Impact of data analytics on reporting quality of forensic audit: a study focus in Malaysian auditors

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Abstract. The primary objective of this research is to study the impact of data analytics on reporting quality of forensic audit, a study focussed on auditors in Malaysia. In this research, the researcher intends to discover the impact caused by emerging technology, in particular the data analytics, in audit profession, as audit field is the most complex field where tremendous volume of data, and research is conducted to investigate a certain situation, to report findings. The researcher uses the primary method to conduct the data. In this research, four different variables that causes impact to data analytics usage in forensic audit reporting quality, are tested. The data was collected from forensic audit and accounting service providers, operating around Malaysia. To analyse the findings, statistical tool, Statistical Package of the Social Sciences (SPSS) is used, to further analyse the responses, and to derive at a conclusion relating to impact of data analytics to reporting quality of forensic audits. The findings discovered that all the variables have significant relationship with the data analytics and its impact to the forensic audit reporting quality, among forensic auditors and practitioners in Malaysia. The conclusion has been discussed in this research which caters for and provides confidence and data privacy, for users of data analytic tools for their forensic audit work. This research creates the awareness of the use of data analytics in order to assist forensic auditors in their routine data gathering and analysis, in preparing reports, statistics and trend analysis etc, by saving their efforts and time, to focus more on performing further analysis and findings based on case or audit assignment. Key Words: Emerging technologies, Artificial Intelligence, Machine Learning, Data analytics, Data Confidentiality, Data Integrity, Risk Management, Data Availability, Reporting Quality.

1 Introduction

Technological advancement with emerging technologies of Industry Revolution 4.0 (IR 4.0) received a global call by international accounting bodies, the International Federation of Accountants (IFAC), requiring professions to quickly adopt into the new platform to stay relevant. The initiatives and efforts taken to embrace, adopt and implement technologies

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would give relevant exposure to forensic accountants generally, to move parallel using the
technologies to enforce the power in forensic services. This shows that the technology
performs as a boom in boosting the profession’s credentials as trusted advisors, rather than
left behind. (MIA, 2018).

In broader perspective, Artificial Intelligence (AI) and Data analytics are one of main
tools easily adopted by auditors in their continuous journey towards innovation. As such, the
Big four audit giants KPMG, EY, PwC and Deloitte, have invested approximately $9billion
on these tools. (Bureau, 2020).

In line with the embracing demand, the Malaysian Institute of Accountants (MIA)
released MIA Digital Technology Blueprint, 2018 which emphasises on equipping
accountants for Digital World, by enforcing focus on technology as their main concern. It
also established Digital Economy Task Force to get the members ready to face technology
disruption which is taking charge of the accounting and audit profession.

Integration between internet and frequent exchange of data between various systems has
created overwhelming volume of data available for analytical purposes. This is an indication
that these “Big Data” snowballs in growth and hence in necessity for sophisticated tools, like
Data Analytics to handle data management (Horak & Boksova, 2017). Conventional ways of
data analysis have vanished, and data analytic software program provide the sophisticated
tools (Cukier & Mayer-Schonberger, 2013; Rezaee & Wang, 2019). Auditors are required to
equip themselves with knowledge of how Big Data and Data Analytics are used in business
operations, to provide the specific service accordingly. To summarize, it is crucial for the
profession and auditors to focus on a long spectrum in the technology era, to act drastically
and to be flexible in every situation. Similarly, accountants are stimulated to appreciate
technology as how human intelligence work with data analytics to apply consideration in

According to researcher Chi Chen, (CFE, CISA, ACFE, 2014), companies face constant
challenges to effectively leverage between their strategies in optimizing operations, growth
of business sustainability with data analytics. Business analysis has become complex and
high risk with technological evolution; hence a proper data analytic tool is fundamental in
ensuring data protection and sanity can be upheld. As cybersecurity threats are on a rise,
regulatory boards are raising the bar, to continuously enforce the requirement into regulatory
environment. Anti-corruption and anti-fraud compliance programs are emphasised and
enforced into companies, to improve and to set their internal controls and risk assessments,
to protect their companies. Hence, multinational companies especially, sets their corporate
governance to places top priority on compliance, and to be adopted by all levels of workforce
in their operations.

To strengthen the policies to protect data security, companies are also required to integrate
data analytic techniques under forensic, which incorporates concepts of big data, across
multiple sources of data, external stakeholder monitoring, text mining, social media updates,
etc, to mitigate risk exposure. In a more specific way, forensic data analytics gives a
confidence to forensic auditors to perform their reviews and investigations in a more
convincing way, from reviewing risks relating to corruption, fraud, bribery etc, as to gather
and utilize technologically compiled information, to be able to detect unusual trends,
statistics, and stakeholder behaviour. The data analytics on forensic specific, integrates
ongoing monitoring tools, processing data at real-time, and providing immediate remedy to
block or prevent fraudulent and suspicious activities. (Chi Chen, CFE, CISA, ACFE).

According to a Data Analyst Salem Mohamed, RSM South Africa, stated in his article
dated 26th May 2021, mentioned that automation, big data, and data analytics are accelerating
in popularity in audit field, as the world is digitally evolving. The transformation into digital
era, has placed a unique expectation on auditor’s role, not only to maintain audit quality, but
to also manage large data in most cost-effective way. Hence, auditors are constantly
validating their opportunities to research on better options to manage, and data analytics comes in as most useful assistance for external auditors. “Analytics” is defined as systematic computational analysis of data, by the OXFORD dictionary.

Data analytics plays primary role to give confidence and support to assist auditors to improve their service quality and making sure to allocate added value to clients. To understand client operations, and to identify various risk factors in business environment, data analytics allows auditors to perform thorough extract and analysis on large data sets.

ICAEW has supported the fact that audit firms should now focus on developing the capabilities of human capital since audit will be performed significantly different from the past which results in the need of higher IT proficiency by the auditors (ICAEW, 2018). When auditors find technology to be convenient in application on daily tasks, they would move on to improving forecasting and analysis, and increasing fraud detection through audit testing as well (ACCA, 2019). Past studies on task-technology fit between auditor’s knowledge and perceived importance on technology revealed a gap. In Malaysia (Ismail & Abidin, 2009) and in Kuwait (Al-Duwaila & Al-Mutairi, 2017), auditors’ knowledge on general office automation, accounting firm office automation, audit automation, e-commerce technology and systems design and implementation were found to be lesser than their perceived importance. Comparatively, Big Four auditors demonstrated a higher likelihood of technology usage (Al-Duwaila & Al-Mutairi, 2017)

The following table shows data analytics and its specific benefits provided for auditors and their services.

Within data analytics, there are various emerging approaches which provides specific assistance and features to serve audit processes. Some of the approaches, deep learning, predictive analytics, text mining, smart contracts via blockchain. are discussed below. (CPA Journal, 2022). First approach is the predictive analytics. This approach gives auditors an ease of time management, by offering highly validated and accurate accounting results. By having such results, auditors can be at ease in selecting their materiality limits to audit tests, can trust on management assertions on a high note, and have higher confidence in the data audited. Second is the deep Learning, also called as “cognitive computing”, consist of automation and human interpretation blended. This approach of data analytics utilizes the basic audit worksheet analysis, for example estimations to bad debts, abnormal contract analysis, lease classifications etc to turn it into advanced methods as neural networks, to analyse the situation in much deeper and multiple layers insights. As its unique feature to perform ground search engines, auditors are investing higher finances towards these technologies. It uses storage and power on a big scale, many businesses outsource this deep leaning project to experts and research hubs, to handle their data with high quality, and care. IBM Watson is one famous service provider. Third is called the Blockchain / Smart Contracts. Blockchain became more famous with the introduction of the virtual currency bitcoin. The features of blockchain supported the bitcoin trading, as it facilitates to store data public and replicate transactions using encryption methods. Specific feature in blockchain is the smart contracts. With the combined technology, blockchain and smart contracts manages automated data management independently, without human assistance. As an example, when errors larger than the materiality limit is detected, blockchain sends a signal of red flag to auditors to perform extensive testing. Last approach is the text mining, also called as text analytics. This is another AI which use natural language processing (NLP) to turn unstructured data text into structured forms and provides a meaningful text for analysis purpose. Combining all the unique features of big data, unstructured to structured, provides greater support for management in terms of validating data quality, and providing trusted information for auditor’s work. (CPA Journal, 2022)
2 Literature Review

2.1 Data Analytics Usage

Digital technologies are emerging and riding the transformation wave of world industry operation. Extracted from published book, titled “The Fourth Industrial Revolution” by Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, defines the 4th revolution is very different from earlier revolutions, which are characterized mainly by technology advancement. (Goh et al., 2019 and MIA, 2017).

Initially, before the spectrum of Data Analytics began, basic automation was a hype where rule-based automation was used. Then, business process automation was practiced and today Robotic Process Automation (RPA) is used to inaugurate the beginning of Data Analytics in enterprise (Vaidyanathan, 2018).

In order to drive business strategy and performances, and to manage enterprise risk assessments, and to achieve success, Data Analytics assists in smoothing the process, by providing range of solutions are approaches to data. (Deloitte, 2022).

The true nature and use of data analytics begin with assisted intelligence and then intelligence process automation when RPA is combined with DATA ANALYTICS. Then, according to Zaani, Rios and Sampanthar (2018), DATA ANALYTICS evolves to being augmented intelligence and the future of DATA ANALYTICS lies in autonomous and algorithmic intelligence.

Today, the developments of data analytics reach at augmented intelligence where it influences the abilities of Machine Learning (ML) for the growth of human analytical competencies and will soon be completely integrated into operations grant full authority to automate processes through a combination of influential machines, bots, and schemes (Vaidyanathan, 2018).

2.2 The Data Analytics Outlook in Forensic Audit Reporting

In general, DATA ANALYTICS is often used as an over-arching term, preached as an advanced computing capability with machines being able to think for themselves. However, auditors’ at large, views data analytics as machine experts which carries abilities to make decisions on thinking, learning, understanding, reasoning, and perception. (Pan et al., 2017).

As viewed by auditors, upsurge in data analytics is not necessarily signify an ultimate change in our routines. As fundamentals, financials for business deals on data, where auditors use data to compile and analysing data, and providing conclusions on it, since the beginning of our profession. While the concept is ancient, it is unprecedented, on the volume of data handled by data analytics, the data analysing speed, & transformed.

In its recently produced report by KPMG, related to topic on Audit 2020 “focus of Change”, discovered that 53% of respondent’s executives views data analytics as a transformer in audit industry, where audit quality and effectiveness is enhanced. The scope on financial information available for testing is increase with the use of automated routine transaction. Also, the special feature of data analytics which covers deeper, and larger sets of data is very helpful tool for accountants and auditors. Additionally, the exposures and expertise held by auditors on data analytics allows them to review on risk assessments and audit procedures in a more advanced way. Moreover, enhancement to data analytics provides better quality on audit discussions and gives an opportunity for auditors to collect deeper insights on company’s operations. Influential visualisation tools within data analytics, helps to deliver the data history, and provides basic assistance to evaluate relationships and to gain real time details to flows of transactions.
One way for an auditor to detect high risk transactions on a wider landscape, within a shorter timeframe, is by directly extracting effective data from financial systems of a company, analysing the data with external and internal data from third parties, using data analytics proficiencies. (Roger O’Donnell, KPMG LLP, 2017).

Past audit related research in IT was focused on specific areas of assurance and IT audit. On recent findings, it was found that IT exposure and knowledge are fundamental requirements in IT auditing platforms. (Carnaghan, 2004; Greenstein and Mckee, 2004; Leader, 2004; Wilkinson, 2004; Brazel, 2005; Curtis et al., 2009). Moreover, auditing is influenced by the various technologies impact XBRL, EDI and collective vibes and gathering emotionally supportive networks. (Bamber et al., 1998; Carnaghan, 2000; Leech, 2000; O'Donnell et al., 2000).

There was research done on case studies on IT related audit to assist in identifying issues and improvement opportunities. (Smith, 2007), and additional research on IT audit shown investigation on its impact to financial audits, companies internal control management, and other risk related areas, (Bagranoff and Vendryz, 2000; Vendryz and Bagranoff, 2003; Omoteso et al., 2010); misstatement detections (Messier et al., 2004); developing information system metrics, and identifying risk modules. (Sherer and Paul, 1993; Havelka et al., 1998; Salterio, 1998; Stockton, 1998).

Further research were done on attributes which influence quality of audit, but not much was done to rationalize and consolidate the factors into system of IT review quality. Merhout and Havelka did a discovery on developing IT review process theory, utilizing techniques of bulk data gathering, with the assistance of practitioners from IT audit, external and internal users, to build a framework. Havelka and Merhout, 2007; Merhout and Havelka, 2008; Havelka and Merhout, 2009). In their research, they distinguished huge dataset characteristics (more than 260 - alluded to as variables by Merhout and Havelka), that were proposed by experts as "basic" to the IT review process.

2.3 Data Analytic creates opportunity

Data Analytics advances accountant’s intellectual and assist in drawing precise and decisions in routine operations, and this assist in accomplishing objectives but also to resolve unexpected issues of real world. (Greenman, 2017 and Baldwin, Brown and Trinkle, 2006). Forensic auditors job requires high risk evaluation, analysis and findings relating to fraud and criminal events. (Glover, Prawitt, & Drake, 2014; Yoon, Hoogduin, & Zhang, 2015). They need to carefully plan crucial designing and implementing procedures to help them detect the unlawful activities. Accuracy of information need to be taken care to draw right conclusions. (Appelbaum et al., 2017). With the evolving technology, Data analytics provides greater opportunity to forensic auditors, by offering new tools to analyse data, allowing it to excavate into bigger, non-traditional data sets and execute more intricate analysis. (PwC, 2015). Forensic auditors can perform their jobs with high quality and effectively, to produce quality audit reports, as they can better understand business environments, and reduce the risk of drawing incorrect conclusion, hence improves audit quality. (Dagilienė & Klovienė, 2019).

Audit Data Analytics characterizes the “analysis of data underlying financial statements, together with related financial or non-financial information, to identify potential misstatements or risks of material misstatement” (Stewart, 2015, p. 108).

Christine E. Earley, 2015, defined 4 four key advantages of DA usage, in audit, where auditors can test a bigger set of numbers compared to manual techniques, and compile audit evidence easily, with the application of risk-based models, and sampling techniques via the data analytic tools. Second advantage relates to audit quality which can be improved by offering deeper findings and insights to client’s processes. Third advantage is where detection of fraud and error can be done easily as auditors are able to leverage the tools and
technologies used. Lastly, it allows auditors to provide services and resolve issues smoothly for clients.

Thus, we can propose the first hypothesis based on the statement above to test the first purpose of this research is as follows:

H1: There is significant relationship between Data Analytics as opportunity creator for forensic audit reporting quality

2.4 Influence of Data Analytics on Audit Reporting Quality

Obviously, Data Analytics which creates a greater opportunity to forensic accountants, may have a concern on its influences too to the reporting quality. Forensic accountants’ role is classified as very unique role and profession, and the data analytic influence can be based on the accountants skill and level of expertise in their field of work. (Yaninen, 2018). An obvious possible challenge in Data Analytics usage can be shortage of expertise in handling the digitalized tool. This poses a greater challenge to education providers to incorporate such skills in their curricular system. Another challenge seen data analytic influence can be on data sanity. The sources of information gathered by Data analytic tools, need to be re-examined by human analytical intelligence. (Appelbaum, 2016). A vast amount of data created by Data Analytics may not necessarily helpful to provide quality reporting. (Fukukawa, Mock, & Srivastava, 2014; Appelbaum et al., 2017). The usage of Data Analytics in detecting fraud and criminal activities involves accessing emails, videos, and other socially linked platforms, which relates to information privacy. (Yoon et al., 2015). Using the socially linked platforms when collecting and analysing information involves costs, which may influence on companies’ budgets and fund allocation. (Yoon et al., 2015).

Under the audit, the main requirement of planning is for auditors to gather financial information of client, to "diagnose" the financial health and sustainability growth of a firm. (Lehmann et al., 2006). This process involves tedious tasks, where auditor need to connect their examination techniques to various sources to gather data. Past studies discovered that auditors judgement is closely dependant on the type of evidences collected, for a going concern matter to be reported in planning stage. (Tsao, G. (2021).

Thus, we can propose the second hypothesis based on the statement above to test the second purpose of this research is as follows:

H2: There is level of influence on data integrity using Data Analytics on forensic audit reporting quality.

2.5 Risk managed by data analytics on reporting quality of audit

Relatively few individuals comprehend that information examination is significant in risk the executive’s control and methodology. Individuals who don't have business foundation will not comprehend that the right information can work on an organization in the greatest manner, while some unacceptable information can send everything in twisting and mayhem. In the present worldwide stage, where everything depends such a great amount on information, it is significant that information logical and the board can be advanced and figured out proficiently. (Risk Management Article, 2022).

As a matter of first importance, the right information can lead you to settling on choices of how to manage your significant data - which can prompt better network safety and assurance, as well as the preventive techniques for how to manage the potential dangers. Second, the information you have can lead you to make more astute and more innovative routes in alleviation procedures as well as better business systems. Third, the information can assist you with working on your business in the most proficient ways, without you stressing
over more serious dangers as all that has been limited and arranged out cautiously. (Risk Management Article, 2022)

A review led by an analyst, Rozarion, A. M., and Issa, H. (2020), inspects the use of information investigation in the public authority area. Accordingly, it adds to the public authority bookkeeping writing by proposing a gamble-based structure to work on the proficiency and viability of reviews of government consumptions. In addition, the utilization of the proposed prioritization approach can possibly moderate the issue of data over-burden and low handling familiarity that openness to huge datasets can make. At long last, this study recommends a few promising examination roads that future investigations can investigate.

Thus, we can propose the third hypothesis based on the statement above to test the second purpose of this research is as follows:

H3: There is significant relationship on risk managed by Data Analytics in reporting quality of forensic audit.

2.6 Credibility of independent data access and extraction using data analytics on reporting quality of audit

Many opinions nowadays are targeted at the doubt of in-secured feelings crop up in human thoughts, on how much does the technology take over on human roles. There are few opinions from researchers on this matter. The AI and Data Analytics are growing super quick, without a need for rest unlike human. This poses greatest advantage to the digitalization, to replace human efforts. Additionally, the data analytics possess learning and teaching attributes too, replacing human, causing unemployment in larger scale and income effect in the population. (Shukla and Jaiswal, 2013). Thus, with progression in technological supercomputer and artistic inventions of processes towards Data Analytics and forensic accountants’ profession, is expected to vanish. Machine and deep learning are greatly dependent on proficiency in data inset into AI, so AI is a great threat to forensic accountants’ skills. (Wisskirchen, 2017 and Miranda and Aldea, 2016).

A study by New Vantage Group (2012) observed that organizations were more stressed over the unstructured idea of information instead of the volume of information. Zhao et al., 2014 recommended that organizations should manage difficulties relating to the incorporation of inner (e.g., conditional records) and outer information (e.g., informal organization information). Obviously, new innovation is expected to address new difficulties brought about by attributes of enormous information; nonetheless, large data specific innovation has advanced colossally over the most recent couple of years. (R.L. Mitchell, 2014). While we are sure that large information explicit innovation will keep on advancing, it is the ideal opportunity for associations to zero in on different assets, other than innovation, which are expected to construct firm-explicit "difficult to impersonate" BDA capacity. (A. McAfee, E. Brynjolfsson, 2012). For example, Ross and partners, 2013 attest that most of the enormous information ventures neglect to pay off on the grounds that most organizations are either not prepared or don't settle on choices because of the knowledge extricated from information. McAfee and Brynjolfsson (2012) accentuate the significance of embracing information driven decision-making society where the senior-level leaders settle on choices in view of information instead of on their impulses. Absence of administrative help is additionally referred to as a basic element influencing the progress of huge information drives. (S. LaValle.et.al, 2014). Another test is to select new ability and train current representatives in enormous information explicit abilities, since working with huge information requires new sorts of specialized and administrative capacities, which are not normally educated in colleges. (J. Chen, 2013). (Gupta, Manjul; George, Joey F., 2016).

Thus, we can propose the fourth hypothesis based on the statement above to test the second purpose of this research is as follows:
H4: There is significant credibility of independent data access and extraction using Data Analytics, in reporting quality of Forensic Audit

3 Research Framework

Fig. 1. Research Framework Model. Source: Researcher Own Source.

3 Methodology/Materials

This research employs positivism philosophy as the basic foundation for this study. The approach of this research is deductive. Using the deductive approach, the hypotheses and theory were developed. This study uses a survey strategy to obtain relevant data from respondents to test the hypotheses. Furthermore, this research implements the mono method which is a quantitative study as this research involves collecting and assessing numerical data. Cross-sectional research will be employed to gather primary data by constructing a self-administered questionnaire (SAQ). The SAQ will be created via Google Forms and distributed through links and emails to the respondents. Likert scale were used ranging from Scale 1-Completely disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Completely agree. Lastly, data collection will be conducted among commercial banks employees and relevant data analysis will be implemented by using various statistical techniques to analyze the numerical data.

4 Results, Findings and Discussion

4.1 Reporting quality of forensic audit

Table 1. Analysis’s respondents understanding of Data Analytics usage for Audit. Source: Primary Data.

<table>
<thead>
<tr>
<th>Reporting Quality of Forensic Audit</th>
<th>Number of Respondents</th>
<th>Sum</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1. Data Analytics is a useful tool for accountants to</td>
<td>25</td>
<td>43</td>
<td>315</td>
<td>4.63</td>
</tr>
<tr>
<td></td>
<td>(36.8%)</td>
<td>(63.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
provide truthful data and reports to auditors

2. Data analysis through Data Analytic helps forensic auditors to perform their duties confidently

<table>
<thead>
<tr>
<th>1</th>
<th>23</th>
<th>44</th>
<th>315</th>
<th>4.63</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.5%)</td>
<td>(33.8%)</td>
<td>(64.7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Data Analytics improves forensic audit quality where data is easily analyzed, and audit findings are more accurate

<table>
<thead>
<tr>
<th>1</th>
<th>29</th>
<th>38</th>
<th>309</th>
<th>4.54</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.5%)</td>
<td>(42.6%)</td>
<td>(55.9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. As forensic auditor, this tool accommodates to audit plans and requirements

<table>
<thead>
<tr>
<th>1</th>
<th>19</th>
<th>45</th>
<th>312</th>
<th>4.59</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.5%)</td>
<td>(27.9%)</td>
<td>(66.2%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Completeness of audit findings are strengthened with the assistance of Data Analytics tool.

<table>
<thead>
<tr>
<th>1</th>
<th>23</th>
<th>44</th>
<th>315</th>
<th>4.63</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.5%)</td>
<td>(33.8%)</td>
<td>(64.7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Table 1 illustrate the frequency and mean for the agreement of respondents on the dependent variable which reporting quality of forensic audit. There consists of 5 statements for the dependent variable which emphasise on the current difficulties faced in reporting quality of forensic audit. Based on the Table 4.2.1, the highest mean value is 4.63 for S1, S2 and S5 and the lowest is 4.54 for S3. It means most of the respondents agrees on the requirement of high reporting quality on forensic audit needs. The second highest of mean is S4 which is 4.59 that shows the data analytic tools are important for forensic auditors. The lower mean is at 4.54 which indicate the data analytics do significantly assist in data analysis and to assist auditors draw proper audit conclusions.

4.2 Level of Opportunity Created by Data Analytics

<table>
<thead>
<tr>
<th>Opportunity created</th>
<th>Number of Respondents</th>
<th>Sum</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data Analytics allows auditors to build descriptive, prescriptive, and predictive analytics models to gather answers and evidence relating to key investigation areas.</td>
<td>3</td>
<td>23</td>
<td>42</td>
<td>311</td>
</tr>
<tr>
<td>2. Predictive analytics creates the opportunity and effective way of</td>
<td>3</td>
<td>27</td>
<td>38</td>
<td>307</td>
</tr>
</tbody>
</table>

Table 2. Level of Opportunity Created by Data Analytics.
testing an entire population and obtaining a higher assurance value.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Data analytics gives the opportunity for auditors to access the original source of each transaction and understand flow of data, instead of the summarized transactions recorded in the accounting system</td>
<td>306</td>
<td>51.5%</td>
<td>4.50</td>
<td>4</td>
</tr>
<tr>
<td>4. The Data analytic tool allows procedures performed to be automated and saved for future use. Efficiency can therefore be realized in future audits in which automated procedures are stored and run.</td>
<td>307</td>
<td>54.4%</td>
<td>4.51</td>
<td>3</td>
</tr>
<tr>
<td>5. The results of analytics performed gives an opportunity for auditors to presented to the management of an entity which may not be involved in the daily operations or its function</td>
<td>310</td>
<td>58.8%</td>
<td>4.56</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2 show the frequency and mean for the respondents’ opinion on the independent variable which is opportunities created by data analytics. 5 statements are prepared for this independent variable to researcher to understand the knowledge of respondents on the data opportunities created to forensic auditors. The highest mean of 4.57 is S1 where Data Analytics allows auditors to build descriptive, prescriptive, and predictive analytics models to gather answers and evidence relating to key investigation areas. This has been strongly agreed by most the respondents. Followed by next mostly supported statement, S5 “The results of analytics performed gives an opportunity for auditors to presented to the management of an entity which may not be involved in the daily operations or its function” which scored a mean of 4.45. Other areas S2, S3 and S4 ranges within means 4.51 and 4.50, which shows still holding strong support from the respondents. Their responses clearly show their awareness on Data Analytics and its benefits to forensic accountant’s service.

4.3 Level of Data Integrity using Data Analytics
Table 3. Level of Data Integrity using Data Analytics.

<table>
<thead>
<tr>
<th>Data Integrity</th>
<th>Number of Respondents</th>
<th>Sum</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data analytics software makes it easy to interrogate and extract data from</td>
<td>3 (4.4%)</td>
<td>25</td>
<td>40</td>
<td>309</td>
</tr>
<tr>
<td>multiple sources so that auditors can run tailored analyses efficiently and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effectively</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Extracting the data directly from a database ensures data integrity is</td>
<td>3 (4.4%)</td>
<td>32</td>
<td>33</td>
<td>302</td>
</tr>
<tr>
<td>maintained and can be cleansed and harmonized to make sure the auditors can</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manipulate the data as required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. It is also common to create visual displays of the data in which outliers</td>
<td>3 (4.4%)</td>
<td>27</td>
<td>38</td>
<td>307</td>
</tr>
<tr>
<td>and exceptions can be more easily identified as compared to a numerical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>presentation of data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Data stored in the analytics tool is highly accurate, reliable, and</td>
<td>1 (1.5%)</td>
<td>25</td>
<td>39</td>
<td>306</td>
</tr>
<tr>
<td>consistent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Data integrity allows key audit risk areas and identifying potential red</td>
<td>1 (1.5%)</td>
<td>28</td>
<td>39</td>
<td>310</td>
</tr>
<tr>
<td>flags through analyzing patterns and relationships between multiple sets of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>data in a client's business</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the level of data integrity using data analytics. The most significant statement is S5 that says data integrity allows key area of audit risk and identifying likely warnings through breaking down examples and connections between different arrangements.
of information in a client's business. This finding scored the highest mean of 4.56. S1 on Data analytics software makes it simple to examine and remove information from numerous sources so inspectors can run custom fitted investigations productively and really is rated second with mean of 4.54 which differs by 0.02 from S5. Third ranking is based on S3 which says it is additionally considered normal to make visual showcases of the information in which anomalies and exemptions can be all the more handily recognized when contrasted with a mathematical show of information, is rated at mean of 4.51. The rest of the S4 and S2 recorded means of 4.50 and 4.44 respectively, where respondents show strong support in terms of data integrity using data analytics.

4.4 Risk Associated with Data Analytics

<table>
<thead>
<tr>
<th>Risk associated</th>
<th>Number of Respondents</th>
<th>Sum</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Under the risk-based auditing, risk associated with a particular forensic investigation can be tested with a greater focus, using Data Analytic tools.</td>
<td>2 28 38 308</td>
<td></td>
<td>4.53</td>
<td>2</td>
</tr>
<tr>
<td>2.Data analytics facilitates the option of testing the entire population, thus improving coverage of audit procedures, and reducing or eliminating sampling risk and obtaining a higher level of assurance</td>
<td>2 29 37 307</td>
<td></td>
<td>4.51</td>
<td>3</td>
</tr>
<tr>
<td>3.Data analytics allow auditors to extract and analyze large volumes of data that assists in understanding the client, and help to identify audit and business risks accurately, to assist a better audit investigation.</td>
<td>1 33 34 305</td>
<td></td>
<td>4.49</td>
<td>4</td>
</tr>
<tr>
<td>4.Audit via data analytics gives an improved understanding of an entity’s operations and associated risks, including the risk of fraud.</td>
<td>2 32 34 304</td>
<td></td>
<td>4.47</td>
<td>5</td>
</tr>
</tbody>
</table>
5. With present state of technology, I am aware that there are risks associated with big data analytics. Various data protection features incorporated into the tool, guards against risks.

<table>
<thead>
<tr>
<th>Credibility of independent data access and extraction</th>
<th>Number of Respondents</th>
<th>Sum</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data Analytic tool offers visual and interactive models that enable auditors to interrogate the data in a simple and intuitive manner.</td>
<td>2 2.9% 27 39.7% 39 57.4%</td>
<td>309</td>
<td>4.54</td>
<td>2</td>
</tr>
<tr>
<td>2. Direct access to the client’s database ensures that completeness and accuracy are constantly verified in support of audit reliance</td>
<td>2 2.9% 30 44.1% 36 52.9%</td>
<td>306</td>
<td>4.50</td>
<td>4</td>
</tr>
<tr>
<td>3. Data Analytic tool offers secured IT environment to access data independently, and ensures data is always protected.</td>
<td>3 4.4% 25 36.8% 40 58.8%</td>
<td>309</td>
<td>4.54</td>
<td>2</td>
</tr>
<tr>
<td>4. Criteria of accuracy show the highest influence on the perception of credibility. It’s can be improvised via data analytics using comprehensive and reproducible algorithms</td>
<td>4 5.9% 28 41.2% 36 52.9%</td>
<td>304</td>
<td>4.47</td>
<td>5</td>
</tr>
</tbody>
</table>

The Table 4 illustrate on risks associated with data analytics and means of respondent’s agreements on dependant variable of reporting quality of forensic audit. Under this area, there were 5 sub statements tested. The highest mean value is 4.54 for S5 and the lowest is 4.47 for S4. It means most of the respondents were supportive on the risks associated with data analytics as important factor for dependant variable of study. The second highest of mean is S1 which is 4.53 that shows that under the risk-based auditing, risk associated with a particular forensic investigation can be tested with a greater focus, using Data Analytic tools.

4.5 The credibility of independent data access and Extraction using Data Analytics

Table 5. The credibility of independent data access and Extraction using Data Analytics.
to improve the veracity of big data.

5. By using data analytics, as forensic auditor, we conclude that an improvement of perceived credibility of sustainability reports is possible with help of big data analytics.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4%</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>33.8%</td>
<td>42</td>
<td>4.57</td>
</tr>
<tr>
<td>61.8%</td>
<td>311</td>
<td>1</td>
</tr>
</tbody>
</table>

The Table 5 represents the frequency and mean for the respondents results on dependent variable which is reporting quality of forensic audit. There consists of 5 statements for the dependent variable which emphasise on credibility of independent data access and extraction using Data Analytics. Based on the Table 4.2.5, the highest mean value is 4.57 for S5 and the lowest is 4.47 for S4. It means most of the respondents agree that by using data analytics, as forensic auditor, we infer that an improvement of seen believability of supportability reports is conceivable with assistance of big data analytics. The second highest of mean is S3 which is 4.54 that shows Data Analytic tool offers secured IT environment to access data independently, and ensures data is always protected. The moderate agreement for the statement of the credibility of data analytics usage are S1 and S3 with mean of 4.26.

### 4.6 Multiple regression

In the testing of developed hypothesis of this research, multiple regression analysis is performed to measure if the independent variable in individual can affect the dependant variable when other variables are held constant.

#### Table 5.2(a) Model summary. Source: Primary data.

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), IV4, IV1, IV2, IV3

R refers to the coefficient of multiple correlation ranging between -1 to +1 while R Square refers to the variability in outcome by the predictors ranging between 0 to 1. Table 5.2(a) shows that the R Square is 0.707 which indicates 70.7% variation in the DV can be explained by the IVs in this research which are opportunity, data integrity, risk managed and credibility of data access, whereas the remaining 29.3% is explained by other variables.
As per Field (2008), the importance level of assessing the outcome can be tried through Analysis of Variance (ANOVA). It is capable in comparing samples relating to numerical dependant variables and to determine if the results are explained precisely. In view of Dallal (2012), the Regression Sum of Squares in ANOVA is the error between Total Sum of Squares and Residual Sum of Squares. Other than that, the Total Sum of Squares alludes to the amount of fluctuation sum in the reaction and Residual Sum of Squares that not ready to be considered after the relapse model is taken on while the Regression Sum of Squares alludes to the changeability sum in the reaction that is considered by the regression model. The df is address the levels of opportunity which is the quantity of independent variables. The df is determined by taking away 1 from the quantity of factors (df = n-1) (Statistic How To, 2018). Additionally, F proportion is utilized to portray the changes between the variables. The significance level (p-value) of ANOVA ought to be not exactly or equivalent to 5% (p-value ≤ 0.05) which shows that the connection between two variables is significant and the null hypothesis should be rejected (Minitab Inc, 2016).

Table 5.2 (b) shows the df is 4 (df = 5-1 = 4) which means the degree of freedom generated by five variables involve opportunities created, data integrity, risk managed, credibility of data and reporting quality of forensic audit. In addition, the residual of degree of freedom is in accordance to the sample size for responses received which is 68. From this 68 of sample size, the 5 variables are deducted from the sample size to obtain 63. Next, the aggregate of 5 for degree of freedom calculation and 63 produce the outcome of 68 for the total of degree of freedom. Hence, it can be concluded that when the sample size increases, the degree of freedom, df also increases.

Furthermore, the F-ratio which presented in Table 5.2 (b) is 37.929 which is calculated by using the Regression of Mean Square divides with the Residual of Mean Square (2.360/.062=37.929). Besides that, based on Table 5.2 (b), it indicates the significance level is <0.001 which is lower than 0.05, so that the relationship between the dependent variable and independent variables which included opportunities created, data integrity, risk managed, credibility of data and reporting quality of forensic audit is significant among forensic auditors in Malaysia. Hence, the null hypothesis should be rejected.

5 Conclusion

As this study focussed on impact of data analytics to reporting quality of forensic audit, the research was dedicated on four independent variables which involves opportunity creation via data analytics, data integrity, risk management and credibility on data extraction. These independent variables are not sufficient to evaluate the overall radius on data analytics, as firstly data analytics is fast evolving with newer updates and technologies, and secondly, there are still wide room for detailed and more insightful research can be carried out to improve the findings for future researchers. On the demography population, more range of
professionals and industries can be added into the research to provide more concrete findings and responses on data analytics, to look for more itemized data to improve the topic of the exploration. Literature reviews can be expanded more into significant and relevant areas and sub-areas in digital evolving economy, which is suggested for future study. In terms of sample and population sizes, can be increase too, to gauge more accurate and real time results for the study.

In this study, 68 respondents gave their views and feedbacks into the study, is less adequate coverage for Malaysia. Recommendation to future researchers to boost the respondent’s size, to cover more areas, and collect more views to reach an exhaustive determination and present the exact characterized information in the review. Additionally, the study was focussed on impact of data analytics on a specific field of industry, suggestion is to expand the coverage to cater for more fields globally.

On the data analysis tools, the statistical analysis software used in this research is SPSS. The future analysts are proposed to endeavour other programming to direct the information examination to give more dependable and huge outcomes for this review. Along these lines, it ready to make the more noteworthy mindfulness on impact on data analytics on reporting quality of forensic audit.

Data analytics are very important tool to assist real time business operators, to provide quality and realistic data reflection about their business and future. The benefits of data analytics usage offer tremendous improvement and growth, with stronger sustainability for business to strive through future. This gives confidence to auditors, especially in forensic field, to perform their investigations and findings to confirm reliability of financials of their customers. Not only improves the integrity and relationship between customers and forensic audit service providers, but it also gives a trust and satisfactions to stakeholders to invest and continue to support businesses to grow. It can be concluded that Data Analytics are strongly recommended for businesses, and for professional accountants and audit fields, to continue to adopt to the technology to have improved future.

6 Recommendation

The forensic accountants are a home of experts that is supposed to show an excited reaction towards the advancing savvy and computerized innovation; proceeded with globalization of detailing and exposure norms; and the new types of guidelines that accompany AI. This is on the grounds that forensic accountants have forever been a calling that plans to work on the nature of business and venture choices drastically. To understand this potential, the calling needs to zero in on basic business issues it intends to tackle and consider upon how advances like AI can increase their methodologies. The following recommendations are for forensic accountants, to guide them in diverting their privilege towards making advanced progress, which is basically acquiring a harmony among disruption and business.

Firstly, to have advanced technique planning - includes distinguishing, figuring out and carrying out smart arrangement that directs each decision-production to remember contemplation for how innovation could further develop the navigation of forensic analysis and reporting. This is basic as it doesn't just test yet upgrade the digital maturity of the profession – thereby improving digital capability development.

Second, pilot project creation - includes in doling out projects for model to assist forensic accountants to analyse and find what works best in analysing and reporting business reports.

Third, to harness the right skillsets in using data analytics – forensic accountants are required to equip themselves with the required skills on technology application, in prioritizing the tech-capabilities needed for organization, people, process and technology.

Fourth, turning into an information virtuoso - features that forensic accountants is an information escalated calling, thus is supposed to can distinguish and accumulate the right
information, send it for the right reason and actually investigate it. This should be possible by zeroing in on prescient examination and estimating, prescriptive investigation, business driven independent direction and mechanized criticism to the association.

Fifth, technological enterprise development – in this, forensic accountants and organisations who provide the services should endure on transforming towards the digital culture which preserves talent, demonstrate strong and clear leadership skills, involvement and ownership in discovering a balance between data analytics and businesses.

Additionally, is based on biological system arranging - features that since disturbance is an environment peculiarity, rather than zeroing in on even and vertical mix inside association, the forensic accountants should shift their focus into broader prospective in supporting client needs and use digital technologies to create and deliver value to client in an integrated, innovative way.

As emerging technology is a wide subject and there is no sureness and consistency in the degree of reception in each firm, future examination should be possible to concentrate on a how evaluators in a comparative review firm see a specific innovation, for example, AI or RPA. Cooperation should be possible with a particular firm to get worker interest cross country so a higher reaction rate could be accomplished. This would permit the firm in intended for acknowledge how the workers are embracing AI in their work scope.

This study which reveals significance of timing in the usage of emerging technology could also be further researched to find out if training, for instance, can be improved to facilitate auditors’ adoption. The level of training that firms provide to auditors in handling emerging technology systems to detect and prevent fraud and error, can be incorporated into audit testing and as research area because updates on accounting standards and policies or ways to complete procedures for specific account balances will often be emphasized but rarely looking from the IT proficiency viewpoint.

7 Limitation of the Study

There are a few restrictions conveyed by this research which limits the validity of the findings. The participants of this research were moderately minority population, which can't be summed up as the view of all Malaysian Forensic Accounting bodies and service providers. Even though this research were confined to most forensic service providers, their responses might not have been balanced between firms, therefore, there are possibility of over representation of one firm to another. Major forensic service providers could likewise give socially advantageous reactions to safeguard their profession and organisations they service. Furthermore, each firm would shift in the gathering level of arising innovation in review testing which would bring about irregularity in answering to the questionnaire. Furthermore, the usage of emerging technologies used to be an optional element for organisations. There are additionally numerous different factors fit to impact misrepresentation identification yet are not tried in this examination.

Reference

5. Al-Ateeq, Bara’ah & Sawan, Nedal & Al-Hajaya, Krayyem & Altarawneh, Mohammad & Al-Makhadmeh, Ahmad, Corporate Governance and Organizational Behavior Review **6**, 64-78 (2022) DOI: 10.22495/egobrv6i1p5
26. Dowling C, Leech S. Audit support systems and decision aids: current practice and
46. Greenstein M, Mckee TE. Assurance practitioners' and educators' self-perceived IT


58. Hunton JE, Wright AM, Wright S. Are financial auditors overconfident in their ability to assess risks associated with enterprise resource planning systems?


Institute, Big data: The next frontier for innovation, competition, and productivity, (2011).


118. Tsao, G. (2021). What are the Factors that Influence the Adoption of Data Analytics and Artificial Intelligence in Auditing?.


125. Vanecek MT, Soloman I, Mannino MV. The data dictionary: an evaluation from the ECP audit perspective. MIS Quart 1983;13.