

The Future of Auditing with Application of Artificial Intelligence and Data Analytics

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Abstract

With emerging technology in Data Science, every industry is seen to adapt to the technological trend to benefit their businesses. It's a competition on delivering better quality and high value goods and services to the market and this is only possible through analysing business carefully. Artificial Intelligence is seen to be changing the game in every industry but there are challenges when technology is to be relied on industries which work on very crucial data. In this paper, the focus is on the field of Auditing which is one of the most respected yet crucial and extensive jobs in the world. The application of Artificial Intelligence into the field of audit is currently deemed to be at an infancy stage but with this paper the extent of application has been understood along with the future implications and benefits to the organizations as well the Auditing industry. The results were in favour of the technology and the possible benefits out stand the cost behind implementation of the same. Challenges do exist in terms of realisation of the benefits, skilled work force to analyse data, development of technology to recommend on possible risks, auto detection, subjective decision making and adaption of sound data systems but with the growth that is been seen, the technology is not far away from being possible.

Keywords: Artificial Intelligence, Auditing, Data Science.

INTRODUCTION

Audit is one of the most crucial and accountable profession which has been recognized and respected for its importance over time. It is a field which is required by almost every organization in the world. With large amount of capital invested in every company by the shareholders who in turn expect a greater amount of returns for every penny invested. Board of Directors or those charged with governance are the agents performing the agency function which makes their duty to ensure that the money invested by the shareholders is not misappropriated. Therefore, the main function of the audit is to ensure, a) Financial statements are free from errors and bias, b) Internal controls are working effectively and efficiently and c) continuous performance development in the operations of the organization. Financial statements are prepared at the end of every period which determines the performance of the organization. For the above-mentioned, Auditors are appointed in every organization to add value in the operations, bring control within the organization and to provide assurance to the Shareholders as well as the Stakeholders of the organization.

Auditors should be independent to the organization and shall directly report to the shareholders of the organization. In the past, issues regarding financial scandals and frauds which have even led to the bankruptcy of major organizations (Segal , 2018), smart accounting techniques and by passing of internal controls of the organization have led to mandatory requirement of Auditors in every organization.

Audit function is categorized into two major branches i.e., Internal Audit and External Audit. Internal Auditors are internal to the organization and report to the Audit Committee which includes a panel of Non-Executive Directors who are then responsible to ensure that the observations of the Internal Auditors are taken into consideration. Internal Auditors work on finding observations from the area of audit, identify the risk and provide recommendations to the management. External Auditors on the other hand are external to the organization and are employed by an independent audit firm and they work towards evaluation of Financial Statements i.e.; Financial Statements are free from bias and errors caused deliberately or mistakes.

Audit as a function is a very hectic job and requires a lot of resources to be conducted. It usually involves evaluation through a process of screening and walk through processes in order to pass conclusion on the area of the audit. Artificial Intelligence on the other hand is a developing technology which works on algorithms and the process includes learning (to acquire the information and rules for using the information), reasoning (to use the rules to reach desired conclusions) and self-correction. As per a technical article (Florez & Fitzgerald, 2017) . Artificial Intelligence (AI) can boost up the performance of the professionals and can result in real time reporting rather than period reporting (International edition of accounting and business magazine, 2017) but this can also result in losing of many entry level jobs.

The replacement of entry level and mid-career level jobs will be replaced and can affect up to two-thirds of US\$9 trillion knowledge worker market place (McKinsey Global Institute, 2013)and is also been called as the "Fourth Industrial Revolution". The AI has even been estimated to eliminate nearly 15 million jobs in the next 20 years (Bank of England , 2015). In China, the numbers rise up to an estimate of 77 percent people losing their main stream jobs (Benedikt Frey & Osborne, 2013).Underlying the positives of the outcome above, with the elimination of existing main stream jobs will also result in introduction of many cognitive technologies can result in many new jobs which would increase the capacity of human skills and expertise. So far, the technology is not so advanced

to replace human auditors completely but may do result in future and therefore, the main purpose of this research is to analyse the extent of application of AI into the field of Audit.

MATERIALS AND METHODS

For studying the application extent of Artificial Intelligence in the Audit Function, the International Financial Reporting Standards/International Accounting Standards (IFRS/IAS) and International Standards of Auditing (ISA) have been studied and focussed. IFRS and IAS cumulatively include 45 (17 IFRS and 28 IAS) (IFRS, n.d.) accounting standards. International Accounting Standard is the former prefix used before the financial statements as issued by the International Accounting Standard Board (IASB), but since 2001, any new development in the existing standard was decided to be prefixed as IFRS and not IAS. (ICAEW, 2018).

ISA's on the other hand include 36 auditing standards which act as guidelines to the auditors while conducting the audit. As the application of auditing standards require a lot of human judgement, industry and case knowledge, the application can sometime be very subjective and therefore only major IFRS, IAS and ISA have been considered to understand the application of Artificial Intelligence and Data Analytics.

Experts from the industries and their technical articles have been studied to understand the expectations from the future of Auditing field and the possible differences it can bring which may prove to be revolutionary for the industry. Technical articles also focus on the challenges that exist and these challenges have been carefully reviewed but not specific to any industry.

TRADITIONAL AUDITING

Traditional auditing techniques involved starting the audit process through a meeting conducted with the auditee and therefore involved most of information being gathered through the source of the client. This also involved a lot of document screening and inspection of documents but only through sample basis. This resulted to reasonable assurance from the auditors and had high chances of conflicting documents being hidden by the client.

With the development of technology, auditors now have the access to the database of the client which gives them access to 100% of the data relating to the finance and operations of the business. This enables the auditors to expand their horizons and reach all the data of the organization and with the application of analytical tools and artificial intelligence can enable the auditors to set the risky areas of the business. This involves auto identification of the risk prone areas, setting of outliers, conducting quick analytical review of the past data and to an extent enable the auditors to inspect the compliance with the International Standards (The audit is changing, 2015).

APPLICATION OF ARTIFICIAL INTELLIGENCE INTO AUDITING INDUSTRY

External audit consists of mainly evaluation of the financial statements with guidelines that are mainly focussed on the compliance with the IFRS/IAS standards and are also subject to the laws and regulations, industry regulations, and best practice measure considerations to conclude that Financial Statements are free from errors and bias. The main objective is to add value to the organizations operations and bring confidence in the shareholders.

Internal Audit on the other hand focus on the internal operations of the organization and is conducted by the Internal Auditors. The Internal Auditors are internal to the business and they focus on transaction details of the organization rather than focussing on the outcome and impact on the financial statements of the company. The focus is more to improve the business operations in order to generate better results at the end of the year in the financial statements (Publications, 2016).

Artificial Intelligence is more of a process which includes Data Analytics, Machine learning and Data processing into its umbrella and the only issue that is rising now is the process of data cleaning. The data cleaning process needs to be adopted by every organization as soon as possible. If not, the process requirement need shall be felt by every organization in the future with the development and adaption of more mature technology. If data cleaning is not undertaken, it shall lead to processing of irrelevant and unclean data which will process "noise" more than useful information leading to additional cost to the business (The Entree-Artificial Intelligence: A matter of trust , 2017). Artificial Intelligence can interpret the requirement of compliance in all the areas of the business and verify autonomously the implications of Accounting Standards.

Together with machine learning, robotics, analytics and human interference, exceptions can be dealt in a way to subjective decision making (The Entree-Artificial Intelligence: A matter of trust , 2017) which also marks the requirement of human intelligence into the play. Machines should be made smart enough with human interaction to interpret the type of data being analysed and inspected which shall enable to make effective decisions for the business. With process automation, automated inspections and recommended decision-making techniques, shareholders as well as the stakeholders can gain larger confidence in the business and this can also invite greater capital and expand the business wings globally.

There are three basic iterative phases that should necessarily be included in the decision process and these are intelligence(gathering of data, setting out objectives, validating data and diagnosing problems), designing of the data (manipulation of the data, quantifying the objectives, assessing the risk and providing alternatives to the issues) and choices (providing recommendations and choices, simulating alternative results to the recommendations and quantifying the best possible solution) (Shafiei, et al., 2012). The audit process also involves similar functioning while reaching conclusions to the observations; these are: finding observations, identifying risk, providing risk rating or risk quantification, providing recommendations or alternatives and adding value by quantifying the benefits of the alternatives.

Functioning of Artificial Intelligence into the Accounting Standards.

Accounting standards are the basis on which auditors rely on while conducting their audits and over the years these standards are created to suit all types of industries. The IFRS and IAS are those guidelines which have been studied, developed and accepted over the years. The application of Financial Standards varies from industry to industry and is very subjective in nature. For example, the way revenue is being recorded in one industry might be completely different from the way it is done in another industry and this is due to nature of the organization (IAS 18- Revenue, IFRS) (ACCA, 2017). The application of financial standards is done in order to bring standardization over recording of transactions through the accepted principles.

The challenge exists in applying AI and take its assistance over decision making and bringing in standardization to the recording of transaction. The subjective nature of the accounting standards makes 100% reliance on the AI technology a tough challenge even in future. At the maximum, it is expected to gain greater and efficient assistance from the machines to highlight issues at greater scale which were never focussed on before which shall bring insights to the organization which were never looked on before. AI may even assist on possible course of action plan that the auditors may execute based on different situations and subject matters. (The Entree-Artificial Intelligence: A matter of trust , 2017).

D&A's – Data & Analytics

Data & Analytics is the tool that is believed to be the future of the profession of audit. It is a tool which can be used for assurance purposes and not only audit. Data Analytics can allow the auditors to manipulate 100% of the data and use samples, populations and variance analytics to draw conclusions of their findings (ICAEW, 2016). Even though data analytics and audit together are in infancy stage now due to most of the organizations not been able to setup efficient Database Management Systems (DBMS). Even though DBMS exists, they include a lot of data which requires cleaning before they can be used as effective information to the business.

As per an event conducted by the professional body of ICAEW and software company Inflo (ICAEW, 2016) the challenge raises in the small-tier and mid-sized organizations for whom data management system are very costly to manage and often more of the organizations rely on ERP software generated data which is also not utilised properly to the benefit of the organization. Integration of Audit software with the Database systems of the organization is a challenging task and often not possible due to outdated systems used by the clients. Majority of the panel of 150 members felt that Data Analytics was not used in the past by audit firms and clients with cost being the major factor to the resources.

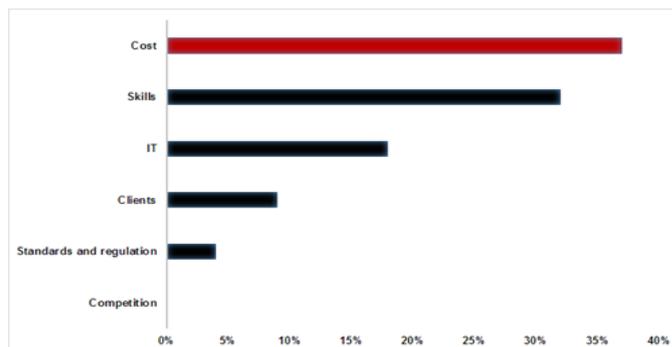


Figure 1: Vote of panel members on cost being the barrier to Analytics (ICAEW, 2016)

‘Client services and Insights’ on the other hand was seen as the biggest opportunity for the audit firms to capture the market followed ‘audit quality’.

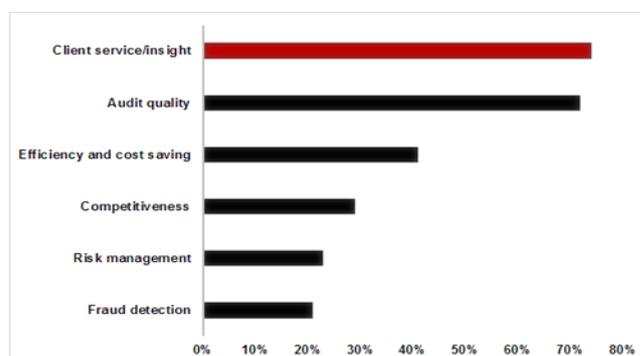


Figure 2: Client service insight being voted the most as opportunity for Audit firms (ICAEW, 2016)

Currently Enterprise Resource Planning (ERP) providers such as the SAP and Oracle have built intelligence system which are offered to the clients to conduct self- analysis of their data but these are not much sophisticated tools. Most of the organizations today outsource data analytics companies such as CaseWare and Validis which increases their cost significantly.

With the help of D&A's, auditors can improve the risk assessment process, construct substantive procedures, plan and create the audit program and implement test of controls which can be conducted through simple as well as complex models to produce high quality results for the client. This shall help the auditors to determine the judgement from the models and how they should be used within the business to project better results (ICAEW, 2016).

Technique which used to be simple and known as the CAAT i.e., Computer Assisted Audit Techniques did help to produce results but D&A analysis bring in results which are far more superior and useful for the business. Some of the techniques assisted by the D&A analysis are:

- a) Sample selection,
- b) Population differentiation,

- c) Comparative analysis of past years data,
- d) Identification of Outliers,
- e) Identification of unusual risk factors,
- f) View on control gaps,
- g) Root cause analysis,
- h) Internal Benchmarking,
- i) Quantification and measurement of manual interventions control failures and consistency of failure analysis,
- j) Identifying qualitative and quantitative variances,
- k) Highlighting potential non-compliance to financial standards such as the IFRS and IAS,
- l) Creation of visualisation for better understanding of the information; etc. (The audit is changing, 2015) & (ICAEW, 2016)

Audit standards were written with an assumption that audits are conducted on the basis of reasonable assurance i.e., only a sample of the data is tested for audit results but this might not be true anymore with the application of Artificial intelligence and D&A techniques, a huge amount of BIG DATA can be tested and audited in no time. But this may require IFRS, IAS and ISA's to reflect the change of modernization into their basic standards. Here, the main challenge is not to have auditing standards that can accommodate the new tools, but also to ensure that the audit quality and level of assurance obtained by the stakeholders are not compromised. Innovation in audit must be encouraged.

Data and transactions can be analysed in many ways with the help of Analytical tools. Data transformation is a process of transforming data to extract information that was not available before by way of using the data in efficient manner. With different types of tools, analysis can be conducted on data which was considered to be dirty data. These tools can also help the auditors to transform the data of the client to much more organized way which was not possible before as it may hamper the client's data. But with modern tools, auditors can freely play around with the data of the client without causing damage to the original data file or original form of the data.

The biggest challenge understood today in the auditing field is to transform data which requires a extensive process of data cleaning. As time moves forward, auditors will be able to connect to the organizations DBMS's which shall be a leap forward step towards taking auditing and analysis to a revolutionary movement and shall act as a breakthrough for the audit industry.

LEAN IN AUDITS

Lean in Audits works on the qualitative perspective of the organizations data and try to improve the quality of the organizations operations. They focus on making the shareholders understand why things are happening in the organization which is also the work of the internal auditors to

an extent (The audit is changing, 2015) Auditors in general work towards detecting the reason behind the risk that is underlying in the organization. With Lean in Audits, auditors can better understand the internal flaws of the organizations operation which shall boost the performance of the company as well as the auditors. Auditors have to go through a lot of documents which is a very extensive and cost adverse process. With the application of Lean in Audits, auditors can analyse the internal deficiencies faster and can cover many high and low risk areas.

Auditors apply lean processes in order to cover both the financial and operational areas of the business which in turn reflects the picture of the financial statements or performance of the organization giving a clear picture of the areas where the organization needs to improve (The audit is changing, 2015). High performance value opportunities can be realised with the Lean in Audit methodologies highlighting the core areas to be improved. Artificial Intelligence if implemented with this, can even recommend the auditors on what can be possible actions to be taken to improve the situation of the risky areas. With the implementation of AI and Lean in Audits, auditors can highlight the end to end process tracing back and forth from ground level operations to financial statements and vice versa.

Lean in Audits and its benefits can not only be seen for the auditors but also to the organization and therefore realizing the advantage may make most of the organizations adopt to a more sophisticated Data Base Management Systems as the cost is always going to be overshadowed over the benefits in long run for the business. Benefits for the organization such as better-informed business decisions, improvement in the overall quality of the products, cost benefits, improvement in the financial status of the company and over all standing in the market, increased customer satisfaction through better services and will therefore provide upward movement in the performance of the organization and add value to their business operations and financial requirements.

Audit firms and auditors on the other hand can achieve increased reputation, better business opportunities, wider scale coverage of risky areas, identification of errors and frauds at greater scale, may achieve absolute assurance i.e., 100% verification of the observations, improve the performance of the auditors, cover more clients and reduce the chances of deduction risks i.e., risk of missing out on detecting frauds and errors in the organization which plays a major role with the reputation of the audit firm.

Block chain Audit

Block chain is the most talked about thing in data science industry but is yet to mature. With block chain technology, every transaction that happens is recorded and is accessible to multiple user on their screen through a process of replicating and synchronizing data on real time basis. Block chain technology is a type of database that helps to identify and form a link to all the transactions in the ledgers that has happened over time through a cryptographical algorithm. Block chain has the capability to transform the corporate reporting and the audit function with the decentralised function i.e., it doesn't have an

administrator. It records transaction with time stamped accurately to every transaction. As the data is encrypted and replicated to multiple nodes or machines, hacking becomes nearly impossible as the hacking needs to be done simultaneously over multiple nodes. Even if the hacking is succeeded, users will clearly come to know that the data is being tampered but through multiple backups created, retrieving of data is going to be easy task for the organizations. (Block Chain and the future of Audit , 2016)

With the help of block chain, verifiable audit trails can be set and with the help of artificial intelligence, auditors can easily identify gaps in the chain and highlight it through reporting to the organizations. Auditors usually in their audit procedures form audit trails in order to analyse the root cause of the issue which requires extensive verification. But with artificial intelligence, data analytical techniques and block chain technology, this can be conducted easily in few clicks which shall improve the efficiency of the auditors. As the data is continuously synchronized, finance teams can provide real time reporting to the management on every transaction that shall bring change in the financial position of the organization.

Audit on the other hand becomes a task as real-time auditing on the 100% of the organizations data becomes a tough task but is not impossible. As per ACCA's audit assertions, "CUT-OFF" is a very important point for auditors where a specific date is selected by the auditors for their audit procedures can be conducted (Association of Chartered Certified Accountants , 2017). Auditors will have to consider a proper cut-off data before they start analysing the data which can add as an aid to the auditors in handling huge amount of data. But on the other hand, with emergence of audit tools, it may not be impossible to analyse real time data till the time audit is been conducted. This may even update the current IAS standard, IAS 10 events after the reporting date which sets the duty of the auditors to report every material event in the financial statements report or audit report till the publishing of the audit report has taken place. (Association of Chartered Certified Accountants , 2017)

Auditing with sensor technology

Sensor technology is widely used in the production facilities, manufacturing units and also in vehicle leasing organizations who use sensors to define the quality of their products and usage of their assets. With the help of sensor technologies, companies can analyse the output generation capacity of their assets, check on the quality of the production facilities and their products, analyse the useful economic life of the assets and can also help in analysing any unusual activities regarding their processes.

With the help of sensors, huge amount of data is collected by the organization pertaining to their organizational activities and this helps auditors identify the outliers in the process or any unusual activities that take place within their operational processes. Auditors can use this data to analyse the cost factors that shall affect the organization with such unusual activities. Everything that happens beyond the scope of the process has an additional cost to the organization which may be an area of the concern.

Sensor technology has been successful in giving organizations with high quality data to be analysed that holds a high amount of integrity. Auditors need to focus on the importance of the data that is generated so that it can be analysed in the right way. A core process of the audit here is to identify anomalies and outliers as it can affect the strategy of the organization and also question the integrity of the workforce who may not be behind achieving the goals of the organization. Auditors can also use the data generated from the sensor technology to analyse the Key Performance indicators (KPI's) to know the current situation of the processes and their functioning. (Trinci, 2018)

With the help of AI and sensor technology, organizations can have real time data available to generate information important to the business and auditors on the other hand can analyse data which was impossible to be tested for observations earlier. Auditors can therefore provide recommendations to the company on their business operations and add value to the overall business. Moreover, here again with effective tools, companies can have their 100% of the data being tested and useful information can be derived which can be used by the management to generate effective business decisions.

CONCLUSION

The current situation of the Audit with the application of AI, data analytics and tools are under the infancy period and to transform the audit field with the 100% application of the technology stated is going to take little more time. With the current technology available and the expectation of experts clearly value the benefits that can be derived. Subjective matters are one of the biggest challenges when it comes to collaboration with the audit standards and quality standards followed by the industry today. AI can aid the industry by bringing in high performance of the auditors, may bring in absolute assurance concept, can help focus on more value adding services to the organizations, bring in new requirements in the auditing industry, provide recommendations which may increase the value of the audit firm reputation and most importantly bring major changes in the way audit standards are based. The change to the industry and the standards is going to be faced with a lot of changes but high demands and requirements followed by tough market competition may bring in a revolution for the Auditing Industry across the globe and may include changes to the current standards with consideration of huge amount of data being generated by all the organizations.

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