



HELLENIC REPUBLIC
National and Kapodistrian
University of Athens

Department of Economics
Faculty of Economics and Political Sciences National
and Kapodistrian University of Athens

« MASTER OF SCIENCE IN APPLIED RISK MANAGEMENT
Specialization: INTERNAL AUDIT »

DISSERTATION THESIS

“RISK - BASED AUDIT AND DATA ANALYTICS”

CHRISTAKOU NIKI

G.DOTSIS

ATHENS
NOVEMBER 2019

Table of Contents

| | |
|--|----|
| Specialization: INTERNAL AUDIT» | 1 |
| Abstract | 3 |
| Introduction | 3 |
| Research Methodology | 4 |
| Chapter 1-Theoretical Part | 5 |
| 1.1. What the RISK BASED AUDIT is | 5 |
| 1.2 .What is Data Analytics..... | 7 |
| 1.3 Data analytics in Auditing..... | 10 |
| 1.3.1 Stages of Risk based Audit..... | 10 |
| 1.3.2 Advantages -Benefits of RBIA..... | 11 |
| 1.3.3Application of data analytics in stages of auditing process..... | 12 |
| 1.3.4 Methods-Tools and types of DATA ANALYTICS in Risk Based Audit..... | 14 |
| 1.3.5 Benefits of Data analytics in RBIA..... | 15 |
| Chapter 2-Surveys | 16 |
| 2.1 Survey of Price water coopers consulting company..... | 16 |
| 2.2 Data analytics- maturity | 17 |
| Chapter 3-Literature Review | 18 |
| Chapter 4 -EMPIRICAL RESEARCH PART | 20 |
| 1. Methodology results (Greece)..... | 20 |
| 2. Audit in new business Environment..... | 23 |
| 2.1Digital Transformation/Disruption | 23 |
| 2.2 New role for Auditors | 23 |
| Conclusions | 24 |
| References..... | 25 |
| APPENDIX | 29 |



Abstract

Audit departments are turning to risk-based approach. This approach helps auditors to understand business objectives, identifying the risks related to organizations business objectives, and the controls to address those risks. The purpose of this thesis is to answer two questions: whether the use of data analytics and information Technology can benefit internal Auditors job and whether the risk based concept has been adopted from audit departments .The research methodology: a qualitative method was used to get a unique in depth of discovering and understanding concepts theories experience trends and any kind of related to the subject biography. Furthermore, at the beginning of this research, few questionnaires were given as this was the initial preferred research method, data collected were not reliable in content since the level of understanding of risk based auditing seems to be in immature stage (Greece). After making some interview with person from companies in various sectors it revealed that while data analytics are part of audit process the concept of risk based audit is not yet fully applied.

Data analytics and disruptive technologies known as Digital Transformation, will change every industry, the same will happen in the audit functions. The new role of auditors should conform to digital transformation disruption which brings to economy, society and business environment tremendous changes. Data analytics and disruptive technologies will change every industry. The same will happen in the audit functions. The future of the Auditor is changing because business is changing. Technology disruption brings the next generation audit approach. The global economy few years from today will require a profession that is flexible, agile and responsive to business risks.

Introduction

Auditing through risk based approach is a very critical procedure inside organizations and business schemas that is why it is one of the top priorities of the board councils. Risk management focuses on cost reduction while it supports the desire for the development of added value inside organizations. At the same time it reflect the reaction towards an evolving regulatory environment and the technological changes along with the availability of data.

Auditors are no longer considered “financial police”. We cannot deny the importance of new technologies in both public and private sector and all kind of businesses. Technology has created a disruption to Auditors role forming totally different future for auditing process by transforming their profession. More, the controls are becoming fully automated, the auditors can review not only a sample of a population but the 100% of it, and periodic audits turn to be continuous audits. These changes are demanding with the dynamic environment recommends the technology, innovation, efficiency and agility.



Risk based audits are the bottlenecks of the following series: Visionary leadership – Stakeholder satisfaction – Best practices and efficiency – Staff development – Risk based audits – Result focused analytics

The focus of this thesis is the highlighting of the role of data analytics in the risk based audit process.

The research questions of our thesis are the following:

Q1: Can data analytics support risk based audit?

Q2: What is the level of adaptation risk based audit approach?

In the following chapters we will examine the existing literature of risk based audit and the engagement of data analytics in that process.

Research Methodology

This chapter refers to the description of the methodology and research design which was used as a tool to enable the data collection and analysis in order to answer the questions of this thesis. More specific a qualitative method was used to get a unique in depth of discovering and understanding concepts theories experience trends and any kind of related to the subject biography. Furthermore, at the beginning of this research, few questionnaires were given as this was the initial preferred research method, data collected were not reliable in content since the level of understanding of risk based auditing seems to be in immature stage. After making some interview with person from companies in various sectors it revealed that while data analytics are part of audit process the concept of risk based audit is not yet fully applied.

That theoretical approach helped to gather insights and understanding of the most relevant literature regarding the current state of the RBA with DA. Also realized how rapidly the usage BDA is developing. Finally new opportunities, risks, future developments and critique of those emerging technologies presented to facilitate further future discussion.

The steps used to cover that qualitative data analysis was the construction of theme, data collection such as articles, surveys academic reports also visual data gathered through video recording or in an unstructured form, preliminary data exam, good planning for managing the whole information extracted from this data. Additionally In-depth interviews were conducted for collecting data from experts that work in the audit and risk company departments.



Chapter 1-Theoretical Part

1.1. What the RISK BASED AUDIT is

Until some decades ago internal Auditors tried to reduce business risk based in the Audit cycle methodology. In more detail they conducted excessive content tests focusing in the deficiencies of the controls and in cases of no compliance with company's policies and procedures. They used to make the Audit plan focusing on the controls in business processes and even audit planning, testing, and reporting were based on these controls. That is the traditional audit approach which basically was based on a cyclical process - steps of: identifying control objectives, assessing control design and testing just a small sample of the population to evaluate the effectiveness of the operations. Additionally the traditional way encompasses the auditor to rely on the company's internal assessment of risks while in the risk based Audit approach the auditors perform risk assessments in a more holistic way as they can understand the business ,completion ,market trends products and also the related risks.

However, the traditional method have become absolute through its difficulty to understand how to examine which risks are important that may influence company's goals achievement and it's difficulty detecting new or current risks since the assessed controls were designed for managing risks that may no longer exist or have changed.

Writing in the European Journal of Accounting Auditing and Finance Research, Dr. Vahit Ferhan Benli and Duygu Celayir summed up the idea of a risk-based internal audit: "RBIA is an audit approach on the basis of determining the risk profiles of the businesses, shaping the audit progress according to the risk profile of the business and allocating the audit resources according to this profile to improve the efficiency of the audit."

Risk based internal auditing (RBIA) based on the definition of Institute of Internal Auditors, is a methodology that links internal auditing to the company's risk management framework in order to provide reasonable assurance to the board of Directors that the company's risks are effectively monitored, managed, and evaluated always in accordance with company's risk appetite.

The risk based Auditing approach provides clear benefits as it alters Internal Audit function from providing assurance to complying issues to actually understanding key risks and how these risks can have impact to the company. It offers the company /organization an effective process to develop true picture of how different areas inside the company can interact and influence each other.

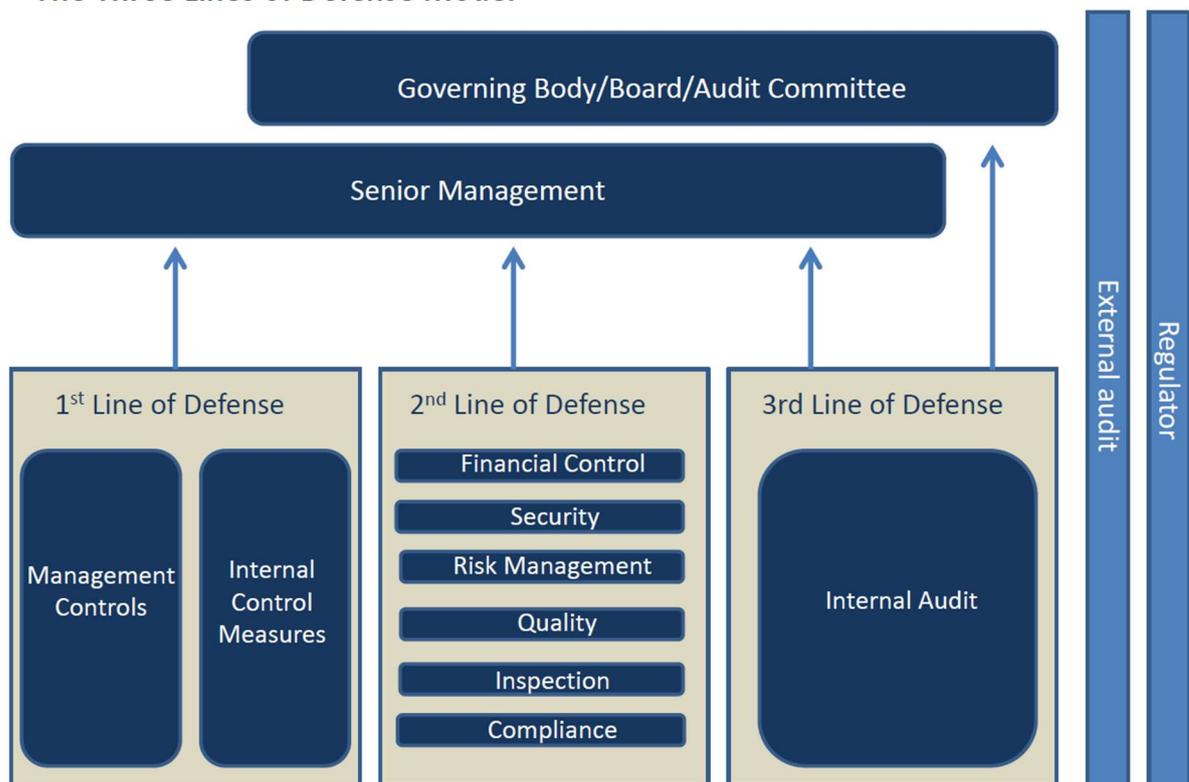
RBIA differs from traditional auditing since it is based on business objectives and risks that are related to the business itself. Through this approach internal auditors undertake new role and new responsibilities –not just assess the controls but also facilitating the needed actions to define how internal controls that can reduce risks at an acceptable level which it is what we call the risk appetite of the company.



RBIA has plays a crucial role in the Corporate Governance by assuring the effectiveness of risk management framework. Internal audit function is responsible for providing assurance to the audit committee and to the management on the effectiveness of internal governance and risk management. It is also responsible for improving existing processes and controls by using its advisory role assisting management in implementing recommended improvements. A way to implement and design an efficient risk management system, for mitigating risks and also effective internal controls, is through a method –framework as the Committee of Sponsoring Organizations of the Treadway Commission’s (“COSO”) *Internal Control – Integrated Framework* suggests.

In order for everyone in a company to understand its role in identifying risks and evaluates controls, clear responsibilities must be carefully assigned. The three lines of defense model outline how specific duties related to risks and controls can be assigned and coordinated within the company.

The Three Lines of Defense Model



Source *The Institute of Internal Auditors*

The three lines of defense Model, even known as the three lines of assurance model, provides a framework with a structure and effective way, through the oversight of management and the board of directors, that management of risk and controls are operating as intended. When these three lines have been structured properly and there are no gaps in coverage, the organization increases the possibility of being effectively



managed. The third line of defense is the internal audit function as the independent and objective assurance provider. The goal of internal audit is to assure the audit committee and the management on the effectiveness of corporate governance through risk management and internal controls functioning as intended. This assurance covers all stages of an organization's risk management framework from hazard identification, risk analysis and response to communication of risk related information, and all categories of company's objectives: operational, financial, strategic and compliance. The third line also evaluates the effectiveness of the first and second lines of defense.

In the following list are depicted main responsibilities of the third line of defense:

1. Providing objective assurance and ensuring independence
2. Examine the efficiency and effectiveness of operations and
3. Verify safeguarding organization's assets
4. Provide reliability and integrity of reporting processes and compliance with related laws, regulations, policies and procedures.
5. Acting in accordance with recognized international practicing auditing standards.
6. Having an active and effective reporting line to the governing body
7. Working more from an idea of two-way traffic reconciling Auditing and consulting role.
8. Make recommendations on how to improve internal controls and governance processes

With three lines of defend Model the organization can design an intergraded risk management system based in clearly defined roles and responsibilities with internal audit functioning in a risk based approach creating a holistic governance, risk and compliance management system (GRC system) for the assessing organization's risk and led toward achieving goals.

1.2 .What is Data Analytics

Data is the new oil ...

The quote goes back to 2006, said the Mathematician Clive Humby, but the quote become more popular after the Economist published a 2017 report with the title "The world's most valuable resource is no longer oil, but data".

Data analytics consist on gathering analyzing and presenting a set of data in order to extract, transform, load, modeling conclusions from these data for decision making purposes. In more simple words data analytics is the managing overwhelming amounts of Data to increase efficiency and improve business performance by discovering patterns in data. Data analytics is a science of examining raw data to draw conclusions about that information and it draws knowledge from several other fields such as information technology, statistics mathematics and business. Through data analysis process large amounts of data via applying algorithmic or mechanical rules the user

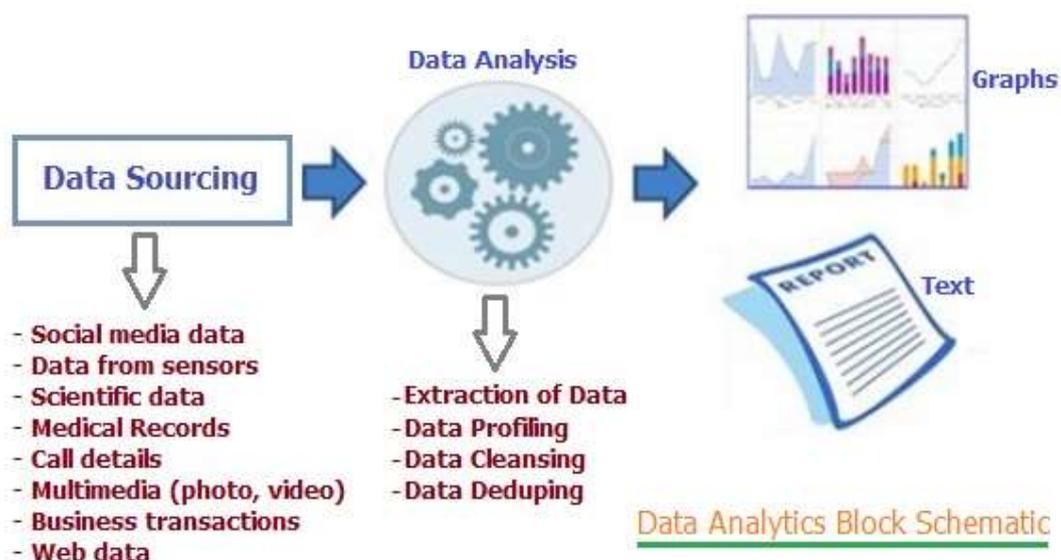


extract insights and conclusions. The analyzed data can be of either historical records or new information and the source can be either from one or more systems. Moreover these systems can be internal or external.

Innovation and Technology have given a tremendous advantage to companies and organizations by serving those advantages and opportunities for growth, increased performance and also to improve their management and operations.

Data Analytics is used in a lot of companies and organizations both public and private sector and can help them increase revenues, improve operational efficiency, optimize processes and customer service experiences, responding more fast to adapt market trends and create a competitive advantage over rivals -- all with the ultimate goal of increasing business performance. Data Analytics, sometimes abbreviated to "Analytics," has become important for every kind of business small or big. The use of Data Analytics has increasingly evolved and broadened over time, providing many benefits.

The figure-1 depicts the data analytics processes



Source:<https://www.rfwireless-world.com/Terminology/Advantages-and-Disadvantages-of-Data-Analytics.html>

Data analytics can help companies in cost running reduction which consequently increases profits. With Data analytics usage the time needed to come to strategy-defining decisions is cutting down significantly as conclusions that are mined from the available data are presented in a more clear and accessible way, helping business leaders to step forward more quick. Data analytics helps companies to identify customer's needs, habits and trends and presume upon data information to more accurately define customer profiles for develop, allowing for better fulfillment of customer expectations and experience.



Organizations that are basically forward-thinkers despite the benefits of data analytics should move beyond traditional analytics, and into advanced analytics.

There are four data techniques and methods that are essential of modern business success to value the best out of data as long this data it's been formatted for reporting, and these are Prescriptive, Predictive, Diagnostic and Descriptive.

The Four Types *of* Data Analytics



Source <https://exagoinc.com/blog/the-four-types-of-data-analytics>

Descriptive DA are the analytics that answer the question of what happened. The most used by auditors type of analytics and is basically characterized by descriptive statistics, Key Performance Indicators (KPIs), dashboards, or other types of visualizations.

Predictive DA are defined as the next step taken with the knowledge gathered from descriptive analytics and answers the question of what could happen and includes probability and predictive models, statistical analysis and forecasts scoring models.

Prescriptive DA are defined the analytics are beyond descriptive and predictive and recommend one or more solutions and present the likely outcome of each solution when followed. Predictive analytics can improve risk identification, audit scoping, controls testing and management of risks.



Diagnostic analytics are the analytics that search for answers why something happened in the past. They help in the root cause analysis providing insights of why something happened. They give the ability to drill down in the data to find dependencies and identify patterns.

1.3 Data analytics in Auditing

1.3.1 Stages of Risk based Audit

Internal audit is experiencing an evolutionary transition due Technology's revolution with strong challenges and new opportunities. The role of auditors is becoming mandatory within an organization for providing guidance on various areas from:

- Effectiveness and efficiency of operations.
- Reliability of financial and operational reports
- Safeguarding of assets, to
- Compliance with laws, regulations, and contracts

The future of auditing changes and so is the auditor's profession. The role of auditors is becoming more demanding through the constant changes to regulation and technological environment. For considering the Internal Audit department valuable function within the organization it should firstly understand the organization's key risks, while also delivering insights into business, identify emerging risks and provide consulting services to management for improving the business processes for gaining a competitive advantage. New techniques for continuous auditing and monitoring are available with the development of technology.

To follow a risk-based auditing design the internal auditors must work closely with the organization's senior leadership and the board, to obtain a clear view of what the top management is expecting from auditing department and in what degree the related actions performed from both sides can reduce and mitigate the organization's risks. Also an internal Audit department's activity is to provide assurance about risk management processes, management of key risks and reporting of these risks. The RBIA methodology helps internal auditors to contribute to the improvement of the risk management. Internal audit can help improve risk management and in general corporate governance by reporting company's risk maturity evaluation report. Maturity report It may also conduct consulting assignments through its advisory role to help management in the direction of improving the organization's risk maturity. Auditors within the risk based audit does not rely only on inherent risk, the risk of the control or in the detection risk but they also rely on the knowledge of the company's operations as through this approach their assessment can assist the company in the cost benefit analysis regarding the known risks. A risk-based approach to internal audit is crucial to ensuring cohesiveness and inside the organization and between all department and internal audit department. Additionally continuous auditing is important in the risk based audit process to determine whether established controls are comply with related laws and regulations, designed to provide assurance for detection and /or prevention for any



noncompliance activity and finally all necessary corrective actions have been made to manage noncompliance issues. Conducting a quality audit is definitely essential to adopt a risk based approach.

Risk Based auditing framework consists:

1. **Assessing Organizational risk maturity** –in this stage audit planning purposes are defined based on the accepted risk maturity levels of the organization which is the risk appetite. In cooperation with management and the board strategic decision about risk acceptance, risk assessments and risk monitoring are defined.
2. **Audit planning** –Audit department conduct an audit plan which consists what would be the areas of risk that Board is expecting to receive assurance of. The audit plan apart from risk based audit plan and the monitoring plan. An audit plan is formed for a specific period-mostly annually – where to, for all risk areas the board is expecting objective assurance are under assessment monitoring reporting and definitely weightily prioritized. Here, the risk management processes, the management of key risks and the recording and reporting of risks (audit results) are included. The execution of this plan focuses to mitigate risks and/or resolve risks. Periodic assessment of the overall process for design effectiveness and operation effectiveness while also identify capabilities needed for improving these processes so to meet the organizations objectives.
3. **Audit assignments** – in this stage risk-based assignments are executed. The executions of the audit plan focuses on mitigating risks and/or resolve risks. Periodic assessment of the overall processes for design effectiveness and operation effectiveness are included while also identifying capabilities needed for improving these processes so to meet the organizations objectives and to provide assurance of the risk management framework compliance The audit report and assurances is required to be in correlation to the risks.

1.3.2 Advantages -Benefits of RBIA

According to the definition made by International Institute of Internal Auditors (IIA); traditional internal audit is "an independent evaluation function which examines the activities created for serving the business within the business and reports the inspection results" (www.theiia.org). In RBIA the approach is totally different. The auditors not only began to consider the risks from the business perspective and how these risk may prevent the organization from achieving its business objectives but also to predict events that may occur in the future with impact on organization's business.

While the traditional internal audit basically focuses on activities happened in the past looking for operation anomalies, instead, RBIA concentration is to prevent the occurrence of incorrect operations through a well defines risk assessment matrix. The RBIA methodology drives the internal audit department's job to become more focused on the business needs. The purpose of the RBIA to

- To provide reasonable assurance to all relevant sides, primarily the top management, that risk are assessed



- Help the business reach to its goals and objectives by being business partner through assessing, mitigating and overall decrease the related risks.
- To allocate the audit resources to the areas where the probability of occurrence and impact of risk together are highest.

The DBIA approach is based on principles of risk management throughout the audit process. This can be followed both in the strategic annual planning process as part of the macro strategic level degree or as an audit process itself as a macro level degree always aim to identify the risk and how to mitigate in the risk's appetite level.

Contributions of risk-based internal audit to the business can provide:

Strategic benefits:

- Management, auditors and board create a mutual understanding about the risk of the organization agree in the audit plan based on risk appetite and are align if changes in the conditions might happen.
- It provides a better knowledge and management of the overall risks (risk Universe)

Performance:

- through consulting engagement auditors can help the organization to deal with risk from the view of business opportunity and on the other hand reduces the negative risks.
- provide ideas about process design that may help into direction of improving controls effectiveness performance.

Aligning the Resources:

- Audit recourse are limitless, with RBIA the use of these resources becomes more efficiently which results in cost saving.
- It also provides alignment and cooperation with sources from other departments.

Managing the Unexpected:

- It creates the ability for the organization to become ready to sudden direction changes in the organizations' strategy.
- It helps auditors to understand what the upcoming business risks would be for business and their actual effect.

1.3.3 Application of data analytics in stages of auditing process

Below are some of the actions an Internal Auditor can perform using a Data analytics Software as a critical tool for achieving these steps effectively, based on applicable audit standards.

The procedures listed below are taken from the applicable audit standards and their appendices. The typical areas where internal auditors use data analytics are:



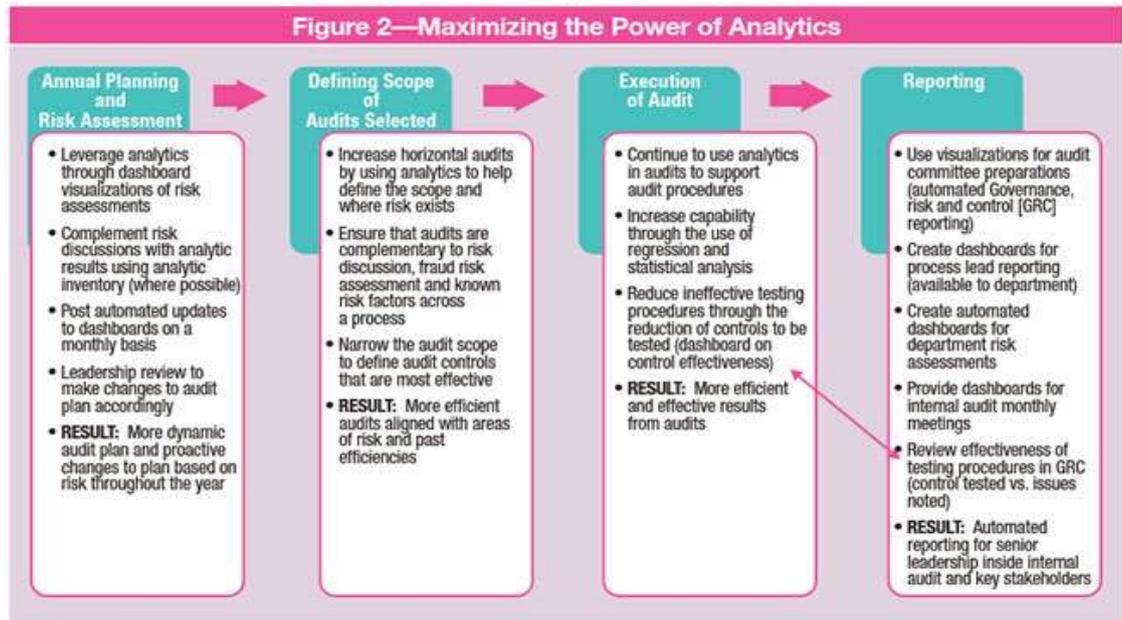
- Accounts Payable – incorrect disbursements, missed credits, offers and contracts, dormant accounts, gift to customers or partners ,offers-tenders
- Accounts Receivable – collections and write-offs, precise product pricing, contract compliance, and proper invoicing, cash receipts validation.
- Payroll – accurate and authorized payments, accurate and authorized payments, overtimes, non-existing or fictitious employees in the payroll schemes,
- Master files – customers, employees,
- Travel and Entertainment- Review the propriety of large and unusual expenses (requires data extraction)
- Data Quality – consistent, validity, complete
- Inventory -counts-test the through techniques the balances
- Sales -discounts to customers or partners
- Contacts with vendors-term and adherence
- Procedures –identify unseal activities
- Compliance – , SOX, Tax, regulated transactions
- Use computer-assisted audit techniques CAATs
- General Ledger – journal entries, closing activities, adjustments

Data analytics can help also be during the fieldwork stages. This can happen by modeling continuous controls or detect fraud indicators through activities necessary for implementation of an internal audit project and more specifically the development of an internal audit program.

The impact of following the technology's evolution from traditional auditing approach to analytics enable auditing and leveraging data analytics end to end in the audit process, can be seen in figure 2

isaca<https://www.isaca.org/Journal/archives/2017/Volume2>





Source: Accenture. Reprinted with permission.

The above figure was performed as a case study where the Accenture Company is illustrating how the use of data analytics beginning from the stage of implementing analytic tools to every PC can provide the best of value to audit process if only companies move to complete transformation of the audit process approach.

1.3.4 Methods-Tools and types of DATA ANALYTICS in Risk Based Audit

A number of tools are available in the market. Organizations choose those tools that can be bridged to existing systems based also to business requirements. Data Analytics can help through automation of the auditing reporting. Creating automated dashboards for processes, risk assessments and testing may help the auditor's conclusions and at the same time improve the audit process. Furthermore, reporting techniques can assist auditors' reports to senior management and shareholders.

Basic Desk top: Microsoft Excel, Microsoft Access

Integrated query tools :PeopleSoft,SAP,Oracle GRC,Approva ,JDE,Ovesite

Report writers: Cognos,Business Objects,

Server based: SQL

Specialized auditing software :ACL, IDEA, Arbutus. SAS

Specialized DA Visualization software The right Data Analytic software handles large data sets efficiently includes statistical and analytical features and also it can be integrate with big data:Tableau, Qlikview



Each tool should be assessed by many requirements, including: Ease of use, training, and available support, available upgrades, book of procedures for common business processes Cost, including maintenance support or annual costs and Alignment and integration with existing systems.

1.3.5 Benefits of Data analytics in RBIA

As defined by Stewart (2015), “Audit Data Analytics (ADA) is the analysis of data underlying financial statements, together with related financial or non-financial information, for the purpose of identifying potential misstatements or risks of material misstatement.” Deloitte’s Audit of the Future Survey (2016) shows that, among the 250 financial statement preparers, audit committee members, and financial statement users who participated in the survey, more than 70% agree that auditors should more extensively use advanced data analytic technologies and consider information beyond traditional financial statements.

Benefits:

- ✓ Very fast to run and produce results
- ✓ Easy to comply with the provisions of Section 404 of the SarbanesOxleyAct
- ✓ Close control gaps before fraud escalation
- ✓ Audit paths can easily identifies to see steps taken
- ✓ Scripting capabilities to capture test logic
- ✓ Quantifies the impact of fraud
- ✓ Cost-effective
- ✓ Via software continues monitoring can be automated
- ✓ Enables focusing on risk and probability of fraud
- ✓ Direct point to critical evidence
- ✓ Support for regulatory compliance
- ✓ Extract Logs for review and evidence
- ✓ Scalability
- ✓ Build/customize on what you need
- ✓ Provide External Audit reliance
- ✓ Validates effectiveness of internal controls
- ✓ Identifies any violation on segregation of duties
- ✓ Identifies process deficiencies/anomalies
- ✓ Tests 100% of transaction population as opposed to sampling
- ✓ Accesses data across disparate systems and from different geographies
- ✓ Quantifies exposure of business risk
- ✓ Helps to access auditable history and compliance tests and follow-up activities
- ✓ Enables better allocation of audit resources
- ✓ Time consuming
- ✓ Create Pre-defined scenarios to perform same perpetual tests
- ✓ Validates effectiveness of internal controls



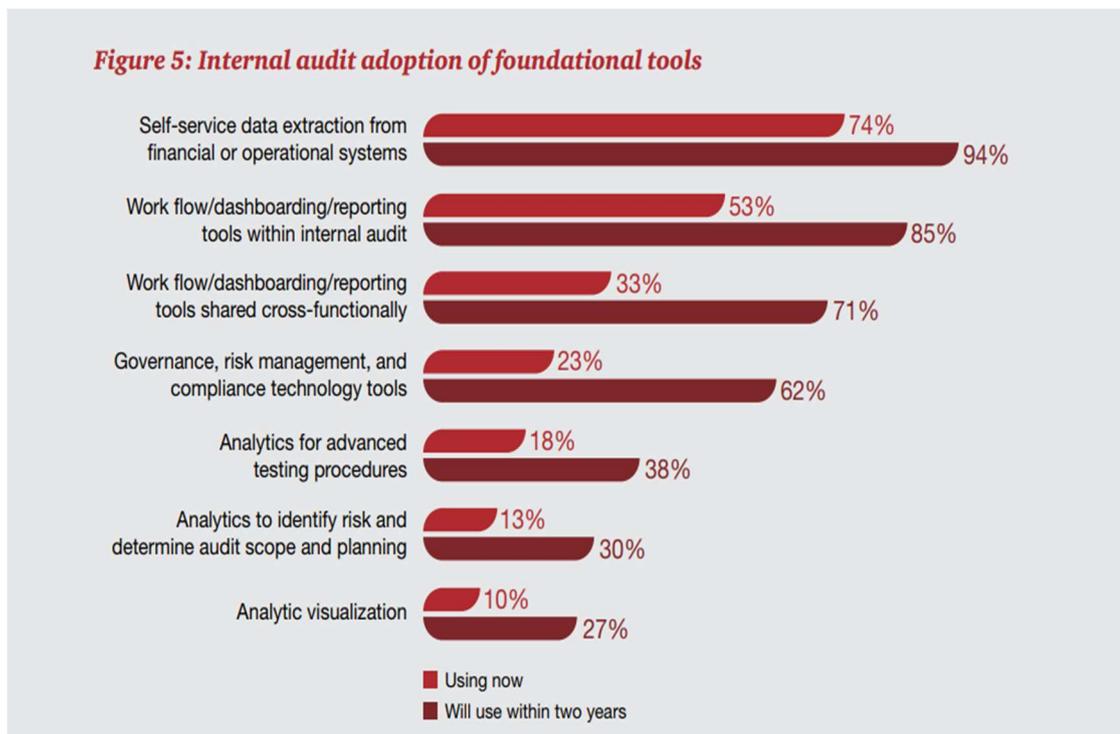
- ✓ Identifies transactional errors
- ✓ Help create a technology-driven process
- ✓ Tests 100% of transactions as opposed to sampling
- ✓ Provides prompt notification of control anomalies
- ✓ Acts as a deterrent
- ✓ Independent of people and systems being audited
- ✓ unlimited file sizes can be audited

Chapter 2-Surveys

In this chapter we use data from global survey as a case study to find out how Data Analytics can benefit Auditors.

2.1 Survey of Price water coopers consulting company

In PwC's 2018 State of the Internal Audit Profession report survey, discusses how internal audit functions soon will be implementing transformational new technologies. The survey of more than 2,500 board members, senior executives, and audit professionals in 92 countries revealed the adoption state of internal audit foundational tools as demonstrated below:



The Power of Data Analytics <https://www.pwc.com/us/en/services/risk-assurance/library/internal-audit-transformation-study.html>



In the study PwC points out risk assessment through data analytics can help in high quality audit providing serious business insights. More specifically when steps in audit cycle become automated with leveraging data into auditing processes auditors can find quick anomalies or errors detecting and fraud prediction which enhances the audit quality which enhances risk assessment. Furthermore business outcomes are extracted and predictions about future capabilities may conduct. The appropriate use of technology significantly benefits the auditor's .Since their professor has been loaded with extra roles, data analytics helps them reducing compliance cost improve auditing efficiency and focus and have multiples roles of the modern internal auditor by reducing the cost of compliance and allowing focusing in risk assessment. Technology in the audit is the enabler to review if processes are operate effectively and also is the catalyst that will help auditors shift their focus of the audit process from a retrospective view to one that which is the prospective.

Data Analytics in the risk based audit process can help Auditors to be better informed for organizations objectives that can shift the relationship between the auditor and the organization; the auditor is no longer considered as the inspector who comes one a year to make judgments but know is considered a value creator to the organization. Auditors are more able to understand real business the operations, and be genuinely interested in the ongoing success.

Even more companies are deploying data analytics and data reporting tools to entire audit life cycle. This can increase risk assessment quality and also enhance productivity and border risk coverage. Another strong advantage is that analytics help identify risks that may have been missed using traditional audit methodologies. Testing the whole population can be done within seconds and time and recourses can be allocated to other engagements. Implementing a robust data analytics platform will greatly assist in cross departmental functions delivering more thorough, strategic and risk-based insights.

2.2 Data analytics- maturity

Is Data analytics is used in internal audit as part of audit process?

According to report from consulting firm Protiviti, while the acceleration of technology is extremely high the use of analytics in auditing is still in its early stages. The report shows that the maturity of data analytics use during audit process remains relatively low.

The report shows that firms are not ready enough to fully adopt data analytics in the whole audit process. The 76% of organizations in Asia Pacific and Europe declare that they have employ data analytics in their auditing engagements while 59% and 58% respectively believe that data are not available to be used the fundamental analysis method. More, the US 63% of entities use data analytics in their auditing process, but 28% said the data available was of high quality. From the research it can be derived that use of analytics is used more a tool for field work and not a part of a risk based audit methodology.





Source <https://blog.protiviti.com/2018/03/12/analytics-auditing-game-changer-new-protiviti-survey-released/>

Data audit maturity is important for Internal Audit function which represents in what degree the Audit department has designed and deployed analytics in the whole audit life cycle using the risk based approach- focusing on business risks. Advanced technology solutions, including analytics and even more artificial intelligence, machine learning can benefit in effectiveness and efficiency of audit engagements. Internal auditors need to have growth mindset and develop capabilities such as knowledge and expertise to advance use of technology for becoming the next digital auditors. Only then they would fulfill the function's core mission to help organization on achieving its objectives and at the same time address emerging business risks.

Chapter 3-Literature Review

This chapter focuses on the development of BDA in the field of audit, as portrayed in the literature.

The development of BDA has its origins in the digitization of accounting records and management procedures from physical files into enterprise resource planning (ERP) systems (Davenport, 1998). Additionally, advancements in computing, telecommunication, data storage and network technologies have served to enable processing, transfer and storage of those enormous data packages (Vasarhelyi, Kogan & Tuttle, 2015). Moreover, the emergence of social media like Facebook, Twitter etc., is raising the public awareness of BD which is omnipresent in people's daily lives (Vasarhelyi, Kogan & Tuttle, 2015). Companies around the world are recognizing the importance of BDA, and are increasingly using BDA tools to process and collect vast amounts of data to be able analyze their competitive environment ((Vasarhelyi, Kogan & Tuttle, 2015; Griffin & Wright, 2015). The implications for businesses are that BDA is influencing companies' decision-making process regarding business strategy and management control systems, with the expectance of increased business performance and profitability due to the use of BDA (Griffin & Wright, 2015; Warren, Kogan & Tuttle, 2015). The literature provides practical implications on how BDA can improve the efficiency and effectiveness of financial statement audits (Cao, Chychyla and Stewart 2015; Warren, Moffitt & Byrnes, 2015). Moreover, descriptions of limitations and risks regarding behavioural implications of BDA in audit (Brown-Libur, Issa & Lombardi, 2015) and reliability of BD (Appelbaum, 2016) can be found. Furthermore,



authors like Vasarhelyi, Kogan & Tuttle (2015) are strongly advocating the need for new accounting and auditing standards, to cope with the risks associated with the rise of BDA in companies and audit firms.

Auditors need to analyze economic declaration records and widespread information associated to monetary statements to decorate decision-makers' confidence. A swiftly growing quantity of company techniques are accounting for the use of IT to grant sufficient applicable information and hold sensible compliance with related rules and laws (Rikhardsson& Dull, 2016). Janvrin and Watson (2017) contend that accountants have a tendency to enlarge their knowledge to new data. For example, in the 1990s, many practicing accountants prolonged their regular auditing offerings to assurance services, symbolizing present day techniques of improving sources of data for monetary accounting (Janvrin& Watson, 2017). Data-based decision making has been regarded a device for attaining improved productiveness and profitability, but this grasp has now not been developed besides trip (Alles, 2015; Waller &Faucett, 2013).

Analysis of the relevant literature shows that the necessity of innovation in the audit profession is supported widely in the academic research and closely monitored by the regulators (Chan & Vasarhelyi, 2011; ACCA, 2016; IAASB, 2016). Regulatory bodies are aware that a new generation of auditors is needed to cope with the increasing amount and complexity of data, and have raised issues in regard to information overload (ACCA, 2016). Furthermore, the challenges of recruiting and retaining the right professionals are discussed and the increased demand from clients to create more value for them is illustrated (ACCA, 2016; KPMG, 2017). Authors like Moroney (2016) are analyzing the efficiency of new regulations concerning mandatory partner rotations and stricter audit inspections in increasing audit quality. Furthermore, regulatory bodies like the IAASB (International Auditing and Assurance Standards Board) are exploring and monitoring the increased role of DA (Data Analytics) in the audit profession, by discussing the benefits and limitations related to it. However, the IAASB is currently hesitant of prematurely commence standard setting activities and enact standards which are too rigid to accommodate rapid technological changes out of fear that it might restrict innovation (IAASB, 2016).

Auditing is about attesting to the integrity of economic statements prepared with the aid of managers. Oversight in this simple declaration can also raise doubt about the accounting profession's skills and thus, should reduce the degree of public self-belief in the career (Edelman & Nicholson, 2011; see additionally Al-Adeem, 2015; Bayou &Reinstein, 2001; Belkaoui, 2017b; Berton, 1985; Previts, 1992). Using large data, new information can be extracted online, sieved, and generated, growing new know-how (Kim, 2000). With enterprise operations expanding globally, the role of the audit occupation has grow to be greater prominent, and the increased quantity of captured statistics has resulted in large transaction volumes. The real-time capture of transaction data, which includes location, time, amount, and medium, can ease the technique of gathering noticeable evidence for development of an audit opinion. Littlely (2012) posits that phase of huge data's possible advantages is presenting auditors with inner and external tools to higher forecast estimates, concerns, fraud, and other audit things (Alles, 2015). Marr (2015) suggests that sure large-scale corporations have witnessed greater increase in current instances via using huge data to enhance their enterprise



processes. A distinguished instance is Amazon's use of large statistics analytics to fortify their retail trip (Marr, 2015). Walmart also applies large information analytics to identify modern-day tendencies in social media to screen buying habits amongst shoppers of alternative merchandise (Cao, Chychyla, & Stewart, 2015; Marr, 2015), thereby monitoring their competitors' advances in actual time (Marr, 2015)

Corporations, for-profit or non-profit organizations, and medium-scale businesses that integrate, secure, and create fee with massive records are probable to outperform their counterparts (Deloitte, 2018; Ghobakhloo, Morteza, Sabouri, Hong, & Zulkifli, 2011). Big facts is revolutionizing numerous fields at an increasing rate and it is solely a count of time before the auditing occupation adopts similar analytical strategies (Cao, Chychyla, & Stewart, 2015). Big statistics analytics can increase accountants' data capabilities and understanding thru their prior familiarity with structured datasets (Richins, Stapleton, Stratopoulos, & Wong, 2017). Thus, it is quintessential for economic accountants, particularly auditors, to take a dominant function in the route of strategic choice making. Big information enables auditors to analyze processes that generate data, together with full populace testing, which provides price to the auditing and accounting career and consequently, to their customers (Gepp, Linnenluecke, O'Neill, & Smith, 2018). Consequently, to correctly exploit the inexhaustible opportunities and value of large data, professionals need to enhance an appreciation of commercial enterprise strategy fundamentals and be capable to draw inferences from swimming pools of on hand data.

Nevertheless, these outcomes mask the truth that many companies are still in the initiation phase of enforcing CA (Vasarhelyi et al. 2012) not to mention the perception of how to efficiently put in force and leverage CA stays restricted (PwC 2014; Hardy 2014; KPMG 2012). PwC (2014) finds that even among the most proactive and strategic oriented internal audit departments, only fifty one percentage effectively use audit technologies in the execution of audit undertaking which include information analytics, while amongst companies with traditional interior audit function, the use was once as low as 29 percent. The consequences from KPMG (2010) verify that there is a big hole between audit departments who choose to put into effect CA – only 23 percent do no longer take into consideration to put into effect CA – and those seven percent who already have partly carried out some varieties of CA.

Chapter 4 -EMPIRICAL RESEARCH PART

1. Methodology results (Greece)

➤ About risk based audit

It seems that it's a common understanding that risk based auditing is more beneficial than that of the traditional audit approach and for sure technology can be very advantageous. But what do the surveys say about the maturity of this useful approach? How much penetrated is the risk based auditing into the organizations audit departments? Is the adoption rate slow or not?



The application of Business Risk Audit approach in Greece is not well documented and researched. Apart from banking and insurance sectors, the response of the private and public sectors audit to this approach is not clear given the available literature and studies of companies' practices. In fact when at the beginning of this research, few questionnaires were given as this was the initial preferred research method, data collected were not reliable in content since the level of understanding of risk based auditing seems to be in infant stage. The questionnaires were distributed in the month of December 2018. Responses were received from 21 auditors from both public and private sector of 15 firms out of the target population of 60 auditors of 30 firms. This represented 35% of the targeted population. The respondents were required to give responses regarding the audit methodology is being used in their own firm. The findings brought out that the approach of risk based audit is not practiced. Since the basic idea of risk based audit is not yet been used in practices there was no point in questioning the application of analytics in the entire audit's circle of life, even more embracing technologies such as data mining and methods of depiction of data (data visualization methods). However after discussing with some responders when isolated the use of analytics method from risk based concept, auditors easily advocate technology helps their work. After making some interview with person from companies in various sectors it revealed that while data analytics are part of audit process the concept of risk based audit is still in early adaption stage. Not to mention that in some companies we experience a mixed risk-audit function model which declares functional overlapping issues. Interviewer 1 from a public sector company said "through experience we can identify the areas with high risks we develop the risk profile and based on this profile we develop the audit plan. I believe that not all people involved in internal audit department understand the concept of risk but I give them direction.» He also believes that highly risk areas are those where employees deal with cash and that is one indicator to rank related controls with big priority. But what about electronic payments or orders.. In banking and insurance sector from where come the interviews 2 the picture seem to be totally different. Mandates from regulators have already seem to force for adopting the risk based approach while at the same time the supervisory body has the knowledge and the monitoring mechanism to suggest improvements.

The insights delivered from this research show that while overseas the risk based concept has been adopted from audit departments, in Greece there is a long way that we have to cover. Starting point is changing the auditors' perception about their job. The word "risk" should be integral part of audit's department job. Risk assessment is at the core of every audit. Controls exist because risk exists. The goals of identifying, assessing, and responding to risks of material misstatement ("risks") are to acquire a clear knowledge of the company and its controls. Auditors are expected to provide reasonable assurance. Consequently they don't try to minimize risk but help company to take sufficient risk to make more money. However, after the 2006 Risk Assessment



Standards (Statements on Auditing Standards Nos. 104—111) provided a new guide map for audit execution some auditors still have difficulty with applying these standards. Additionally, the auditor should perform risk based audit approach through substantive procedures taking in association responding to specific risk.

The use of data Analytics is in the same direction as the report of the Protivity shows from researcher in the report mentioned above. Companies mainly use analytics as tools for work field and not from scratch to deliver high-quality audits. From deeper analysis of data company can reveal insights about its operations, its risks, its financial reporting and controls. Specifically, auditors don't use data to enable a deeper and more robust understanding of the business and its risks. Of course analytics help but that doesn't mean that can tell you what will happen in the future or how to mitigate the risks. The whole risk based approach needs auditors to understand the real business of the organization. The focus of analytics is to provide probabilities that may create potential outcomes.

➤ **Audit and risk management**

Risk management and internal audit departments need to work together and for providing independent assurance about risk management department is better to be a concrete function with separate senior manager. Managing the risk helps provide the company with a safe and secure environment for the assets, employees and customer and ensures stability of business operations. It can also help in saving time recourses, revenues, people and assets. In recent years, managing risks, in an organization, has become acknowledged as an integral part of proper corporate governance practice. The interviewer 2 was a CRO in insurance company before his current role in banking sector. He even knows the role of audit function. We see how different sector have different way to do same work.

.Technology with Data Analytics application in the whole audit process cycle is utilized from all interviewers companies. The foundation for risk-based internal audit process which is basically to understand the risks associated with key business operations in accordance with established controls designed to mitigate either the likelihood of the risk occurring or its impact if it is not yet adopted. Through these interviews we realize that the whole organization environment is not designed based on risk aware approach. But it seems that gradually companies will be reinforced into direction of implementing the risk based auditing approach. The best value enterprises can get from audits is to help them define areas with risks and determine the appropriate improvements.



2. Audit in new business Environment

2.1 Digital Transformation/Disruption

We have already entered into new technological era where lot of professions and businesses are being transformed in a rapid pace. This new digital era is affecting organizations and demands changes through adoption of Technology for performance improvement in that level where new business opportunities may occur.

“Digital transformation marks a radical rethinking of how an organization uses technology, people and processes to fundamentally change business performance, says George Westerman, MIT principal research scientist and author of *Leading Digital: Turning Technology Into Business Transformation*.

Digital transformation, which Westerman says should be led by the CEO, requires cross-departmental collaboration in pairing business-focused philosophies with rapid application development models.”

The technological developments are the most pervasive driver pressuring for constant technology evolution. This evolution does not leave Auditing out but forces into a certain transformation.

2.2 New role for Auditors

The future of the Auditor is changing because business is changing. Technology disruption brings the next generation audit approach. We cannot have the same traditional approach to address new emerging business risk. The 3rd line of defense must transform both functionally and mindfully. The design and capabilities of internal audit function has to become more agile and adopt the benefits of digital transformation. “The vast majority of species from [the Jurassic] period are long extinct, because they were unable to adapt. The same could ultimately be true of internal audit professionals who fail to evolve and adapt to changing practices and the environment around them.” Richard Chambers, *Internal Auditor Magazin*.

This transformation is critical and inevitable but it is not easy. Advanced technology solutions, such as agile auditing, artificial intelligence (AI), machine learning (ML), robotic process automation (RPA) and continuous monitoring, and many others, are the components of becoming the tomorrow’s digital audit function.

But the very first step, in our view, is establishing the mindset and commitment to: Transform your internal audit group’s governance, methods and use technology capabilities to address emerging business risks. The main idea is the auditors should help in assessing risks and risk management practices. Risk and risk management with



an eye toward the future is a recurring issue. As Chris Stansbury, CFO of Arrow Electronics, says, “Clients are no longer looking for just a rearview mirror view, but a view through the windshield on where we are going and how to navigate the landscape of risks, opportunities, changing regulations, competition and globalization. The enterprising landscape will continue to develop and take a preventive approach in risk management. Auditors also have to provide confirmation of comply with related rules and regulations while provides insights and advises from improvement. Recognizing this change and the need of managing this change quickly, the auditors aim to better understand how they can use the developments of information technology (IT advances) in order to improve the quality of controls, extend the control area (audit coverage) in enterprising regions with risks, decrease the time of control execution and confirm its cost benefit effectiveness.

Conclusions

Audit departments are turning to risk-based approach. This approach helps auditors to understand business objectives while identify the risks associated with achieving those objectives, and the controls to address those risks. When organizations want to get more value from Internal Auditors an Enterprise risk management function need to be established .ERM function and internal audit departments need to interact as the 3 lines of Defense model recommends and not working in silos. Also Internal Audit as 3rdline of defense should promote collaboration between Internal Audit and the 1stLine of defense to increase the effectiveness and efficiency of processes so that they can meet stakeholders’ objectives. Coordination, integration, and alignment all 3 safe guarders’ roles cannot be the responsibility of one single function like Internal Audit. The application of Business Risk Audit approach in Greece is not well documented and researched. Apart from banking and insurance sectors, the response of the private and public sectors audit to this approach is not clear given the available literature and studies of companies’ practices.

Internal audit departments need to help business leaders comprehend and avoid business risks. Traditional assurance roles are expanding to encompass gurd fraud risk management and a more forward-looking view that will follow identify and address critical business risks. The Risk based audit approach is gaining foothold. In some industries like banking and insurance or listed companies regulators have impose frameworks which forces the risk based auditing approach. The insights delivered from this research show that while overseas the risk based concept has been adopted from audit departments, in Greece there is a long way that we have to cover. Starting point is changing the auditors’ perception about their job. The word “risk “should be integral part of audit’s department job



The future of audit is audit the future. The new role of auditors should conform to digital transformation disruption which brings to economy, society and business environment tremendous changes. Traditional business models due to increasing concentration of economic power and wealth in a small amount of large corporations' hands of very large corporations are under digital transformation. The future audit demands include incorporation of data analytics and further technology capabilities into audit engagements to provide deep insights, enhanced risk monitoring, and process effectiveness. Future audit efforts must be more proactive. Auditors are already able to filter and analyze thousands of transactions to identify exceptions or anomalies, making it easier to focus on areas with higher risk. While traditional audit processes have consisted of completing forms and checklist tasks, the global economy requires the auditors' profession to be transformed and revitalized into a more flexible, agile and responsive to business risks form.

The future of audit

The future of the audit is audit the future. The new role of auditors should conform to digital transformation disruption which brings to economy, society and business environment tremendous changes. Traditional business models due to increasing concentration of economic power and wealth in a small amount of large corporations' hands of very large corporations are under digital transformation. The future audit demands include incorporation of data analytics and further technology capabilities into audit engagements to provide deep insights, enhanced risk monitoring, and process effectiveness. Future audit efforts must be more proactive. Auditors are already able to filter and analyze thousands of transactions to identify exceptions or anomalies, making it easier to focus on areas with higher risk. While traditional audit processes have consisted of completing forms and checklist tasks, the global economy few years from today will require a profession that is flexible, agile and responsive to business risks of. Digital Transformation will disrupt the entire way of working and thinking. This huge transformation requires full change of corporate body parts into new ways of functioning. This transformation is happening because of the rise of new companies using new technologies and processes. The new role of auditors is to be the «right hand" to provide assurance in continuously improving business performance by focusing on the future and have critical thinking and not thinking critically.

References

<https://searchdatamanagement.techtarget.com/definition/data-analytics>

<https://resources.infosecinstitute.com/best-practices-for-conducting-a-risk-based->



<https://resources.infosecinstitute.com/best-practices-for-conducting-a-risk-based-internal-audit/#gref>

<https://www.misti.co.uk/internal-audit-insights/how-internal-audit-can-benefit-from-the-three-lines-of-defence-model>

https://en.wikipedia.org/wiki/Governance,_risk_management,_and_compliance

<https://www.accountingedu.org/internal-auditing.html>

<https://study.sagepub.com/sites/default/files/Onwuegbuzie%20%26%20Frels.pdf>

<https://www2.deloitte.com/us/en/pages/risk/articles/internal-audit-analytics-insights-driven-auditing.html>

<https://blog.protiviti.com/2018/03/12/analytics-auditing-game-changer-new-protiviti-survey-released/>

Alles et al. 2004(b): Alles Michael; Kogan, Alexander and Vasarhelyi, Miklos. 2004. Realtime Reporting and Assurance: Has their time come?, ICFAI Reader, January 2004.

Alles, M.G., A. Kogan, and M.A. Vasarhelyi. "Putting Continuous Auditing Theory into Practice: Lessons from Two Pilot Implementations." *Journal of Information Systems* 22(2) (2008): 195–214.

Alles, M. G. (2015). Drivers of the use and facilitators and obstacles of the evolution of Big Data by the audit profession. *Accounting Horizons*, 29(2), 439-449.

Alves, M. D. C. G., Matos, S. I. A. (2010). Adoption of enterprise resource planning system – some preliminary results. Proceedings of the European Conference on Information Management & Evaluation.

Brown-Liburud, H., Issa, H., & Lombardi, D. (2015). Behavioral implications of Big Data's impact on audit judgment and decision making and future research directions. *Accounting Horizons*, 29(2), 451-468

Cash et al. 1997: Cash, James; Bailey, Andrew and Whinston, Andrew. 1997. A survey of techniques for auditing EDP-based accounting information systems, *The Accounting Review*, 52 (4), S. 813–832.

Cangemi, M. P. (2016). Views on internal audit, internal controls, and internal audit's use of technology EDPACS. vol. 53, no. 1.

IAASB 2010: International Auditing and Assurance Standards Board (IAASB). 2010. IAS 610 (Revised), A7.

IIA 2005: The Institute of Internal Auditors (IIA). 2005. Global Technology Audit Guide, Continuous Auditing: Implications for Assurance, Monitoring, and Risk Assessment, The Institute of Internal Auditors, Altamonte Springs.



Kozlovski, S. and M. A. Vasarhelyi. "An Audit Ecosystem: A Starting Point with Definitions, Attributes and Agents." Working paper. Newark: Rutgers Business School (2014).

KPMG 2015: KPMG. 2015. Internal Audit: Top 10 key risks in 2015, available at: <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/to/p10-considerations-internal-audit-2015.pdf>

KPMG 2012: KPMG. 2012. Leveraging data analytics and Continuous Auditing processes for improved audit planning, effectiveness and efficiency, available at <http://www.kpmg.com/us/en/issuesandinsights/articlespublications/documents/dataanalytics-continuous-auditing.pdf>

Moffitt, K. C. and M. A. Vasarhelyi. "AIS in an Age of Big Data." *Journal of Information Systems* vol. 27, no. 2 (Fall 2013): 1–19.

Papazoglou, M. P. "Agent-Oriented Technology in Support of E-business." *Communications of the ACM* 44(4) (2001): 71–77.

Protiviti (2017). 2017 Internal Audit Capabilities and Needs Survey. Available at: https://www.protiviti.com/sites/default/files/united_states/insights/2017-internal-audit-capabilities-and-needs-survey-protiviti.pdf

Sun, Z., Sun, L., Strang, K., (2018). Big data analytics services for enhancing business intelligence. *Journal of Computer Information Systems* Vol. 58, no. 2.

Tang, F., Norman, C. S., Vandrzyk, V. P. (2017). Exploring perceptions of data analytics in the internal audit function. *Behaviour & Information Technology*, vol. 36, no. 11, p. 1125-1136.

Vasarhelyi, M. A. "Audit Automation: Online Technology and Auditing." *The CPA Journal* (April 1985): 10–17.

"The CPAS/CCM²⁰ Experiences: Prospectives for AI/ES Research in Accounting Information Systems." Paper presented at the ISACA meeting, Budapest, September 4–7, 1996.

"A Framework for Audit Automation: Online Technology and the Audit Process." *The Accounting Forum* (January 1983).

Vasarhelyi, M. A. and M. G. Alles. "The Galileo Disclosure Model." Version 1.0. (2006). <http://raw.rutgers.edu/Galileo>.

Vasarhelyi, M. A., M. G. Alles, and K. T. Williams. "Continuous Assurance for the Now Economy." A Thought Leadership Paper for the *Institute of Chartered Accountants* in Australia, July 2010).

Vasarhelyi, M. A. and F. B. Halper. "The Continuous Audit of Online Systems." *AUDITING: A Journal of Practice and Theory* 10.1 (December 1991).



Vasarhelyi, M. A., F. B. Halper, and K. J. Esawa. "The Continuous Process Audit System: A UNIX Based Auditing Tool." *Artificial Intelligence in Accounting and Auditing: Using Expert Systems* vol. 2, edited by M. A. Vasarhelyi. (Markus Wiener Publishers, 1995).

Zhang, L., Pawlicki, A., McQuilken, D., and Titera, W. "The AICPA Assurance Services Executive Committee Emerging Assurance Technologies Task Force: The Audit Data Standards (ADS) Initiative," *Journal of Information Systems* (Spring 2012).



APPENDIX

Questions of the Questionnaire

1. Are you familiar with the definition of risk based audit?
2. Do you know the methodology of risk based audit process?
3. Do you know the risk profile of you company?
4. During audit you can in position to define exactly the risk mitigation
5. Are you familiar with the term business risk?
6. In your department do discuss the company's risk profile?
7. Do you know the difference between traditional and risk based audit?
8. Do you believe that management and auditors are partners?
9. Do you know the three lines of defense framework
10. Which of the three lines of defense is the internal audit function
11. Do you use data analytics in day to day business
12. Do you believe data analytics help
13. Do you save time by using data analytics
14. Are you familiar with the new technology techniques
15. Do you believe that you need training to data analytics methods
16. Data analytics help in audit whole population of data
17. Do you use data analytics for the reporting

Interviews

Questions

1. In your company do you have integrate risk based audit to the audit function process?
2. In what level of risk maturity do you believe your company is?
3. In your company /organization you have a separate risk management unit?(three lines of defense model)
4. Do you cooperate with risk management function ?
5. Do you know to evaluate their work ?
6. Do you use data analytics in the audit process? In what degree?
7. Do you use any specializes auditing software?
8. How familiar are auditors with new technology?
9. Do you believe auditors in your company understand risk management?

🚩 First interviewer CAE from Public Sector Company (Energy Sector)



We use the risk based approach in my company. Mainly through experience we can identify the areas with high risks we make the risk profile and based on this profile we develop the audit plan. I believe that not all people involved in internal audit department understand the concept of risk but I give them direction. We do not have a separate risk management department that is why the audit department also does the risk identification risk profile apart from the audit functions. About data analytics we are not in a mature stage yet but small steps have been taken. Basically we are still using the traditional paper way of doing things. It's been little time since few people from my team started using excel. We have a lot distance to cover to get into a technological maturity level.

🚦 Second interviewer CRO from banking sector (small non systematic bank)

Post crisis momentum resulted in strong regulation and supervisory guidance in the banking sector. In the bank I work for we have implemented the three line of defense framework. While we are not yet in a mature stage we have to move to that direction at a good pace due to forces from regulation and digital new are. The risk maturity level is not high enough but we try through cooperation with audit department to engage risk maturity so as to achieve business excellence. The third line of defense which is the independent and objective voice of the bank has applied the risk based approach to its work. The goal of internal audit is to assure the effectiveness of governance, risk management, and internal controls. This assurance covers all stages of an organization's risk management framework from hazard identification, risk analysis to communication of risk related information in all categories of organizational objectives: strategic, operational, financial and compliance. It also evaluates evaluation of the effectiveness of the first and second lines of defense. We use data analytics basic desktop techniques in the audit and risk processes and people is getting more and more familiar with these new technology methods. Auditors in the bank have started understand the concept of business risk recently .Regulators demand forces us to improve knowledge and capabilities. Here I would like to mention that Bank of Greece which is the regulation and supervision body for banks provides the appropriate control to Bank's in order to comply with frameworks and improve risk management internal control and corporate governance in general. Risk management and internal audit departments need to work together and for providing independent assurance about risk management department is better to be a concrete function with separate senior manager. Managing the risk helps provide the company with a safe and secure environment for the assets, employees and customer and ensures stability of business operations.

🚦 IA Manager from private sector company

In our company the risk based audit approach is taken in account while forming the audit plan. I assume CAE knows what are the risks that are related with the procedures and controls we are going to audit. Our director knows the risk profile and based on the profile we develop the annual audit plan. So the approach is based on which are the processes related to these high risk areas that need to be audited through a certain period –basically through year. To be honest the risk maturity is part of risk management



function. Recently we start analyzing more the risks profile and in some case external consulting companies are helping us building new policies and procedures. We use data analytics methods and next year we will implement new auditing software ACL. We need training to those new technology methods but it is part of the new digital mandates. The risk management is a separate function in our company we cooperate since they give us the risk profile and we conduct the audit to avoid these risks. We don't evaluate the work done from risk department but we use the risk profile and the recommendations to improve audit results.

Regulation issues use of data analytics

COSO which is a joint initiative of five private sector organizations and is dedicated to provide knowledge and thought by developing frameworks and guidance on enterprise risk management (ERM), internal control, and fraud deterrence, has in 2017 update the *Enterprise Risk Management — Integrated Framework*. The framework addresses the need for organizations to improve enterprise risk management approach in order to manage evolving risks in business environment. The update highlights how important is for organizations to deal with emerging business risks from a holistic perspective via both business strategy setting and added value performance. New 2017 IPPF Red Book is available from 1Q 2017. The International Professional Practices Framework (IPPF) is the framework - authoritative guidance by The IIA. Institute of Internal Auditors is a global, guidance-setting body which provides professionals auditors worldwide with authorized recommended guidance and frameworks. The IPPF includes Mandatory Guidance and Recommended Guidance designed to apply to all types of entities in all business sectors. The new release's target is to expand internal audit functions roles to a new perspective including capabilities such as proactive insight thinking, business protection, and future focused approach. There isn't a definition of risk based internal auditing (RBIA) provided by the IPPF. IIA provides the 2014 Guidance on implementing key aspects of RBIA methodology. RBIA is a methodology that interconnects internal auditing with an organization's overall risk management framework. RBIA enables internal audit to provide assurance to management that risk management processes are managing/mitigating risks effectively, in accordance to the risk appetite. IA also promotes the implementation of data analytics in auditing pointing the opportunity offered through technology to audit functions to add value to their organization, enhance audit assurance, fraud detection and SarbanesOxley testing.

Data analytics and new Technologies



Data analytics and disruptive technologies will change every industry the same will happen in the audit functions. Audit committees are intended to become forward thinkers so as to add value to the company and be ahead of the market. New generation audit will consist in an agile intelligent audit with planning, scope, execution, function and focus as components of the audit process become an going dynamic plan. Technology can help Auditors meet the requirements of their future role. Technology definitely helps but along with software's and e tools auditors should be re skilled to add value to the organization auditors must develop new skills and capabilities to evolve themselves. When individual evolve consequently the organizations evolve as well.

Audit firms –Big 4

Deloitte UK, EY, KPMG UK and PwC UK, the big four professional services companies have the national power to make a difference in any sector, and therefore the responsibility to really make a difference”, Caroline Casey, founder of The Valuable 500, commented. markets globally 80 percent of the audits are conducted by the Big Four firms. Mr Petrodaskalakis from EY in the annual IIA Greece conference in his speech mentioned that the “In the future internal Audit will be viewed as an air traffic control towers. Technology will enable real time risk monitoring and reporting of high risk findings and contributed to increase business value”. PwC in the same conference focused on the benefits-opportunities of new technologies as well as on the emerging responsibilities for auditors to follow the new demands. Increase the compliance and reduce process risks through automation consists opportunity while the responsibilities such as need to understand the technology (bot's designs frond –end integration) and also to understand the risks. The big 4 have adopt the risk based approach and they apply innovative technology tools such as data analytics artificial intelligence machine learning to help in their professionals' transformation into future consultant experts to provide high valued services to their customers. They also conduct useful studies reports and survey to spread knowledge, give insights and highlight new approaches in consulting assurance auditing taxation services. The risk based approach with the use of data analytics methods are only few of the methodologies the big four have supported.

"I hereby declare that, in accordance with article 8 of Law 1599/1986 and article 2.4.6 par. 3 of Law 1256/1982, this thesis/dissertation is solely a product of personal work and does not infringe any intellectual property rights of third parties and is not the product of a partial or total plagiarism, and the sources used are strictly limited to the bibliographic references."



Niki Christakou

