203	0.201	0.125	-0.044	0.228	0.332	1.000	
CAATTs Use (Use)	0.430	0.454	0.487	0.285	0.352	0.257	0.141	0.016	0.422	0.045	0.260	1.000