AUDIT ANALYTICS, ADMINISTRATIVE ACCOUNTING STANDARDS, INTERNAL AUDITING: CADASTRE & LAND ADMINISTRATION CORPORATE GOVERNANCE

Vasiliki A. BASDEKIDOU, Dr., Special Research Fund Account (ELKE), Aristotle University of Thessaloniki, Greece, Vasiliki.Basdekidou@gmail.com
Athanasios D. STYLIADIS, Prof. univ.dr.eng.., Eastern Macedonia and Thrace Institute of Technology, Greece, Styliadis@ath.forthnet.gr

***Abstract**: In the Greek cadastre the usage of audit analytics is below any expectations according the European and International standards, although internationally internal auditing is increasingly accepted. In order to address this problem, the innovative concept "Cadastre Audit Analytics, CAA" is introduced in this article. Then, the concept is projected in three contexts and became a framework rich in collaborative financial engineering functionalities. Finally, the article discusses the application conceptual model (audit analytics, administrative accounting, and internal auditing) as an intermediate step towards a well-defined and documented accounting, auditing, and corporate governance system, in accordance with the international accounting standards.*

***Keywords:** Audit technology, Audit analytics adoption, Cadastre, Administrative accounting, International accounting standards, Corporate governance*

1. Introduction

The term "Audit Analytics, AA" has been defined, in 2015, as a science by the American Institute of Certified Public Accountants (AICPA, 2015). The definition: "*Audit Analytics is a science of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modelling, and visualization for the purpose of planning or performing the audit*" [1]. The role of Audit Analytics in administrative accounting, auditing and corporate governance has been discussed in detail in academia [2,3,4]. Also, for Audit Analytics cadastre practices and functionalities, a number of empirical investigations has been introduced and should be useful [5,6].

Audit Analytics provides advantages in auditing (to both external and internal auditors), cadastre management, land administration and corporate governance. In particular, AA creates unique opportunities for internal auditors to assess potential risks, enhance auditing functionalities, identify operational inefficiency, and therefore provide insights [2]. Internal auditors perform much broader tasks than external auditors, such as inquires and investigation in economics, financial and operational matters, fraud risk analysis, reviewing and evaluation, etc. [7]. Therefore, internal auditors should have more demands on the use of Audit Analytics in order to accomplish those tasks in an organizational, productive, skilful, and hence more effective manner. Even more, internal auditors usually have more frequent access to cadastre and land administration accounting data, to which audit analytics can be employed to quickly detect anomalies, blackmail issues, extortion, and fraud in general. Finally, although current cadastre regulations for external auditors neither encourage nor

prohibit the use of AA, external auditors are likely to focus on the procedures that are explicitly required to satisfy land administration regulatory requirements [6].

In corporate governance, although internal auditors are increasingly aware of the importance and value of AA [1], recent surveys show that AA is not being fully utilized by the majority of companies [2]. In particular, many certified auditors are not able to effectively incorporate AA in their work and therefore they use it just on an *ad-hoc* cheaply basis. In this domain, while some journal papers and practical reports [5,6,7] attempted to explore the barriers to the adoption of AA; so far a limited academic research has been performed in order to identify the actual usage levels and the factors involved in AA – corporate governance relationship.

The main goal and objective of this article is to examine and define in a conceptual model, those organizational factors that have an impact on AA post-adoption usage at both levels, the application and the feature one; and therefore to propose AA procedures in corporate governance and particular cadastre and land administration issues, in order to improve the performance of the involved internal auditing functionalities.

2. Background

The majority of prior studies examined ICT (Information and Communication Technologies) acceptance in corporate governance; and management and practice it at an individual auditing level rather than at the corporate organizational level [6,8]. Only a few studies investigate how auditing departments adopt and use ICT. Even more, the state-of-the-art ICT technology "Cloud Computing, CC", to the knowledge of the author of this paper, has not been adopted so far in auditing, while there is a limited use in corporate governance but no usage has been reported in cadastre and land administration issues. In this domain, [9] developed a theoretical model to address the factors affecting ICT acceptance at corporate governance organizational level; however, they were not able to collect real-world data to review, test, estimate, and assess the proposed model. Actually, in [9], there is an attempt to add several organizational and external factors in their model to investigate the consequences and those factors that control external auditors in using generalized auditing software; but their model still focused just on individual auditors without AA functionalities.

Application-level AA management and practice is defined as the extent to which AA software and ICT/cloud computing is used in auditing. The frequency of performing AA, the number of audit tasks to which the techniques are applied, and the scope of audit processes in which analytics is involved are all measures of application-level AA usage.

Feature-level AA management and practice is defined as the extent to which particular AA techniques are used in auditing. Actually, feature-level AA considers both the *quantity* and the *complexity* of different AA techniques being used. It is important to note that, in order to have a high level of feature-level AA management and practice, certified auditors in corporate governance should understand both basic and sophisticated techniques, as well as their strengths and weaknesses.

According to the 13-year real-world experience of the author of this article in Special Fund Research Account/Aristotle University/Thessaloniki, it is really possible for a corporate to achieve greater application-level management and practice, but still remain at a low feature-level management and practice. That is to say, internal auditors could use basic AA throughout the audit process frequently, but they do not have the knowledge to use more advanced ICT/cloud computing tools.

Following the background discussion, this article uses an organizational approach (*innovative concept - framework - application conceptual model*) to introduce the usage of AA in corporate governance and particularly in cadastre and land administration.

3. Hypothesis Development Procedure

This Section indicates, in a concise way and without lengthy definitions, the logic (as a hypothesis development procedure) which has been used in this paper for the interpretation of the "*innovative concept - framework - application conceptual model*" proposed organizational approach, referring to AA adoption in cadastre and land administration issues.

3.1. The Innovative Concept (CAA)

In the Greek cadastre and land administration the management and practice of AA is below any expectations according the European and International standards, although internationally internal auditing is increasingly accepted. In order to address this problem, the innovative concept "*Cadastre Audit Analytics*, CAA" is introduced in this article.

The CAA is defined as a collaborative financial engineering term, which is actually a pool of factors influencing the utilization of Audit Analytics in Cadastre and Land Administration, while focusing on the performance improvement of the internal audit process because of the use of ICT and cloud computing technologies.

3.2. The Administrative Accounting Standards – Cadastre Corporate Governance (AAS-CCG) Framework

For the purposes of the proposed (corporate governance rich in AA functionalities) organizational approach, the CAA innovative concept is projected in three contexts (Administrative Accounting; International Accounting Standards; and Corporate Governance) and became a framework rich in collaborative financial engineering functionalities.

This proposed framework has been named "*Administrative Accounting Standards for Cadastre Corporate Governance*, AAS-CCG".

3.3. The Application Conceptual Model

Finally, the AAS-CCG framework has been transformed to an application conceptual model (related to applications for cadastre and land administration) according to the flowchart-procedure demonstrated in following Figure 1. In order to perform this transformation, the AAS-CCG framework has been parameterized by the items of a 1-d array (i.e. the dimensions of the derived conceptual model well defined as operational functionalities).

The items (dimensions) of this transformation modeling are the following: *The ICT & Cloud Computing Functionality*; *The Visual Computing Functionality; The Cadastre Management & Land Administration Functionalities; The Cadastre Size & the Environmental Uncertainty Functionality; The Cadastre & Land Administration Training Functionality; The International Accounting Standards Functionality; The Application-level Audit Analytics Functionality; The Feature-level Audit Analytics Functionality; The Performance Evaluation Auditing Functionality.*

3.3.1 The ICT & Cloud Computing Functionality

IT complexity refers to the degree to which a corporate uses highly computerized transactions. The AICPA [1] states that in determining whether specialized skills are needed on the audit team to understand ICT controls, or to design and perform tests of ICT controls or substantive tests, the auditor should consider factors such as “*the complexity of the entity's systems and ICT controls and the manner in which they are used in conducting the entity's business*”.

From the corporate governance literature, the [6,8,9] found that when client ICT complexity is high, external auditors are more likely to use computer-related audit procedures. While limited research examines the relation between ICT complexity and audit analytics usage by internal auditors, it is conjectured in this paper that they are positively associated. AA can help to reduce time and costs in the audit engagement. Furthermore, AA not only broadens the auditing scope, but also increases the capability in identifying potential fraud.

Hypothesis 1. Firms with greater ICT/cloud computing complexity are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

3.3.2 The Visual Computing Functionality

Technological competence nowadays is expressed by the Artificial Intelligence (AI) technologies and particularly the visual computing technology (in this domain the leader is the NVIDIA Corporation, a NASDAQ firm:NVDA). Technological competence is necessary for AA software management and practice. It is infeasible to use AA appropriately without the support of technical resources and competent personnel, the lack of which present barriers to ICT implementation [6]. As prior research shows that AI technological competence is a prerequisite for the adoption of technology innovation, it is expected that internal auditor departments with greater technological competence are more likely to be ready to adopt AI/visual computing technology innovation and use it in the audit process.

Hypothesis 2. Internal audit departments with better technological competence like the visual computing are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

3.3.3 The Cadastre Management & Land Administration Functionalities

Management support, or management commitment, is the degree to which a corporate management invests in technology innovation. Management literature suggests that support from upper levels plays a key role in the success of nearly all programs within an organization [4,7]. Audit analytics is not an exception and requires management to dedicate resources to purchasing AI/visual computing software, implementing maintenance services, and training auditors for AA [6,8].

Hypothesis 3. Enterprises with a stronger management support are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence,

they are more consistent and adaptable with the introduced AAS-CCG collaborative financial engineering framework.

3.3.4 The Cadastre Size & the Environmental Uncertainty Functionality

Prior literature has widely debated on the impact of enterprise size on an innovation adoption [6,7,9]. In this domain, the association between *size* and *innovation* depends on the description and evaluation procedure of the "size", the involved environmental uncertainty, and the technical innovations adopted by the corporate governance.

In the proposed organizational approach for cadastre and land administration, "size" is anticipated to have a positive impact on the management and practice of AA for two reasons. The first reason is that, large cadastre offices tend to have more resources available to facilitate the adoption process. In this domain, a survey on AA acknowledged that the cost of software and training is one of the main reasons for limited use of auditing technology tools [1,2,4]. So, the large cadastre offices and companies usually have satisfactory financial resources to purchase sophisticated AI/visual computing software, as well as to support training and maintenance services. The second reason is that, large land administration firms have more transactions and procedures to be audited than the smaller ones. Hence, the advantage of using AA in cadastre and land administration is more suitable and credible for the larger offices, firms, and companies.

Hypothesis 4. In cadastre and land administration, larger offices, firms, and companies are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

3.3.5 The Cadastre & Land Administration Training Functionality – Professional AA Training

The proposed term "*professional AA training*" is referred to the ease of getting professional training support for using AA in corporate governance. Extensive discussions between the author of the article and several internal auditors suggest that a major obstacle that hinders the use of advanced AA is the inability to get professional training support. From the literature, [5,8] found that training systems are more successful when technical support is in place (i.e. on-situ training). Also, any information regarding new features, functionalities, and products can also enhance the "*professional AA training*" and therefore the understanding of the involved AI/visual computing software in AA procedures [6,9].

In the proposed organizational approach for the cadastre and land administration domain (i.e. a specialized corporate governance with AA functionalities), although analytics software vendors provide online training classes and on-site training classes, the problem is only lightening rather than totally eliminated. Always, the high cost and the limited duration of training classes may restrict the advantages and may limit training tasks.

Hypothesis 5. Cadastre offices and firms, as well as land administration companies, with a good "*professional AA training*" department are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence, they are more consistent and adaptable with the introduced AAS-CCG collaborative financial engineering framework.

3.3.6 The International Accounting Standards Functionality – AA Standards

The proposed "*AA standards*" term is referred to the perceived level of encouragement of using AA auditing standards in corporate governance. While there is no a mandatory requirement for using AA; a number of professional bodies and published guidance encourage the use of technology-based auditing and other data analysis techniques in performing internal auditing [1,2]. In this domain, cadastre firms and land administration companies that face a number of (political, economical, currency, etc.) risks in their business, should have a perception of how strongly the "*AA standards*" encourage them for using AA.

Hypothesis 6. Cadastre offices and firms, as well as land administration companies, with higher perceived level of encouragement by auditing "*AA standards*" are more likely to set CAA targets and to achieve greater application-level AA management and practice. Hence, they are more consistent and compatible with the introduced AAS-CCG collaborative financial engineering framework.

3.3.7 The Application-level Audit Analytics Functionality

Application-level and feature-level AA management and practice are obviously not independent with each other. From the corporate governance literature, [3,4] both suggest that users continue to explore and adopt new features after adopting information systems. While at the beginning users only see the need for a limited number of features, they eventually realize that a larger set of features is necessary as they gain more experience [6,8].

Although greater software use may not necessarily encourage the use of a wider set of AA tools, it might help auditors develop determination and certainty in using AI/visual computing audit software. In addition, greater application-level AA management and practice leads to more familiarity with audit software. Thus, auditors in cadastre and land administration, who use audit software more often, are more likely to succeed in learning and using various AA tools and achieve competence, also because of determination and familiarization. Thus, there should be a positive relationship between application-level and feature-level regarding AA management and practice collaborative financial engineering functionalities.

Hypothesis 7. Cadastre offices and firms, as well as land administration companies, with greater application-level AA management and practice, are more likely to set CAA targets and to achieve greater feature-level AA usage. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

3.3.8 The Feature-level Audit Analytics Functionality

Technological competence as it expressed by AI/visual computing and "*professional AA training*" are expected to have impacts on feature-level AA management and practice as well [6,7,9]. In this domain, advanced sophisticated AA tools are more likely to have a direct impact on advancing AA competence. For example, Vasarhelyi et al. [10] interviewed internal audit managers and found that training is necessary in providing employees with basic ICT knowledge.

Similarly, technological competence is the basis of using advanced AA techniques in cadastre and land administration corporate governance. Cadastre firms with up-to-date ICT infrastructure and skilled ICT staff have the capability and are more likely to perform

advanced AA, while those with low technological competence may only be able to utilize basic AA tools.

Hypothesis 8. Cadastre offices and firms, as well as land administration companies, with better technological competence, as it expressed by AI/visual computing, are more likely to set CAA targets and to achieve greater feature-level AA management. Hence, they are more consistent and adaptable with the proposed AAS-CCG collaborative financial engineering framework.

Hypothesis 9. Cadastre offices and firms, as well as land administration companies, with better "*professional AA training*" are more likely to set CAA targets and to achieve greater feature-level AA practice. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

3.3.9 The Performance Evaluation Auditing Functionality

Facilitated by audit software, AA can perform investigation upon a large population in corporate governance, save effort for auditors, and identify misstatements or fraud in complicated corporate governance cases. The increase in corporate competence and in AI/visual computing expertise and flexibility will also enable auditors to conduct more frequent audits in high-risk areas and enhance the reliability of audit results.

Similarly, in cadastre and land administration, if internal auditors are well trained in using various AA software tools, the likelihood of spotting anomalies will increase, leading to improvements in the internal auditing procedure. Therefore, the use of AA is expected to improve audit competency, expertise, and electiveness; and enhance the ability to identify more exceptions. Thus:

Hypothesis 10. Cadastre offices and firms, as well as land administration companies, with greater application-level AA management and practice are more likely to set CAA targets and to achieve better performance in internal auditing. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

Hypothesis 11. Cadastre offices and firms, as well as land administration companies, with greater feature-level AA management and practice are more likely to set CAA targets and to achieve better performance in internal auditing. Hence, they are more consistent and compatible with the proposed AAS-CCG collaborative financial engineering framework.

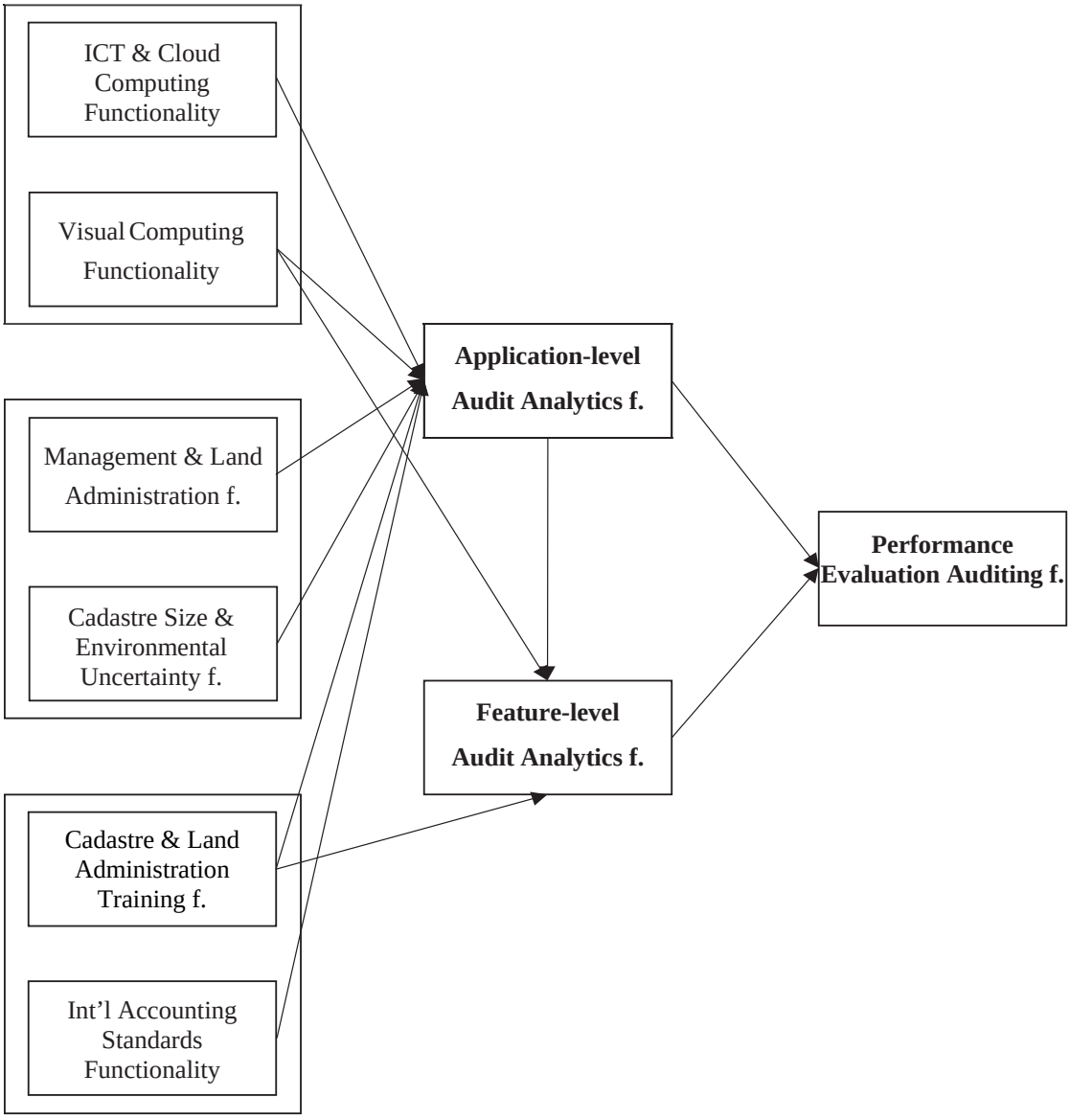

Figure 1 - From the AAS-CCG Framework to the Application Conceptual Model (Cadastre & Land Administration Functionalities)

4. Research Methodology – Analysis - Validation

In order to evaluate the proposed methodology a survey was conducted. The survey data were collected from finance, accounting, and risk management professionals during the service of the author of the article at the Career Services Office (CSO) of the Aristotle University of Thessaloniki (Thessaloniki, Greece). The sample consists from 114 individuals and at a preliminary level two questions (*survey constructs*) were asked for filtering purposes.

These questions were the following:

(a) "*Does your Organization/Firm/Company have an established Audit Analytics Policy/Rules/Guidelines?*"; and

(b) "*What Specific Areas do your Audit Analytics Policy/Rules/Guidelines address?*"

From the 114 participants in this survey, 7 participants were dropped off from the sample, because they answered NO for the (a) question but YES to at least one sub-question from the (b) question-group. Following, a number of questions were asked that assessed, in a scale from 1 (represents: "*strongly disagree*") to 10 (represents: "*strongly agree*"), the three (3) context used by this article for the projection of the CAA personalized innovative concept (i.e. the contexts: Audit Analytics - Administrative Accounting context [AA-AA]; Audit Analytics - International Accounting Standards context [AA-IAS]; and Audit Analytics - Corporate Governance context [AA-CG]).

The Audit Analytics - Administrative Accounting context [AA-AA] is described by a formative survey construct which represents survey participants' perceptions regarding how their organization/firm is using administrative accounting externally with customers and internally with employees. This analysis treats AA-AA as a formative construct, since any changes in the various indicators of AA-AA are assumed to determine relative (related) changes in the value of this construct, and these indicators are not necessarily correlated.

The Audit Analytics - International Accounting Standards context [AA-IAS] is described by a reflective survey construct depicting participants' perceptions of their organization/firm operates in accordance with the international accounting standards. This analysis treats AA-IAS as a reflective construct, since the values of the individual survey measures are assumed to be taken by participants' overall perceptions of the international accounting standards usage and these individual measures are expected to be correlated [6].

Finally, the Audit Analytics - Corporate Governance context [AA-CG] is described by a reflective survey construct with a number of reflective measures to the extent to which an organization/firm has effective, competent, and practical corporate governance environment. In this domain the corporate governance implementation actually reflects the degree to which an organization/firm has implemented specific rules/guidelines/policies regarding corporate governance. It is actually a 2nd order reflective construct with two (2) underlying 1st order survey constructs that address rules/guidelines/policies of audit analytics on accounting; and on administrative accounting.

In Table 1 the conducted survey's constructs (questions) are presented:

Table 1 – The Survey Constructs

Audit Analytics – Administrative Accounting [AA-AA][a]

Your organization/firm uses audit analytics in an administrative accounting context:

- [AA-AA 1] just as a supplement to audit functions.
- [AA-AA 2] to nearly every company's/firm's task.
- [AA-AA 3] just as a basis of auditing functions.
- [AA-AA 4] very often/frequently.

Audit Analytics – International Accounting Standards [AA-IAS][a]

Your organization/firm uses audit analytics in an international accounting standards context:

- [AA-IAS 1] that encourage the use of various analytics tools and methods to enhance internal auditing function reliability.
- [AA-IAS 2] that encourage the use of various analytics tools and methods to enhance external auditing function reliability.
- [AA-IAS 3] to encourage the use of various analytical methods to detect misstatement.

- [AA-IAS 4] if my organization/firm provides easy-to-understand step-by-step guidelines on how to use audit analytics tools in internal/external auditing procedures, I will be willing to use these audit analytics tools.

Audit Analytics – Corporate Governance [AA-CG][a]

Your organization/firm uses audit analytics in a corporate governance context:

- [AA-CG 1] the management is supportive of using audit analytics in general.
- [AA-CG 1.1] the management is supportive of using audit analytics on accounting.
- [AA-CG 1.2] the management is supportive of using audit analytics on administrative accounting.
- [AA-CG 2] the management is supportive in financing a purchase of audit analytics hardware/software.
- [AA-CG 3] the management is supportive in financing training in audit analytics hardware/software classes.
- [AA-CG 4] the management is supportive in financing audit analytics hardware/software maintenance/upgrade.

[a] Respondents indicated the level of agreement/disagreement with each statement on a 5 point scale, where 1 = strongly disagree and 5 = strongly agree.

In following Table 2, the statistical variable Average Variable Extracted (AVE) for both of the reflective constructs (AA-IAS and AA-CG survey questions) well exceed 0.80; and for the formative one (AA-AA survey question) is above 0.50; while the variable Composite Reliability (CR) well exceed 0.90 for all constructs (AA-AA, AA-IAS, and AA-CG survey questions). Hence, according to the statistical theory, the AVE and CR variables ("measures" or 2nd level metadata) indicate that, mainly, the reflective survey constructs AA-IAS and AA-CG possess **convergent validity**, which (as a good-quality indicator) establishes the necessity of the proposed AAS-CCG collaborative financial engineering framework.

Table 2 - Construct descriptive statistics and correlations (107 accepted participants)

Construct	Mean	Std. Dev	CR	AVE	AA-AA	AA-IAS	AA-CG
AA-AA	3.722	1.024	0.920	0.514	0.726		
AA-IAS	3.709	1.012	0.941	0.874	0.264*	0.733	
AA-CG	3.293	1.132	0.994	0.833	0.372***		0.371**

Notes:

CR: Composite Reliability.
AVE: Average Variance Extracted.
* Denotes correlation among constructs with p-values of 0.05.
** Denotes correlation among constructs with p-values of 0.01.
*** Denotes correlation among constructs with p-values of 0.001.

5. Conclusions and Future Research

The current paper proposed an innovative organizational approach for adopting Audit Analytics (AA) in cadastre and land management corporate governance issues. For this purpose, the terms «*professional AA training*» and «*AA standards*» have been introduced; the innovative concept «Cadastre Audit Analytics, CAA», and the innovative framework «Administrative Accounting Standards – Cadastre Corporate Governance (AAS-CCG)» have also been defined; and an application conceptual model regarding cadastre and land administration cases has been discussed.

For future research the proposed application conceptual model (cadastre – land administration), could be regarded as an intermediate step towards a well-defined and documented cadastral auditing and land management corporate governance system, in accordance with the international accounting standards and with spatio-temporal e-learning functionalities [11,12,13].

6. Acknowledgments

We would like to thank Professor Emeritus Ian Williamson (Melbourne University / Department of Geomatics, Australia) former President of the FIG (International Federation of Surveyors) Commission 7 "*Cadastre & Land Management*" for valuable discussions about Greek cadastral and land administration issues in relations to property law and accounting, during the Prof. Athanasios Styliadis's research sabbatical in Australia (Melbourne University / Department of Geomatics, 1996).

7. References

1. *American Institute of Certified Public Accountants (AICPA), 2015. Audit Analytics and Continuous Audit: Looking Toward the Future.*
   Available at: https://www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/auditanalytics_lookingtowardfuture.pdf.
2. *PWC, 2012. Data Analytics How Data Analytics Can Help Internal Audit Better Understand Risk.*
   Available at: https://www.pwc.com/en_US/us/industry/utilities/publications/assets/pwc-utility-company-internal-audit-data-analytics.pdf.
3. *Audimation, 2011. Top 10 Areas Where Data Analysis is Adding the Most Value. Available at: https://www.audimation.com/articles/top-10-areas-where-data-analysis-is-adding-the-most-value.html?url=articles%2Ftop-10-areas-where-data-analysis-is-adding-the-most-value.html.*
4. *Cao, M., Chychyla, R., Stewart, T., 2015. Big data analytics in financial statement audits. Accounting Horizons, Vol. 29, No. 2, pp. 423–429 (American Accounting Association, AAA), New York. DOI: https://doi.org/10.2308/acch-51068*
5. *Barua, A., Konana, P., Whinston, A.B., Yin, F., 2004. An Empirical Investigation of Net-Enabled Business Value. Management Information Systems Quarterly (MISQ), Volume 28, Issue. 4, pp. 585-620 (Management Information Systems Research Center, Carlson School of Management, University of Minnesota).*
   Available at: http://aisel.aisnet.org/misq/vol28/iss4/4/
6. *Li, H., Dai, J., Gershberg, T., Vasarhelyi, M.A., 2018. Understanding Usage and Value of Audit Analytics for Internal Auditors: An Organizational Approach. International Journal of Accounting Information Systems, Vol. 28, Issue 1, pp. 59-76 (Elsevier).*
   DOI: https://doi.org/10.1016/j.accinf.2017.12.005
7. *Carcello, J.V., Eulerich, M., Masli, A., Wood, D.A., 2017. Are Internal Audits Associated with Reductions in Operating, Financial Reporting, and Compliance Risk?.*
   Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2970045
   DOI: http://dx.doi.org/10.2139/ssrn.2970045
8. *Janvrin, D.J., Bierstaker, J.L., Lowe, D.J., 2008. An Examination of Audit Information Technology Usage and Perceived Importance. Accounting Horizons, Vol. 22, No. 1, pp. 1–21 (American Accounting Association, AAA), New York.*
   DOI: http://dx.doi.org/10.2308/acch.2008.22.1.1

9. *Rosli, K., Yeow, P.H., Siew, E.G., 2012. Factors influencing audit technology acceptance by audit firms: a new I-TOE adoption framework. Journal of Accounting and Auditing: Research & Practice, Vol. 2012, Article Id: 876814, pp. 1–11. IBIMA Publishing. Available: http://www.ibimapublishing.com/journals/JAARP/jaarp.html DOI: http://dx.doi.org/10.5171/2012.876814*
10. *Vasarhelyi, M.A., Alles, M.G., Kuenkaikaew, S., Littley, J., 2012. The Acceptance and Adoption of Continuous Auditing by Internal Auditors: A Micro Analysis. International Journal of Accounting Information Systems, Vol. 13, Issue. 3, pp. 267–281. Elsevier. DOI: https://doi.org/10.1016/j.accinf.2012.06.011*
11. *Styliadis, A.D., 2007. E-Learning Documentation of Historical Living Systems with 3-D Modeling Functionalities. Journal Informatica, Volume 18, No. 3, pp.419-446.*
12. *Styliadis, A.D., Patias, P.G., Zestas, N.C., 2003. 3-D Computer Modeling with Intra-Component, Geometric, Quality, and Topological Constraints. Journal Informatica, Vol. 14, No. 3, pp. 375-392.*
13. *Styliadis, A.D., Vassilakopoulos, M.G., 2005. A Spatio-temporal geometry-based model for digital documentation of Historical Living Systems. Information and Management (Elsevier), Vol. 42, No. 2, pp. 349-359.*