The African Journal of Comprehensive Auditing

Issue no. 25
December 2022

(Special Issue on the Occasion of Holding of the AFROSAI General Assembly)

The 15th AFROSAI General Assembly Meetings

(First Part - Second Part)

(First Part)
Dakar- Senegal
(7-9 July 2021)
Virtually

(Second Part)
Dakar- Senegal
(17-18 March 2022)
Hybrid

The African Journal of Comprehensive Auditing is annually issued in December in three languages, i.e., Arabic, English and French, in order to provide staff of the AFROSAI member SAIs with various technical themes and regional and international news related to audit work .

It is worthy to mention that all articles and ideas published in the Journal do not represent the views of AFROSAI and its Board of Editors but rather express the views of their writers.

The Board kindly invites staff of the AFROSAI member SAIs to furnish it with any articles, ideas and proposals for publication in this journal via the following addresses:

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The Editorial

Editorial of

H.E Counsellor/ Hesham Badawy

Editor-in-Chief of the Journal

H.E Counsellor/ Hesham Badawy
President of the Accountability State Authority - Egypt

The Special Issue no. 25 - December 2022 of the African Journal of Comprehensive Auditing is published on the occasion of holding the AFROSAI General Assembly Meetings that are conducted every three years. The 15th AFROSAI General Assembly Meeting was intended to take place in the year 2020. However, due to the repercussions of the COVID-19 pandemic that have plagued the whole world in addition to the total lockdown imposed by the pandemic's precautionary measures, the 15th AFROSAI General Assembly has been postponed to be held in the year 2021.

The 15th AFROSAI General Assembly was held in two parts, in the first incident of its kind: Part One was held virtually during the period from the 7th to the 9th of July 2021 chaired over by the Senegal Court of Auditors while Part Two was held in a hybrid format during March 17th and 18th, 2022 hosted by the Senegal Court of Auditors in Dakar.

I would like to express my thanks and appreciation to H.E Mr. Junias E KANDJEKE; the Auditor General of Namibia and the former AFROSAI President, for his effective efforts during his tenure as the AFROSAI President. In addition, I congratulate H.E. Mr. Mamadou FAYE, First President of the Senegal Court of Auditors, for assuming the post of the AFROSAI President wishing him all success

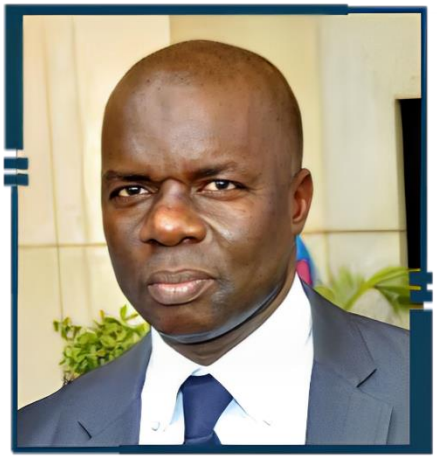
in fulfilling more achievements and successes for our African Organization. Also, I would like to appreciate their efforts that were concluded by implementing a number of achievements, the most important of which are updating the AFROSAI's Statutes as well as restructuring its organizational structure which contribute to the achievement of the AFROSAI's objectives. I would like to seize this opportunity to extend my great thanks and gratitude to H.E. Mrs. MBAH ACHA Rose FOMUNDAM, the AFROSAI Secretary General, and to the associate team for their efforts to facilitate and promote the Organization's work and seeking to elevate it.

The Special Issue no. 25 (December 2022) of the African Journal of Comprehensive Auditing includes the most prominent topics that were discussed during the 15th General Assembly; including the resolutions issued by the General Assembly which reflect the Organization's vision for keeping pace with the development in the field of financial audit and governance, as well as the winning scientific researches in the framework of the AFROSAI Scientific Competition 2020 which contributes to the knowledge reinforcement of the SAIs' members in addition to enabling them to practice audit using information technology under the title "The Impact of Technological Innovation on Audit Evidence ", which has become an essential requirement for the empowerment of future auditor.

In conclusion, I would like to point out the most important recommendations of the Dakar Agreement which include integrating the needs related to the digitization and automation of audit processes and the related partnership's needs to the SAIs' strategic planning processes, as well as increasing the information technology audit and improving the data analysis of: Compliance, Performance and Financial audits.

Welcome Speech by H.E Mr. Mamadou FAYE, First President of Senegal Court of Auditors Incoming President of AFROSAI

First Part of the 15th AFROSAI General Assembly



- The Auditor General of Namibia, President of AFROSAI,
- Madam Minister, The Secretary General of AFROSAI,
- Dear Secretary Generals of the Language Sub Groups of AFROSAI,
- The Heads of Supreme Audit Institutions,
- The Prosecutor General of the Court of Auditors of Senegal,
- Distinguished Magistrates of the Court of Auditors,
- Dear financial and technical partners,
- Dear delegates,
- Distinguished guests,
- Ladies and gentlemen,

You certainly understand why I start by expressing gratitude to the Heads of Delegations and to all other participants who have honored our invitation to participate in the 15th General Assembly meeting of the African Organization of Supreme Audit Institutions (AFROSAI).

I am also pleased to wish you a warm welcome to Dakar which has been waiting for you since it was chosen as host of this General Assembly. But, unfortunately, COVID-19 forced us to hold this meeting on-line.

Ladies and Gentlemen,

I would like to seize this opportunity to express my gratitude to the President of the Republic, His Excellency Macky Sall and to his Minister of Finance and Budget for the remarkable support they gave the Court of Auditors in organizing this meeting.

To conclude, dear participants, I sincerely wish us a successful meeting and hope that the decisions that shall be taken enable our SAIs to better contribute, by making recommendations, to a proper and transparent management of the public funds of our beloved continent.

Thanks for your kind attention.

Acceptance Speech by H.E Mr. Mamadou FAYE

First President of Senegal Court of Auditors

Incoming President of AFROSAI

- The Auditor General of Namibia, President of AFROSAI,
- Madam Minister, The Secretary General of AFROSAI,
- Dear Secretary Generals of the Language Sub Groups of AFROSAI,
- The Heads of Supreme Audit Institutions,
- The Prosecutor General of the Court of Auditors of Senegal,
- Distinguished Magistrates of the Court of Auditors,
- Dear financial and technical partners,
- Dear delegates,
- Distinguished guests,
- Dear Participants,

I would like to begin by expressing my profound gratitude to the Heads of Supreme Audit Institutions who have just elected me as President of the prestigious African Organization of Supreme Audit Institutions (AFROSAI).

This confidence placed in my person simply reflects the excellent work of my predecessors, Mr. Abdou Bame GUEYE and Mr. Mamadou Hady Sarr, former First Presidents of the Court of Auditors of Senegal, who earned your trust in 2017 at Windhoek, prompting you to choose Senegal as host of the 15th General Assembly of our cherished Organization.

I would also like to heartily thank Madam Minister, Secretary General of AFROSAI and her General Manager for the remarkable and noticeable work they are doing to enhance the performance of AFROSAI as well as for the remarkable and constant support they have continuously given our Court of Auditors in preparing this meeting.

Mr. President Kandjeke, I would like to commend the success you achieved during your term of office despite operating in a difficult context, particularly influenced by COVID-19. I equally commend the leadership you continuously showed during your term of office.

Special mention to financial and technical partners.

Dear Heads of SAIs,

The President you have just elected is a graduate of the Ecole Nationale d'Administration et de Magistrature (National School of Administration and Magistracy) of Senegal, who has served his country for 33 years. He served as Minister of African Economic Integration for 12 years and spent 21 years at the Senegalese Court of Auditors where he served as Public Auditor, Chief Counsellor, President of Chamber of Budgetary and Financial Affairs before becoming The First President.

He is therefore a specialist in state budget issues in general and in the follow-up of the implementation of finance laws in particular.

Ladies and gentlemen,

Today is also a day of commitment for me.

During my term, AFROSAI will strive to be more modern and efficient. To achieve this feat, the Organization shall;

- Improve its organizational framework and its internal governance mechanism;
- Increase its human resources both qualitatively and quantitatively;
- Improve its communication and relationship with stakeholders;
- Provide itself with a befitting headquarters;

I will equally ensure that AFROSAI contributes significantly to encourage SAIs to commit themselves to more professionalism, greater independence as well as in assisting our countries in assessing the attainment of the Sustainable Development Goals (SDGs), which are part of the Agenda 2030 of the United Nations.

I equally intend to strengthen the partnership between AFROSAI and the six (6) other regions of INTOSAI as well as the donor community of INTOSAI so as to secure more support for AFROSAI.

Lastly, I would like to indicate that I am fully committed to collaborate with the African Union and African economic integration organizations, especially in the quest for a lasting solution to the problem of funding the operations and activities of AFROSAI.

To conclude, I would like to assure you that as President, I would be at the service of all member SAIs ad LSGs of our Organization.

And I will do my best to serve the best interest of AFROSAI.

I therefore count on the support of the Secretariat of AFROSAI, the LSGs, the SAIs themselves by referring to the strategic plan which shall be my compass.

Thanks for your kind attention.

Summary of the First Part of the 15th AFROSAI General Assembly (July 8th-9th, 2021)

The first part of the 15th AFROSAI General Assembly was held virtually during the period (July 8th-9th, 2021), in the presence of about 132 participants representing 36 AFROSAI member Supreme Audit Institutions (SAIs), AFROSAI observers, and a representative of the (GIZ) as the AFROSAI Technical and Financial partner.

The activities of this meeting were preceded by the 56th AFROSAI Governing Board Meeting which was held on July 7, 2021, in the presence of 12 AFROSAI member SAIs, representing the presidency and the members of the AFROSAI Governing Board (then), as follows:

- SAI Namibia - President of the AFROSAI Governing Board.

- SAI Senegal - First Vice-President of the AFROSAI Governing Board.

- SAI Egypt - Second Vice-President of the AFROSAI Governing Board. Its President is the Second Honorary President of AFROSAI.

- SAI Gabon - Its President is the First Honorary President of AFROSAI.

- SAI Cameroon - Headquarters of AFROSAI.

- The AFROSAI Governing Board Member SAIs: Algeria, Burundi, Côte d'Ivoire, Mozambique, Sierra Leone, South Africa, and Morocco.

In addition to the representative of the (GIZ) as the AFROSAI technical and financial partner and the heads of the AFROSAI technical committees of (The AFROSAI Capacity Building Committee and the AFROSAI Knowledge Sharing and Management Committee).

During the said meeting, the minutes of the 55th AFROSAI Governing Board was adopted.

All topics to be presented to the AFROSAI General Assembly were approved.

Hereunder the main proceedings of the first part of the 15th AFROSAI General Assembly:

1- The opening speech was delivered by the President of AFROSAI (President of SAI Namibia).

2- H.E. Mr. Mamadou FAYE – First President of the Senegal Court of Auditors – was appointed as the new President of AFROSAI – and handed over the duties of the presidency of AFROSAI. H.E. delivered a speech accepting the position.

3- The quorum was verified, the agenda was presented, and the tenth and eleventh items related to the statutes, regulations and procedures of the AFROSAI Governing Board were cancelled and postponed to the second part of the General Assembly. The agenda was approved after the amendment. The regulations and procedures of the General Assembly were presented and approved.

4- The General Auditor of Namibia presented his report with the results achieved during his tenure. The report focused on strengthening and improving the governance of AFROSAI by reviewing the basic documents of the organization, including the statutes and internal regulations of the Governing Board and the organizational chart of the organization and its added value to society as well as participating in supporting the regional sub-groups' activities. His Excellency also presented the efforts made to create memoranda of understanding with regional organizations, including the African Union, in addition to developing a strategic plan for the organization while respecting the values of INTOSAI during the period (2017-2020), with the aim of making the AFROSAI a model organization to be emulated.

5- Presenting the activities report and the financial report of the AFROSAI Secretary General.

6- Presenting the reports of the AFROSAI technical committees.

7- Presenting the report of the activities of the AFROSAI Working Group on Environmental Auditing (WGEA).

8- Presenting the report of the African Journal of Comprehensive Auditing.

9- Presenting the report of the AFROSAI sub-regional organizations.

10- Approving the draft AFROSAI strategic plan (2022-2027).

11- Approving the draft AFROSAI budget (2021-2023).

12- Renewal of AFROSAI bodies.

13- Approval of the new AFROSAI Governing Board composition.

14- Determining the host body for the next AFROSAI General Assembly.

15- Presenting the organization's position to host the INCOSAI XXV in 2025, which will be hosted by the ASA of Egypt.

16- Extending the term of the members of the Governing Board till the holding of the 16th General Assembly in 2024.

Summary of the 57th AFROSAI Governing Board Meeting (July 9, 2021)

The 57th AFROSAI Governing Board Meeting was held after the end of the 15th AFROSAI General Assembly with the new formation as follows:

- SAI Senegal – President of the AFROSAI Governing Board in its capacity as the host of the 15th AFROSAI General Assembly.
- SAI Libya - member of the Arabic-speaking Sub-Regional Organization - First Vice-President of the AFROSAI Governing Board – in its capacity as the host of the 16th AFROSAI General Assembly.
- SAI Namibia - Second Vice-President of the AFROSAI Governing Board in its capacity as the host the 14th AFROSAI General Assembly.
- SAI Cameroon - Headquarters of AFROSAI.
- SAI Tunisia and SAI Sudan - representatives of the Arabic-speaking Sub-Regional Organization.
- SAI Mozambique and SAI Somalia - representatives of the English-speaking Sub-Regional Organization.
- SAI Côte d'Ivoire and SAI Djibouti - representatives of the French-speaking Sub-Regional Organization.
- SAI Algeria - representative of AFROSAI in the INTOSAI Governing Board.
- SAI Egypt - Chair of the Editorial Board of the African Journal of Comprehensive Auditing. Its President is the second Honorary President of AFROSAI.
- SAI South Africa - Member of the INTOSAI Governing Board and Chair of the INTOSAI Capacity Building Committee.
- SAI Gabon - Its President is the First Honorary President of AFROSAI.

The selection of the host for the next AFROSAI Governing Board was discussed, and Djibouti and Libya offered to host.

It was agreed that SAI Djibouti will host the next AFROSAI Governing Board.

Resolutions of the First Part of the 15th AFROSAI General Assembly (July 8th-9th, 2021)

The delegations of the Supreme Audit Institutions participating in the first part of the 15th AFROSAI General Assembly, held virtually on July 8th-9th, 2021, headed by Mr. Mamadou FAYE; President of the Court of Auditors of Senegal, deliberated and adopted the following decisions regarding the following items on the agenda:

Resolution No. (001/2021/15AG/AFROSAI) of July 8, 2021 on the Appointment of the New President of AFROSAI Governing Board

Considering: The Statutes of AFROSAI;

Considering: Resolution 004/2017/AG/ AFROSAI of 27 October 2017 on the other items of the agenda of the 14th General Assembly, in its 19th point which is based on the selection SAI to host the 15th General Assembly of AFROSAI;

Considering: The Rules and Procedures of the Governing Board of AFROSAI;

The General Assembly:

Appoints the First President of the Court of Auditors of Senegal as President of the Governing Board of AFROSAI for a non-renewable three-year term, starting from 8 July 2021.

The Secretary General is responsible for ensuring the implementation of this resolution which shall be registered.

Resolution No. (002/2021/15AG/AFROSAI) of July 9, 2021 Recognizing the Extension of the Mandate of Members of AFROSAI Governing Board and that of the Presidents of Technical Committees

Mindful of: The provisions of article 8 paragraph 1 of the Statutes of AFROSAI which provides that the General Assembly shall hold every three (3) years;

Considering: Resolution 004/2017/AG/ AFROSAI of 27 October 2017 on the other items of the agenda of the 14th General Assembly, in its 19th point which is based on the selection SAI to host the 15th General Assembly of 2020 AFROSAI scheduled for 2020;

Given: The force majeure related to COVID-19, which led to the tacit postponement of all events and activities of AFROSAI in 2020.

Considering: Circular Letter 0018/L/PR/ AFROSAI/ SG/DPS of 15 June 2021 convening the 15th AFROSAI General Assembly on-line on the 8th and 9th of July 2021.

The General Assembly:

Recognizes the extension of the term of members of the Governing Board of AFROSAI and that of the Presidents of the Technical Committees until 8 July 2021.

This resolution will be registered and publish where wherever necessary.

Resolution No. (003/2021/15AG/AFROSAI) of July 9, 2021 on the Extension of Mandate of the AFROSAI Organs and the Adjustment of the Budgetary and Strategic Cycles.

Considering: The provisions of article 8 paragraph 1 of the AFROSAI Statutes which provides that the General Assembly shall hold every three (3) years;

Considering: Resolution No. (004/2017/AG/ AFROSAI) of 27 October 2017 on the other items of the agenda of the 14th AFROSAI General Assembly, in its (point 19) which is based on the selection of the SAI to host the 15th AFROSAI General Assembly in 2020;

Given: The force majeure related to the COVID-19 Pandemic, which led to the tacit postponement of all events and activities of AFROSAI in 2020

Considering: Circular Letter No. (0018/L/ PR/AFROSAI/SG/DPS) of 15 June 2021 convening the 15th AFROSAI General Assembly on-line on the 8 and 9 July 2021;

Considering: Resolution No. (002/2021/ 15AG/AFROSAI) of 9 July 2021 recognizing the extension of the mandate of the AFROSAI Governing Board members and that of Presidents of Technical Committees.

The General Assembly:

Decides that the mandate of the members of the Governing Board takes effect from 9 July 2021 till the holding of the 16th General Assembly in 2024.

Consequently, **extends** the duration of the term of the SAI Cameroon as headquarters of AFROSAI till 2024 as well as the strategic and budgetary cycles as follows:

Strategic Cycle; from 2022 to 2027;

Budgetary Cycle; from 2022 to 2024.

The President of the Governing Board and the Secretary General, in their various areas of competence, are responsible for the implementation of this resolution.

Resolution No. (004/2021/15AG/AFROSAI of July 9, 2021 on the Adoption of the AFROSAI 2022-2027 Strategic Plan

After reviewing the AFROSAI 2022-2027 Strategic Plan draft as well as the contributions made thereafter by its members;

Considering: The ambition to make AFROSAI a leading international organization at the service of proper financial governance;

Considering: The need to improve the organizational and operational system of AFROSAI;

Considering: The strong will of the member SAIs to enhance the visibility of AFROSAI;

The General Assembly:

1. **Adopts** the AFROSAI 2022-2027 Strategic Plan, subject to the amendments that shall be made on the draft Statutes of AFROSAI.
2. **Mandates** the General Secretariat to edit, multiply and widely disseminate the Strategic Plan to SAI members using appropriate mechanisms.
3. **Authorizes** the General Secretariat to recruit a permanent staff whose aggregate salary will not exceed 30% of the total budget of AFROSAI.
4. **Mandates** the Governing Board to approve the appointment of the new Presidents and members of the AFROSAI Technical Committees after consultations with the SAI members by the General Secretariat.
5. **Mandates** the General Secretariat to finalize important activities initiated by the SAI Senegal and Kenya in their capacities as Presidents of the AFROSAI Technical Committees under the implementation of the former AFROSAI Strategic Plan.

The President of the Governing Board and the Secretary General, in their various areas of competence, are responsible for the implementation of this resolution.

Resolution No. (005/2021/15AG/AFROSAI) of 9 July 2021 on the Other Items on the Agenda of the 15th AFROSAI General Assembly

1. Adoption of the Agenda

The General Assembly **adopted** the agenda with the exception of the items on the Draft Statutes of AFROSAI and the Rules and Procedures of the Governing Board, which shall be reviewed during the second part of the General Assembly- scheduled for Dakar, Senegal at the end of the year- dedicated to technical issues.

2. Progress Report of the Outgoing President of AFROSAI

The General Assembly:

- **Approves** the report presented by the Auditor General of Namibia, outgoing President of the Governing Board.
- **Expresses** its gratitude to this SAI for the numerous and multifaceted efforts it made to give AFROSAI fresh impetus.

3. Progress Report of the Secretary General of AFROSAI

The General Assembly:

- **Approves** the progress and financial report of the Secretary General;
- **Authorizes** the General Secretariat to continue with activities undertaken, in synergy with the Governing Board, the Technical Committees, the Language Sub Groups, the Working Groups and the SAI members of AFROSAI.

4. Reports of the Capacity Building Committee and the Knowledge Management and Sharing Committee

The General Assembly:

- **Approves** the report presented by the First President of the Court of Auditors of Senegal, in his capacity as Chair of the Capacity Building Committee of AFROSAI as well as the supporting documents.

- **Approves** the report presented by the Auditor General of Kenya, in its capacity as Chair of the Knowledge Management and Sharing Committee

5. Progress Report of the AFROSAI Working Group on Environmental Auditing

The General Assembly:

- **Approves** the progress report of the Working Group on Environmental Auditing, presented by the Auditor General of the Federation of Nigeria;
- **Reiterates** the attributions of the Working Group for the continuation of activities undertaken, in synergy with the Governing Board, the Technical Commissions, the Language Sub Groups and the members of AFROSAI.

6. Report of the Editorial Board of the African Journal of Comprehensive Auditing of AFROSAI

The General Assembly:

- **Approves** the report presented by the Chairperson of the Editorial Board of the African Journal of Comprehensive Auditing.

7. Report of the Language Sub Groups

The general Assembly **takes note** of the reports presented by the Secretariats of AFROSAI-A, AFROSAI-E and CREFIAF.

8. Presentation and Approval of the 2021-2023 budget of AFROSAI

The General Assembly:

- **Approves** the 2021-2023 three-year budget of AFROSAI which is balanced in revenue and expenditure to the tune of 242,610 USD/year for three years .
- **Approves** the adjustment of the 2022-2024 budgetary cycle of AFROSAI.

9. New Governing Board Members

The General Assembly **approves** the following composition of the Governing Board for a renewable three-year term, starting from this General Assembly.

President: SAI Senegal in its capacity as host of this 15th General Assembly of AFROSAI;

First Vice President: SAI Libya, which shall host the 16th General Assembly of AFROSAI;

Second Vice President: SAI Namibia in its double capacity as the SAI that hosted the 14th General assembly of AFROSAI and the representative of AFROSAI in the Governing Board of INTOSAI.

Members:

- **SAI Cameroon** hosting the General Secretariat of AFROSAI;
- **SAI Sudan and SAI Tunisia**, representatives of AFROSAI-A;
- **SAI Mozambique and SAI Somalia**, representing AFROSIA-E;
- **SAI Côte d'Ivoire and SAI Djibouti**, representatives of CREFIAF;
- **SAI Algeria** in its capacity as representative of AFROSAI in the Governing Board of INTOSAI
- **SAI Egypt** in its capacity as the Chairperson of the Editorial Board of the African Journal of Comprehensive Auditing.
- **SAI South Africa**, member of the Governing Board of INTOSAI, Chair of the Capacity Building Commission of INTOSAI.
- **SAI Gabon**, its President is the Honorary President of AFROSAI.

10.Appointment of Auditors of AFROSAI

The General Assembly:

- **Appoints** SAI Chad and SAI Democratic Republic of Congo as Senior External Auditors for a three-year term;
- **Authorizes** the Governing Board to approve the candidacies of Alternate External Auditors

11.Appointment of the SAI to host the next General Assembly

The General Assembly **approves** the candidacy of SAI Libya as host of the 16th General Assembly of AFROSAI, which shall hold in 2024.

Closing Speech by Mr. Mamadou FAYE
First President of Senegal Court of Auditors
Incoming President of AFROSAI

- The Auditor General of Namibia, the Outgoing President of AFROSAI,
- Madam Minister, The Secretary General of AFROSAI,
- Dear Secretary Generals of the Language Sub Groups of AFROSAI,
- The Heads of Supreme Audit Institutions,
- The Prosecutor General of the Court of Auditors of Senegal,
- Distinguished Magistrates of the Audit Bench,
- Dear financial and technical partners,
- Dear delegates,
- Distinguished guests,

Having arrived at the end of our deliberations for the 15th General Assembly, on behalf of all the staff of the Court of Auditors of Senegal, I would like to renew my gratitude respectively to;

- The President of the Republic, Macky Sall, Board Chair of the Court of Auditors;
- The Minister of Finance and the Budget;
- Madam Minister; The Secretary General of AFROSAI and her collaborators;
- The Heads of the Language Sub Groups;
- The Heads of Supreme Audit Institutions;
- Financial and technical partners;
- And to all the organizers of this meeting (the staff of the Court of Auditors, the media, interpreters and hotels).

In the course of these two-day deliberations, we have discussed and adopted the reports of the Outgoing President of AFROSAI, the Secretary General, the technical commissions, Working Group on Environmental Auditing, the Editorial Board of the AFROSAI journal and that of Language Sub Groups.

We equally reviewed the 2022-2027 Strategic Plan and the draft three-year budget of AFROSAI, renewed the organs of AFROSAI and chose the host of the next General Assembly.

Dear Heads of SAIs,

The open and interesting exchanges we had during our deliberations enabled us to collectively observe that our beloved Organization has made remarkable achievements but that there is still much to be done to make AFROSAI more modern and efficient.

In other words, within the next 3 years, we will have to meet the challenges which await us especially the proper financing of the operations and activities of AFROSAI, the improvement of its organizational framework, its internal governance as well as its communication mechanism in order to make its achievements more visible. We will also have to pay our annual contributions and assist AFROSAI in recovering arrears.

Fortunately, all the participants have manifested the willingness to meet these challenges that await us.

Dear Heads of SAIs,

Our greatest wish is that the decisions taken during our deliberations be applied and that a significant proportion of the Strategic Plan of AFROSAI should be executed to this end, SAI members of our organization will be required to be fully committed, to be completely mobilized and to participate more actively in the activities of AFROSAI.

In any case, your active participation in this General Assembly, the quality of your excellent speeches and your determination undoubtedly assure us that these challenges shall be met for the benefit of AFROSAI and the citizens of Africa in turn.

It is on this note of hope and expectation that I invite you to Dakar in November 2021 and declare the 15th General Assembly of AFROSAI closed.

Summary of the Second Part of the 15th AFROSAI General Assembly Dakar - Senegal (March 17th-18th, 2022)

The second part of the 15th AFROSAI General Assembly was held in Dakar, Senegal, during the period (March 17th-18th, 2022) at the King Fahd Hotel, with the attendance (physically and virtually) of 180 participants from 42 AFROSAI member SAIs and 9 international and regional organizations.

The activities of the AFROSAI General Assembly were preceded by an Extraordinary Meeting of the AFROSAI Governing Board headed by H.E. Mr. Mamadou FAYE - First President of the Senegal Court of Auditors, President of the AFROSAI Governing Board and, where all the topics to be presented to the General Assembly in its second part were approved.

Regarding the 15th AFROSAI General Assembly which was held during the period (March 17th-18th, 2022):

Mr. Mamadou Faye, First President of the Senegal Court of Auditors and the President of the Meeting inaugurated by welcoming the AFROSAI General Secretary and the Heads of delegations of the participating SAIs, and expressed his thanks to the President of the Republic of Senegal for his support to the Senegal Court of Auditors, as well as the Minister of Finance of Senegal, the President of the Austrian Court of Audit; the INTOSAI General Secretary, and the President of SAI Brazil Which will host the INCOSAI XXIV in Rio de Janeiro in November 2022. Mr. FAYE also thanked the General Auditor of Namibia and the AFROSAI Secretary General for their efforts towards the Organization.

His Excellency stated that the second part of the General Assembly aims to endorse the AFROSAI statutes and the rules of procedures of the AFROSAI Governing Board, the organizational chart, the formation of technical committees and the result of the scientific competition; The ideas that will be exchanged during the workshops on the control of extractive industries and Big Data will contribute to strengthening governance in our countries and raising the level of performance of our SAIs.

Hereunder the main proceedings of the second part of the 15th AFROSAI General Assembly:

1. The agenda and the rules of procedures of the Governing Board, as well as the amendments to the AFROSAI Statutes, were adopted and the Governing Board was mandated to implement the new Statutes.
2. The draft organizational chart of the interim Executive Directorate was adopted, bearing in mind that the transitional period is from 2022 to 2024.

3. The formation of the two technical committees was announced and endorsed by the General Assembly as follows: (1) The Institutional and Technical Capacity Building Committee which is composed of 23 SAIs headed by SAI Kenya (TICBC), and (2) The Organizational Capacity Building Committee (OCBC) which is composed of 22 SAIs headed by SAI Niger.

4. The results of the scientific competition for the year 2020 endorsed by the Governing Board were approved. The researches presented in the competition were evaluated through the Scientific Committee headed by SAI Kenya, with the membership of the SAIs Egypt, Zimbabwe, Chad, Senegal, Tanzania, Liberia, Cameroon, Mauritania, and Libya (where Libya replaces Mauritania in the evaluation of researches in Arabic). The committee concluded that the SAI Ethiopia won the first place (a prize of 1500 dollars), SAI Egypt and SAI Kenya won the second place and shared the prizes for the second and third places (by 750 dollars each). During the award ceremony, it was announced that the three winners will receive a study trip and a training workshop, in addition to the announced financial prizes.

5. The conclusion of the activities of the second part of the 15th AFROSAI General Assembly, with several resolutions, as well as the Dakar Agreement, includes the following:

Resolutions of the Second Part of the 15th AFROSAI General Assembly

The Heads of Supreme Audit Institutions (SAIs), members of the African Organization of Supreme Audit Institutions (AFROSAI), representing the General Assembly, gathered in Dakar, Senegal, on the occasion of the second part of the 15th AFROSAI General Assembly, held on March 17-18, 2022, took the following resolutions:

Resolution No. (006/2022/15AG2/ AFROSAI) of March 18, 2022 Adopting AFROSAI's Statutes

Considering: The ambition to make AFROSAI a modern Organization which meets its members' aspirations;

Considering: The need to improve the organizational and operational system of AFROSAI;

Considering: The strong will of member SAIs to increase the visibility of AFROSAI;

Considering: The outcome of works in Working Group charged with the review of the Statutes;

Considering: The favorable opinion of the Governing Board for the transmission of AFROSAI's draft Statutes from the Governing Board to the General Assembly for review and adoption;

Having taken into account: the contributions of SAIs members expressed during the plenary discussions on various aspects of the draft Statutes of AFROSAI;

The General Assembly:

Adopts AFROSAI's Statutes;

Mandates the Governing Board to provisionally approve the implementation of texts for the said Statutes, particularly those related to AFROSAI's operational rules, the procedural rules of the General Assembly, the financial regulations of AFROSAI and the procedural rules of Technical Committees.

The Governing Board, the General Secretariat, the Executive Directorate and the others Organs of AFROSAI are responsible for the implementation of this resolution.

Resolution No. (007/2022/15AG2/ AFROSAI) of March 18, 2022 Adopting the Internal Rules of Procedure for the AFROSAI Governing Board

Considering: The ambition to make AFROSAI a modern organization that meets the aspirations of its members;

Considering: The need to improve the organizational and operational system of AFROSAI;

Considering: The strong will of the member SAIs to increase the visibility of AFROSAI;

Considering: The Statutes of AFROSAI;

Considering: The favorable opinion of the Governing Board for the transmission of the draft Statutes of AFROSAI from the Governing Board to the General Assembly for consideration and adoption;

Having taken into account: the contributions of member SAIs expressed during the plenary debate on various aspects of the draft Internal Rules of Procedure for the AFROSAI Governing Board;

The General Assembly:

Adopts, in accordance with the provisions of Article 15 paragraph 2(o) of the AFROSAI Statutes, the Internal Rules of Procedure for the AFROSAI Governing Board.

The Governing Board, the Executive Directorate are each responsible for the implementation of this resolution.

Resolution No. (008/2022/15AG2/AFROSAI) of March 18, 2022 Approving the Organizational Structure of AFROSAI's Executive Directorate

Considering: The ambition to make AFROSAI a modern organization which meets the aspirations of its members;

Considering the need to improve the organizational and operational system of AFROSAI;

Considering: the strong will of the member SAIs to increase AFROSAI's visibility;

Considering: AFROSAI's Statutes;

Considering: the favorable opinion of the Governing Board on the draft organizational structure of the Executive Directorate;

Having examined the different documents presented by the General Secretariat of AFROSAI and taken into account the contributions of member SAIs, related to the discussions held during the General Assembly;

The General Assembly:

1. **Adopts** the organizational structure of the Executive Directorate of AFROSAI consisting of the following positions:

- Executive Director;
- Manager in charge of Strategic Issues and Development;
- Manager in charge of Communication and Stakeholder Relations;
- Management Controller;
- Head of Accounting Service.

2. **Assigns** responsibilities to each of the following positions:

A) The Executive Director of AFROSAI

The Executive Director is responsible for the implementation of the following activities:

a) Administrative Management:

– monitoring the activities of Specialized organs and reporting to the Governing

Board on the implementation of annual operational plans and work programs and their compliance with the priorities and objectives of the Strategic Plan in force;

- continuously evaluating the Strategic Plan in force and informing the Governing Board of any recommendations made to improve its effectiveness and impacts;
- assisting the Chairperson, the Governing Board, and Specialized Organs in the execution of their duties and responsibilities;
- taking every necessary step to establish Specialized Organs approved by the Governing Board;
- Organizing and monitoring the activities that can enable the organization to achieve its objectives;
- disseminating information to members;
- encouraging the sharing of ideas, knowledge and experiences;
- fostering cooperation, and providing members with support and assistance as directed by the Governing Board;
- maintaining cooperation among members, Sub-Regional Organizations, as well as the secretariats of other organizations within the INTOSAI community;
- implementing decisions necessary for the proper functioning of the Organization, in line with the guidelines contained in the Strategic Plan and annual or triennial work plans duly approved by the Governing Board;
- implementing cooperation agreements signed by the Chairperson of the Governing Board;
- conducting due diligence and discussions with potential institutional partners and collaborating with them under the terms defined by the Governing Board;
- recruiting and appointing the staff of the Executive Directorate, in accordance with the internal rules, regulations and procedures of the Organization;

- organizing annual planning meetings of AFROSAI;
- monitoring the results and activities of the Organization and its member institutions;
- compiling and summarizing related proposals and contributions of Sub-Regional organizations on given topics for onward transmission to the Governing Board;
- compiling and forwarding the requests and/or observations formulated by member SAIs to the Governing Board;
- initiating reform projects in accordance with the guidelines of the Governing Board;
- proposing internal rules, regulations and procedures of the functioning of the General Assembly and the Governing Board;
- representing the Organization during technical meetings subject to the recognized prerogatives of the President and Secretary General of AFROSAI and in collaboration with them;
- preparing the triennial report of AFROSAI that the President of the Organization presents to the INTOSAI Congress. This report shall be drawn up in an inclusive manner, tracing the activities at continental and sub-regional levels. The report shall first be sent to the Governing Board for information;
- preparing and presenting a triennial report on the performance of the Directorate to the General Assembly, an annual report to the Governing Board and a half-yearly report to the General Secretariat;
- ensuring the Secretariat and providing logistical support for meetings of the General Assembly, the Governing Board and Specialized Organs;
- carrying out any other tasks and responsibilities entrusted to him by the Governing Board.

b) Financial and Accounting Management:

- preparing and publishing the annual performance report of the organization, containing the audited financial statements as approved by the Governing Board and adopted by the General Assembly after approval;

- preparing annual plan of activities and the budget based on the approved triennial budgets;
- reporting on the level of implementation of the annual activities plans and on the use of allocated budgets.

B- The Manager in Charge of Strategic Issues and Development

The Manager in charge of Strategic Issues and Development supports the Executive Director in his missions by proposing and implementing monitoring and evaluation mechanisms for the activities foreseen in AFROSAI's Strategic Plan, as well as the modalities for conducting the planning, innovation and reform processes of the organization.

Thus, under the authority of the Executive Director, he/she has the duty to:

- permanently monitor the work of AFROSAI's specialized bodies;
- continuously evaluate the Strategic Plan and make proposals for recommendations to be submitted to the Governing Board in order to increase the effectiveness and impact of the Plan;
- provide AFROSAI members with support and assistance required by the Governing Board;
- submit proposals and drafts of cooperation agreements and follow up their operational implementation after approval by the Governing Board or the General Assembly;
- prepare the draft annual work plan;
- prepare AFROSAI's preliminary draft triennial report and that of the Executive Directorate's performance report;
- carry out prospective reflections on the future strategic objectives and priorities of AFROSAI.

C- The Manager in Charge of Communication and Stakeholder Relations

The Manager in charge of Communication and Stakeholder Relations is responsible for assisting the Executive Director in the accomplishment of his missions through the design, implementation and monitoring of information sharing modalities within AFROSAI and between the latter and its Partners.

In this light, under the authority of the Executive Director, he/she is responsible for:

- disseminating any information deemed relevant by the Executive Director to members of the Organization;
- ensuring the optimal functioning and updating information on AFROSAI's website;
- ensuring the publication of Newsletters on a quarterly basis;
- ensuring the conservation of statutory and regulatory documents, as well as the Organization's archives;
- ensuring fluidity and proper functioning of communication means such as (the internet, intranet, telephone, fax, etc.);
- ensuring the compilation of requests and/or observations formulated by member SAIs, so that they can be transmitted by the Executive Director to the members of the Governing Board;
- publishing an annual report on the performance of the Organization, containing the audited financial statements. approved by the Governing Board and adopted by the General Assembly after approval;
- supporting the Executive Director in his role as Rapporteur at the General Assembly, the Governing Board and the Specialized Organs meetings;
- providing administrative and logistical support for all the needs of AFROSAI's Statutory Organs.

D- The Management Controller

The Management Controller assists the Executive Director in taking strategic and operational decisions. In this light, he/she takes responsibility, under the Executive Director's behest in:

- Preparing the draft annual or three-year action plan under the Executive Director's supervision;
- Preparing AFROSAI's draft budget in collaboration with the accountant;
- Designing and leading a steering and decision-making support system;
- Preparing purchase orders and decisions for the disbursement of funds;
- Monitoring the execution of the budget as per approval by the Executive Director;

- Preparing a report on the execution of the budget in terms of income and expenditure, while identifying the execution rates and any disparity and explaining them;
- Preparing, together with the other operational units, a performance report in terms of objectives, results and indicators of results for all AFROSAI programs;
- Preparing tender documents and related draft contracts;
- Preparing and administering the performance evaluation grid for the staff of the Executive Directorate after approval by the Executive Director;
- Preparing draft contribution letters to members, as well as draft reminder letters;
- preparing documents related to the recruitment and management of staff, in collaboration with the Head of accounting service.

E- The Head of Accounting Service

The Head of Accounting Service is responsible for keeping records. Thus, is responsible, under the authority of the Executive Director, for:

- Collecting, coordinating and verifying accounting data;
- Carrying out closing operations and drawing up documents for the tax and social administration;
- preparing invoices for members' annual contributions;
- Making payments in a manner approved by the Executive Director;
- ensuring the control and follow-up of AFROSAI's bank accounts;
- ensuring the maintenance and conservation of books and accounting documents;
- Controlling the regularity of the supporting documents before any payment;
- Keeping the cash register;
- Preparing and submitting the monthly bank reconciliation statement for approval to the Executive Director;
- Preparing the financial statements of AFROSAI;
- providing the auditors with all the accounting information required for the external audit.

3. Adopts the related personnel expense items consisting of:

N°	STAFF COST	ELEMENTS
1.	Salaries	Basic salary or supplement
		Seniority bonuses
		Personal or collective bonuses
		Overtime
		Gratuities
2.	Social security and employer's contribution	Social and employer contributions
		Disability
		Family benefits
		Accident at work
3.	Tax charges on salaries	Personal income tax (PIT)
		Municipal surcharges
		Audio-visual fee
		Municipal tax
4.	Bonuses	Performance bonuses
		Specific bonuses
5.	Management costs	Recruitment costs
		Advertising costs
		Selection costs for candidates
6.	Training costs	Trainers' training costs
		Management and administration costs dedicated to training (logistic)

4. Recall that the highest personnel costs are set at 30% of AFROSAI's budget.

The Governing Board and the General Secretariat are responsible for the implementation of this resolution.

Resolution No. (009/2022/15AG2/ AFROSAI) of March 18, 2022 Setting up AFROSAI Technical Committees and Adopting their Composition

Considering: The ambition to make AFROSAI a modern organization which meets the aspirations of its members;

Considering: The need to improve the organizational and operational system of AFROSAI;

Considering: The strong will of the member SAIs to increase AFROSAI's visibility;

Considering: the favorable opinion of the Governing board on the composition of the AFROSAI Technical Committees;

In accordance with: the AFROSAI Strategic Plan;

The General Assembly:

Decides, in accordance with the provisions of Article 11 paragraph 2 (h), to create two Technical Committees within AFROSAI, one for Institutional and Technical Capacity Building and other for Organizational Capacity Building.

Mandates each of the said Technical Committees:

√ **The Institutional and Technical Capacity Building Committee**:

- Implements projects aimed at strengthening the independence of African SAIs;
- Develops professional qualifications of public sector auditors in order to improve the quality of audits;
- Contributes to the implementation of the United Nations 2030 and African Union 2063 Agendas;
- Works with key stakeholders at national and regional levels to prevent the impact of Illicit Financial Flows (IFFs);
- Supports gender equality;
- Be proactive in proposing innovative solutions to any emerging issues requiring a response from African SAIs.

√ **The Organizational Capacity Building Committee**:

- Support SAIs in the use of tools to enhance their performance;
- Strengthens SAIs leadership and strategic change management capacities;
- Support SAIs in the adoption of tools to promote transparency, accountability and integrity;

Notes the composition of the said Technical Committees as follows**:**

√ **Institutional and Technical Capacity Building Committee**:

Chairperson: SAI Kenya

Members:

SAI Algeria	SAI Gambia
SAI Angola	SAI Guinea
SAI Botswana	SAI Guinea Bissau
SAI Burkina Faso	SAI Morocco
SAI Burundi	SAI Mozambique
SAI Chad	SAI Namibia
SAI Comoros	SAI Niger
SAI Côte d'Ivoire	SAI Senegal
SAI Djibouti	SAI South Africa
SAI Egypt	SAI Togo
SAI Gabon	SAI Zimbabwe

√ **Organizational Capacity Building Committee**

Chairperson: SAI Niger

Members:

SAI Algeria	SAI Guinea
SAI Angola	SAI Guinea Bissau
SAI Botswana	SAI Mauritius
SAI Burkina Faso	SAI Morocco
SAI Burundi	SAI Namibia
SAI Chad	SAI Senegal
SAI Comoros	SAI Somalia
SAI Côte d'Ivoire	SAI South Africa
SAI Gabon	SAI Togo
SAI Gambia	SAI Zimbabwe
SAI Ghana	

The Governing Board and the Executive Directorate are each responsible for implementation of this resolution.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The Impact of Technological Innovation on Audit Evidence

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Abstract

Technological innovations in computer hardware and software, internet, websites, online search engines, smart phones, machine learning, artificial intelligence, data analytics, drones' technologies, cloud technologies, robotic process automation, and distributed ledger technologies has an important role for audit data collection, analysis, and reporting purposes. This article discusses the effect of technological innovation on audit evidence.

The article revealed that if properly utilized, technological innovation and automation has an important effect on improving the collection of sufficient appropriate audit evidence, improving testing, saving auditing time, lowering costs, developing electronic working papers, providing higher levels of assurance, and managing risk more effectively; therefore, enhancing audit quality. It is also shown that lack of financial and skilled human resources, inadequate training and experience of auditors, and the auditors' personal behavior may pose a challenge in effectively utilizing technological resources in the auditing process.

1. Introduction

1.1 Background

Technological innovation touches almost all domains of life and people are continuously searching for technology and innovation for every human activity which has previously been done manually. In one way or another, technological innovation is affecting the social, economic, and political life of people around the world. Technology has also been changing the mode of governance and enables governments to provide services to their citizens more efficiently and effectively.

With substantial changes taking place in technological innovations, public organizations and different institutions need to adapt themselves to the changing reality. One of those organizations which are being influenced by technological innovation and the external environment are auditing organizations. Adopting technological innovations and workplace innovative practices could help audit organizations contribute to better public services and achievement of objectives (Demetriades, 2020).

The increasing sophistication of technology as well as the progressive digitization of business and government service delivery has fundamentally altered the manner in which audits are conducted (Vasarhelyi & Romero, 2014). Accordingly, the auditing profession should be adapted to the changing environment of society that are currently exposed and influenced highly by innovation. This may require new methods of planning, conducting, and reporting an audit process. New technological tools support a shift from traditional sampling techniques to real- time whole population audits, allowing for results that are more accurate as well as greater accountability and transparency. Besides, automating repetitive tasks could free up valuable audit time, while data analytics may facilitate a more investigative analysis in the early stages of an audit (Fossati, Reilly, and Schnell, 2020).

It is inevitable that technological innovation has an impact on the auditing process. Innovation is also having a significant influence on the way in which audit evidence is collected and documented and offers a way of enhancing audit quality if used properly. One of the major activities in conducting an audit is the accumulation of sufficient and appropriate audit evidence.

There are some researches and scholarly articles on technology, innovation and audit. To mention a few, Vasarhelyi and Romero (2014) in their study: technology in audit engagement: a case study, examine external auditor usage of technology. They concluded that the characteristics of the audit team largely determine the levels of technology utilization. Matthew (2016) in his paper discussed the effect of emerging technologies on data in auditing and concluded that the prevalence of advanced technologies in auditing is increasing slowly but significantly, and will certainly continue in the coming years. Professional bodies such as the Association of Chartered Certified Accountants (ACCA) and Chartered Accountants Australia and New Zealand (ACCA, CA ANZ (2019)) investigated the link between audit and technology and identified that auditors need to adapt to the changes in business models of their clients and will need to be more adaptable to technological changes in the future.

On the other hand, this piece of article mainly discusses the effect of technological innovation on audit evidence. Thus, an attempt has been made to highlight audit and technological innovation, audit evidence and technological innovation, effects of technological innovation on audit evidence, the challenges of technological innovation, and finally the future of auditing and actions required to be taken to make full use of technological innovation in the audit process.

1.2 Objectives of the Study

The main objective of this article is to assess the effect of technological innovation on audit evidence. In line with this general objective specific objectives include the following:

- To identify the link between technological innovation and audit evidence;
- To pin point the challenges of technological innovation on audit and specifically audit evidence;
- To examine what the future of auditing would look like and actions to be taken by audit institutions at the era of rapid technological advancement.

1.3 Significance of the Study

The rationale of preparing this article is to assess the effect of technological innovation on audit evidence. Hence, the results of this study will help public audit institutions, private audit firms, and other auditing bodies to know what benefits do technological innovation could bring to the auditing profession. Also, it is hoped that the findings from this article will help these auditing entities in identifying strengths and weaknesses of their current status of using modern technologies in their audit undertakings. This will enable them to redefine audit methodologies, procedures and manuals in line with the changing environment.

The findings of this article will also add value to other researchers and the relevant body of knowledge regarding the effect of technology on audit evidence.

1.4 Methodology of the Study

In this article, I employed qualitative research approach. Qualitative research method is used to obtain an in-depth understanding of the link between technological innovation and audit evidence. Thus, this article is written by studying a wide array of relevant sources, both published and unpublished. Mainly, it is based on secondary data sources such as books, audit manuals, organizational publications, seminar papers, commentaries, and journal articles.

2. Technological Innovation and Audit

The Webster's dictionary define technology as a capability given by the practical application of knowledge and a manner of accomplishing a task especially using technical processes, methods, or knowledge. Innovation can be defined as a new idea, product, device and a way of thinking beyond the present and into the future (Stenberg, 2017). Technological innovation is a new device, a new thinking, or a new process that enables to transform society in general. Thus, technological innovation is considered as a process which is science, technology and system based (Letangule and Letting, 2012).

When we come to auditing, auditing is the accumulation and evaluation of evidence about information to determine and report on the degree of correspondence between the information and established criteria (Arens, Elder & Beasley, 2012). The auditing process is currently supported by the emergence of recent technological innovations. Technology offers the ability both to improve the quality of audit and to add value to it (Suffield, 2020). Consequently, embracing new technologies and innovations allows us to reimagine our audits, aiming to provide a smarter, better, and different type of audit (Meuldijk, 2020).

As with all technological developments, there are several key drivers signaling the need for technological change in audit. Such drivers include the rapid increase in the sheer volume of data, the changes in business models and rapid digitization of both government and business organisations, the shift towards automation and the demand for a proactive and forward-looking approach to audit (Suffield, EU, 2020).

There have been different technological innovations that assist an audit to be more efficient.

Such us

- The development of computer hardware from desktop to smart phones;
- Software such as application software, (including spreadsheet and database software like Microsoft excel, Microsoft access, statistical software, etc.);

- VoIP (Voice over Internet Protocol) technologies which enables video conferencing (Skype, Zoom, Cisco WebEx etc.);
- The development of internet in various generations; and
- Online search engines (Google, Yahoo!, MSN etc.), and different websites.

More recently, there are also technological innovations that play a tremendous role for the auditing process. Such technologies include distributed ledger technology (DLT), data analytics, robotic process automation (RPA), drones' technology, artificial intelligence (AI), machine learning (ML), natural language processing (NLP), deep learning (DL), and cloud technologies (ACCA, CA ANZ, 2019; Suffield, 2020). In addition to these, various computer software audit tools are also being used across countries and audit organizations within the same country at different levels. These audit tools include computer assisted audit techniques (CAATs), spread sheets, Interactive Data Extraction and Analysis (IDEA), and KNIME (Konstanz Information Miner).

Technology will drive down the time taken to conduct an audit, as testing becomes more automated and conducted on a real-time basis (ICAEW, 2018). Artificial intelligence (AI) can be a powerful tool for auditors (e.g. pattern detection, fraud detection, analytics, and trends) (Pilos, 2020). In addition, as Cheong, A. Cho, S., Vasarhelyi, M.A., Zhang, C. (2020) citing Yoon *et al* (2015) stated, sophisticated data analysis techniques using automation and computerization enable auditors to process data in an increasingly effective and efficient ways. Rota also highlighted that:

Digitalization, the development of robotic process automation (RPA), artificial intelligence, machine learning capabilities and big data analytics provide substantial opportunities for compliance and financial audits to become more precise and comprehensive. The characteristics of millions of entries can be checked in a few minutes, immediately flagging any exceptions so that auditors can concentrate on higher risk transactions.

The increased processing speed means that instead of checking samples, auditors can analyze full populations of transactions (Rota, 2020).

Technological innovations have, therefore, wide-ranging applications in audit and the auditing profession is digitalized these days more than ever. The change of business models and the continuous use of technological innovations by governments and business organizations in their day to day operations compelled auditing institutions to utilize modern technologies to audit these processes. As a consequence, audit should become more and more digital to cope with a changing reality (Pilos, 2020). The Institute of Chartered Accountants in England and Wales (ICAEW) pointed out that:

Given the speed of technological and digital advances, it is imperative that those in the audit and finance profession invest in understanding and developing these technologies to benefit their respective sectors. This is a huge challenge, particularly in audit, where the pace of technological change, specifically the move from sample testing to 100% populations testing, and from historic testing to real-time testing, is spearheading the need to revisit the audit approach in an unprecedented manner (ICAEW, 2018).

Furthermore, technology utilization varies among different sectors. Technological innovation and utilization in the auditing process by private audit firms and supreme audit institutions is less developed as compared to digitization of activities carried out by business organizations and most government sectors. In my view, many audit institutions are not making use of the available technology in the audit process. There is also a big gap between big audit firms and smaller auditfirms as far as the usage of technological innovations and audit software tools are concerned. It is underscored that,

As technology evolves, the accounting profession has been lagging, with a set of anachronistic rules of disclosure and assurance. Both in the government and

the private sector, the lag between technological practice and accounting and assurance have further and further widened. More discussion - and action on the nature of this gap, and the characteristics of technologies that are being used and also can be used in the measurement and assurance of business, needs to be encouraged (Cheong et al, 2020).

Therefore, audit institutions should pay a much greater attention for technological innovations and effective utilization as their clients are now more digitalized than ever. The increasing volume, variety, and velocity of data also necessities the application of modern and advanced analytical tools in order to organize, interpret, structure and present data into useful information that gives meaning to the user.

3. Technological Innovation and Audit Evidence

The purpose of an audit is to help establish and maintain deserved confidence in a company, in its directors and in the information for which they have responsibility to report, including the financial statements (Brydon, 2019). Collecting audit evidence against different assertions and established criteria is the main part of the auditing process. Audit evidence is any information used by the auditor to determine whether the information being audited is stated in accordance with the established criteria (Arens, Elder & Beasley, 2012). Thus, financial auditors provide audit opinions on the basis of their verification of the data underlying the assertions made by others. On the other hand, performance auditors and information technology/information system auditors provide conclusions and recommendations based on the audit evidences that are collected against the established criteria.

Customarily, auditors collect audit evidence through different techniques. These include file examination, observation, interview, analytical review, recalculations, re-performance, photography, and specialist assistance.

Currently the existence of large volume and variety of data necessitates the need for modern technologies for the collection and analysis of audit data. For instance, the use of exogenous 'big data,' such as the automated collection and analysis of online news articles, scientific papers and public documents can provide supplementary or corroborating audit evidence for performance audit projects (Hardy, 2020).

Using technological innovations with assistance of internet, computers and smart phones, the auditor can perform

- Document collection and review using online search engines;
- Conducting focus group discussions and interviews via video conferencing tools and social media platforms from different people, institutions and organizations that may be very far or remote;
- Data manipulation, analysis and reporting;
- Recent advances in technology like artificial intelligence, robotic process automation, cloud technologies and data analytics, to mention a few, also play an important role in accumulating sufficient appropriate audit evidence.

Collecting and collating audit evidence involves administrative and repetitive tasks that do not require judgment and hence lend themselves to automation (FRC, 2020). As it is stipulated in the Financial Reporting Council, while the primary objective is efficiency, the use of automated techniques when properly implemented may improve quality by guarding against human error (FRC, 2020). Technology can also help identify previously unrecognized patterns or clusters of interest and therefore raise questions which would have otherwise been overlooked. It is also valuable in that it permits the exploratory analysis of audit evidence and has the potential to increase the audit scope (Fossati, Reilly, and Schnell, 2020).

The appropriate use of technology is dependent on an entity's system landscape and quality of data (FRC, 2020). Technologies are useful only when people develop and exploit them

properly. As it is mentioned before, these technologies have the potential to greatly enhance audit quality and efficiency, but at the same time may represent a challenge for auditors when they seek to demonstrate their compliance with auditing and ethical standards (FRC, 2020).

4. The Effect of Technological Innovations on Audit Evidence

Technological innovation is changing the way business operations are conducted and managed. Rapid technological innovations and continuously moving, larger volumes and variety of data provide opportunities to renew the whole auditing industry. Whilst the nature, timing and extent of the impact that technology will have on the audit are difficult to predict, emerging technologies like automation, artificial intelligence, block-chain and even drones have the potential to transform the way an audit is conducted whilst enhancing audit quality (KPMG, 2017).

Technology will have a major and ongoing impact on the audit profession, including the nature, quantity and sources of data, analyzed to generate audit evidence (KPMG, 2017). The various effects that technological innovations have on audit evidence include the following:

Sufficient Appropriate Audit Evidence: technological innovations enable to make efficient data collection and analysis thereby providing sufficient appropriate audit evidence. It enables to collect, test and analyze huge amount of data than traditional ways of data collection andanalysis. Thus,

- Technologies in computer hardware enable to store, retrieve, process, analyze data and keep audit evidence.
- Using different application software on Smartphones and drones support to take photos and videos that are used as audit evidence.
- Using the internet; online search engines and websites of different organizations allow remotely accessing more data from various institutions, stakeholders, professional bodies and individual scholars.

- E-mails and various social media platforms help obtain information from large domain of population and people from different geographical areas. They also permit to undertake questionnaires in distant areas.
- Video conferencing help to conduct focus group discussions and interviews of people including the audit client at different places.
- In addition, software such as Statistical Package for the Social Sciences (SPSS), Stata software etc. assist for data manipulation, visualization, analysis and reporting.
- Artificial intelligence, machine learning and drones' technology supports to undertake inventory counts, process video and digital images, and transcribe verbal recordings of interviews and other testimonial data.
- Cloud computing technologies facilitate the access of applications and data from any location worldwide and from any device with an internet connection.
- Audit data analytics methods can be used in audit planning and in procedures to identify and assess risk by analyzing data to identify patterns, correlations or relationships, and fluctuations from models.

Improved Audit Quality: Technological innovations, as it is discussed above enables to accumulate sufficient appropriate audit evidence even from distant areas. This offers the ability both to improve the quality of audit and to add value to it.

Improved Testing: Data analysis technologies have opened opportunities for auditors to comprehensively test and analyze (on an automated basis) entire populations of financial transactions and operations instead of testing only a sample. This help collect more appropriate audit evidence. Analysis of entire population avoids the problem of bias in sampling. Moreover, technological resources enable the auditor to perform tests on large or complex data sets where a manual approach would not be feasible (FRC, 2020).

Saving Time: Technological resources for audit data collection and analysis save a significant time for the auditor which enable to complete audit plan in a timely manner (something many firms run into issues with).

Low Cost: The price an accounting firm charges a client is mostly based on the number of days it takes to undertake the audit, and the cost incurred by the audit firm. Technological resources make the repetitive tasks of auditing much easier and faster. This reduces the number of days required to collect audit evidence. This in turn reduces the time to complete the audit process and also the cost as well.

The Development of Electronic Working Papers: electronic working paper reduces the cost that would otherwise be incurred for paperwork and printing. Electronic working papers facilitate the production, review, storage and transfer of documents and audit evidences.

Providing Higher Levels of Assurance: Providing sufficient and appropriate audit evidence enables a higher level of assurance. For example, machine learning provides the opportunity to identify patterns and unusual exceptions in large sets of data that might not be discernible using more traditional techniques (which typically involve making advance predictions of what may be unusual) (FRX, 2020).

Managing Risk more Effectively: A key benefit of the heavy reliance on technology in the audit process is that companies that make use of data analytics technology are able to gain insights beyond the reach of the internal team of the company (they are auditing) (KLR, 2016).

In short, technological developments play an important role in auditing in general and in compiling audit evidence in particular. It also helps to provide added value to clients and keep abreast of developments in the auditing sector. New and advanced software developments have automated many functions of the audit process, allowing auditors to spend less time on paperwork and more time transferring their knowledge to other high-risk areas of the business they are assessing (KLR, 2016).

5. Challenges of the Adoption of Technological Innovation in Audit

Technological innovation has both benefits and challenges. The coming of new and advanced technological resources to the auditing process entails a modification to the existing manuals and standards of auditing. It is also evident that the regulatory framework for audit will evolve more slowly than technology (Pilos, 2020). However, focusing primarily on the potential impact of technology on auditing standards and viewing changes that may be needed to standards as a precondition to the use of technology we believe could inhibit or slowdown innovations in auditing (KPMG, 2017).

There are areas where the use of technological resources creates new challenges for auditors. The heterogeneity in clients' data makes it challenging to use audit automation or analytics tools (Cheong et al, 2020). Technological resources are utilized for audit procedures that are repetitive and standardized. Therefore, to achieve audit automation, adjustment is needed to make audit data homogenous.

Another challenge is the skill requirement of using technological resources for audit. Cheong et al, (2020) citing (Zhang, Dai, and Vasarhelyi, 2018) states that in most audit institutions, many auditors have not yet gained the skills needed in a more automated audit workflow and are not ready for the digital transformation. Examples of such new skills are data analytics, programming, and acquaintances with emerging technologies.

The attitude of the auditors and management to changes in the application of technological resources in the audit process could be another challenge. Some auditors might be skeptical of the benefits that modern technologies could bring to the auditing process and some others could fear the change itself due to their personal behavior. Leadership at top of the audit institutionmay also challenge the adoption of new technological innovations in audit probably due to lack of financial and human resources, unavailability of the technological resource, or any other constraint.

6. The Future of Auditing and Actions Required to be Taken by Audit Institutions

The usage of technological innovations such as data analytics, distributed ledger technologies, machine learning, artificial intelligence, drones, and cloud technologies in the audit processes are so far not immense. The use of technology by businesses and government is expanding dramatically as technologies such as data analytics are embedded into decision making and financial reporting processes, as well as the internal control environment. This will inevitably impact on the way an audit is conducted in the future (KPMG, 2017).

Technology has much to offer the auditor in terms of enhancing efficiency and effectiveness. It may be used increasingly to support the assessment of the reasonableness of estimates made by management. The potential for the use of technological resources to enhance audit quality is clear. However, technology is not a replacement for the skills and informed judgment of an experienced auditor (FRC, 2020).

Consequently, despite the growing digitization of audit, technological innovation could not replace the role of the auditor especially in professional judgment, skepticism, and communicating the audit report. However, combining IT and digital working methods with auditors' professional judgment promises to be the most successful way forward into the future (Rota, 2020). Also, technology cannot yet fully replace human auditors; however, it can perform specific and narrowed tasks more effective than humans (Cheong et al, 2020). In addition, machine learning and AI can become a supportive tool for the auditors to make a professional judgment (Cheong et al, 2020). As Cheong et al (2020) quoting (Zhang, 2019) stated,

[…]machines are intrinsically better than humans at performing tedious and rule-based tasks. When auditors do not need to spend most of their time performing repetitive and basic tasks, they can focus their effort on more challenging and critical tasks, especially those related to the assessment of the risk of material misstatement. This 'man-machine cooperation' is the future form of audit.

While technical and ethical (TEQ) competencies remain at the core of the professional accountant's skill, all professional accountants must complement strong technical skills and ethics with strong communication skills (ACCA, CA ANZ, 2019). In addition, the auditors of the future should be technologically sound with excellent project management skills, the ability to adapt to change, skillful at telling their audit narrative and aware of the technological development that can help them do their job (Suffield, 2020). A key skill for auditors – at least during the coming years – will be the flexibility to adapt to a working environment which will continue to evolve (ACCA, CA ANZ, 2019). Auditors don't necessarily need to be technology development experts or computer programmers; however, they do need practical knowledge, experience, and a high level of comfort using cutting-edge, rapidly evolving technology to manipulate and analyze data (Raphael, 2017).

As to what actions to be taken by audit organizations including supreme audit institutions of countries, one of the skills that will be required is commitment and creativity combined with critical thinking. Investing only in technology without changing anything else can easily lead to a situation where we have simply converted our analogue processes and practices into digital ones. The benefits of this kind of approach are likely to be marginal (Lahdelma and Gullichsen, 2020).

Policy makers likewise need to develop appropriate audit standards, procedures and manuals that are keeping up with practical needs and business trends of the day. New standards should be developed to examine and regulate the adoption of new technologies for data collection and analytic purposes in the auditing process. More innovative auditing standards for big data and analytics can be a driving force for progress in smart audit practices and enhanced audit procedures (Cheong et al, 2020).

Another skill audit institutions need to focus on is leadership. Leadership plays a vital role in promoting creativity in organizations. Effective implementation and utilization of technological innovation in the audit process requires committed leaders who work for change and improvement. This includes cooperating with relevant stakeholders and building the capacity of the management and the auditors to make the adoption of technological innovation in audit a reality.

There is also a need for technical knowledge and skills for the digital transformation to succeed. Lahdelma and Gullichsen (2020) identified the following three set of skills:

- Being able to understand the potential impact of new technologies on our audit;
- Being able to determine how to use new technology efficiently in our daily work;
- Knowing how to acquire expertise to develop and maintain technical solutions that are not only sustainable but also affordable.

7. Conclusion and Recommendations

7.1 Conclusion

This article assessed the effect of technological innovation on audit evidence and thereby an attempt has been made to pinpoint the link between technological innovation and audit, technological innovation and audit evidence, the effect of technological innovations on audit evidence, the challenges of the adoption of technological innovation in audit, and finally the future of auditing and actions required to be taken by audit institutions.

This technical article is mainly prepared by reviewing books, different scholarly articles, academic journals, insights of various professional bodies, and newsletters. The article revealed that technological innovations in machine learning, artificial intelligence, data analytics, drones' technologies, cloud technologies, robotic process automation, distributed ledger technologies, as well as computer software such as CAATs, IDEA, KNIME

has an important role for audit data collection, analysis, and reporting purposes.

The article showed that if properly utilized, technological innovation and automation has an important effect on improving audit quality, improving testing, saving auditing time, lowering costs, developing electronic working papers, providing higher levels of assurance, and managing risk more effectively. It is also indicated that lack of financial and skilled human resources, lack of commitment of leaders, inadequate training and experience of auditors, and the auditors' personal behavior may pose a challenge in effectively utilizing technological resources in the auditing process.

To conclude, the article further revealed that technological innovations are developed to assist, not to replace, the human auditor. The importance of technological resources to enhance audit quality is clear. However, although technological resources would help in audit data collection, analysis, and reporting, it could not replace the role of the auditor especially in professional judgment, skepticism, and communicating the audit report.

7.2 Recommendations

The article revealed that there are challenges for the adoption of technological innovations in the audit process. Consequently, the audit organizations including supreme audit institutions should give due emphasis to those challenges to improve the application of those technological resources which has a tremendous impact for achieving the objective of their respective offices.

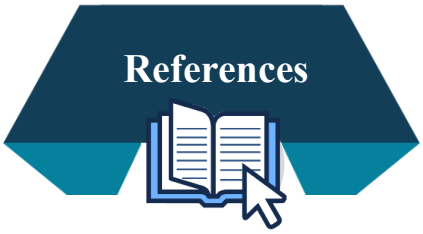
Audit firms and institutions need to invest in technological innovations that help accomplishtheir audit vision, mission, objective and goals. But before the adoption of any technological innovation, costs and benefits of such deployment should be thoroughly investigated and researched. Countries and institutions could also learn the real effect of the application of such technologies from those counterparts that are already adopting such tools.

The main purpose of an audit has not changed with its main focus of ensuring accountability and transparency, stakeholder and the general populations' trust concerning the effective, efficient and economic use of resources. However, the methodology on how this is to be achieved and the related regulatory framework, manuals and standards should be reviewed to ensure they correspond to the digital reality.

Audit institutions should work together with higher education institutions so that students of accounting and auditing get training and skill in curriculums that take into account the emerging technologies in the field. Supreme audit institutions should also work in cooperation with the concerned stakeholders including professional bodies in this regard. Experts in technological innovations should work together with audit institutions.

A strategic area going forward for audit institutions will be the training and development of audit staff to ensure they have the knowledge and skillset required to deal with new technological innovations and the criteria and parameters being applied. Therefore, auditors should be trained and equipped with the necessary inputs to make them adapt to technological innovation and change and conduct an effective audit that stand with the changing world. This should be implemented and monitored through annual plans and reports of the respective institutions.

Finally, audit institutions should work and be prepared now for the future. They should work together with technology companies and the concerned government stakeholders to adopt technological innovations properly in the audit process. They should also need to cooperate and exchange their skills and experiences to each other as to how various technological innovations can be applied in audit. They have to maintain high motivation levels and turn drawbacks into successful learning experiences.



ACCA, CA ANZ (2019), Audit and Technology. Retrieved from file:///C:/Users/DELL/Downloads/pi-audit-and-technology.pdf

Arens, A., Elder, R., & Beasley, M. (2012), *Auditing and Assurance Services: An IntegratedApproach* (14th ed.). New Jersey: Pearson Prentice Hall.

Brydon, D. (2019), Assess, Assure and Inform. Improving audit quality and effectiveness. Reportof the independent review into the quality and effectiveness of audit. Available online at https://assets.publishing.service.gov.uk/government/uploads/system/uplods/attachment_data/file/852960/brydon-review-final-report.pdf

Cheong, A. Cho, S., Vasarhelyi, M.A., Zhang, C. (2020) Smart Audit: the digital transformation of audit. *Journal of Big data and digital audit*, 1. 27-32. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Demetriades, S. (2020), Workplace innovation practices. *Journal of Big data and digital audit,*1. 18-22. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Demetriades, S. (2020), Workplace innovation practices. *Journal of Big data and digital audit,*1. 18-22. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Fossati, E., Reilly, E., & Schnell, C. (2020) The ECA Lab – our in-house incubator for applying data analytics, data visualization and process mining to audit. *Journal of Big data and digital audit,* 1. 38-41. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

FRC (2020) The Use of Technology in the Audit of Financial Statements AQR Thematic ReviewMarch 2020. Accessed online at https://www.frc.org.uk/getattachment/1c1478e7- 3b2e-45dc-9369-c3df8d3c3a16/AQT Review_Technology_FINAL.pdf

FRC (2020), Technological Resources: Using Technology to enhance audit quality. Accessedonline at https://www.frc.org.uk/getattachment/13f339df-6365-460b-b679- 4b898e973b32/Technology-Thematic-March-20.pdf

Hardy, Richard (2020) New technologies for monitoring the Common Agricultural Policy. *Journal of Big data and digital audit,* 1. 48-51. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

ICAEW (2018) Understanding the impact of technology in audit and finance. Panel discussion. Retrieved online at file:///C:/Users/DELL/Desktop/AE/Understanding%20the%20impact%20of%20technolo gy%20in%20audit %20and%20finance.pdf

Kahn, Litwin, Renza & Co., KLR (2016), How has Technology Improved the Audit Process? Online newsletter, July 19, 2016. Available online at https://kahnlitwin.com/blogs/business-blog/how-has-technology-improved-the-audit-process

KPMG (2017) Request for Input – Exploring the Growing Use of Technology in the Audit, with a Focus on Data Analytics. KPMG IFRG Limited. Retrieved from https://www.ifac.org/system/files/publications/exposuredrafts/comments/KPMGresponsetoDataA nalyticsRFI.pdf

Lahdelma, P. & Gullichsen, I. (2020) Public auditors preparing for digital transformation – the case of the National Audit Office of Finland. *Journal of Big data and digital audit,* 1. 85-87. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Letangule & Letting (2012), Technological Innovation and Corporate Performance. International Journal of Management & Business Studies. 2(3). 66-71. Retrieved from http://www.ijmbs.com/23/solomon1.pdf

Matthew, C. (2016), The Effects of Emerging Technologies on Data in Auditing. Senior Theses.https://scholarcommons.sc.edu/senior_theses/68

Meuldijk, F. (2020) Digital audit – providing more added value with new techniques and through new skills. *Journal of Big data and digital audit,* 1. 101-104. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Noel, F. (2020) IT audit at the ECA – assessing the digital environment in policy areas. *Journal of Big data and digital audit,* 1. 42-44. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Pilos, S. (2020) Auditing the digital reality. Journal of *Big data and digital audit,* 1. 33-34.Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Pilos, S. (2020) ECA's Big and Open Data conference for EU SAIs: TINA is born. *Journal of Big data and digital audit,* 1. 108-111. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Raphael, J. (2017) Rethinking the Audit. Journal of Accountancy, available online at https://www.journalofaccountancy.com/issues/2017/apr/rethinking-the-audit.html

Rota, V. (2020), Digitalization of audit procedures: a pilot project for the financial audit of the European Commission's executive agencies. *Journal of Big data and digital audit,* 1. 45- 47. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Stenberg, A. (2017), What does Innovation mean - a term without a clear definition. Retrieved from https://www.divaportal.org/smash/get/diva2:1064843/FULLTEXT01.pdf

Suffield, M. (2020) Auditors of the future – what are the skills needed in a digital age? *Journal of Big data and digital audit,* 1. 23-26. Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf

Vasarhelyi, A. & Romero, S. (2014) Technology in audit engagements: a case study. *ManagerialAuditing Journal*. 29(4), 350-365. Retrieved from http://raw.rutgers.edu/MiklosVasarhelyi/Resume%20Articles/MAJOR%20REFEREED%20ARTICLES/M70.%20Technology%20in%20Audit_A%20Case%20Study.pdf

Impact of Technological Innovation on Audit Evidence in Kenya

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Abstract

Technological Innovations is the application of Information Technology in auditing. It ranges from simple automation using spread sheets applications to an advanced practice of audit software with Databases and Business Intelligence Applications. The study sought to establish the effect of Technological, Organizational and Environmental factors of Technological Innovations on Audit Evidence based on a survey research design with a target population of 47 Public Audit firms. Data collection was done using questionnaire and analyzed using Statistical Package for Social Scientists (SPSS). The findings established that use of Technological, Organizational and Environmental factors have statistical significant effects on appropriateness and sufficiency of evidence. In addition, enhanced connectivity and applications software that would enable obtaining audit evidence in real time instead of relying on manual historical data and use of dronesand GPRS for physical verification of projects were noted as ways to enhance technological innovations in audit firms.

1. INTRODUCTION

1.1 Background of the Study

An audit opinion is an implicit expression of two conclusions based on the audit evidence collected and processed during the audit: (1) that the opinion is accurate; i.e. that the evidence collected is appropriate to support the opinion, and (2) that the opinion is justified; i.e. the evidence collected provides sufficient support for the opinion (Morton, 2002).

Whether sufficient appropriate audit evidence has been obtained to reduce audit risk to an acceptably low level that will enable the auditor to draw reasonable conclusions on which to base the audit opinion, is a matter of professional judgement (Causholli and Knechel, 2012). While the auditing standards provide some guidance to assist the auditor in deciding the quantity (sufficiency) and quality (appropriateness) of audit evidence to be obtained, they do not dictate exactly how much evidence needs to be gathered, or the quality thereof (Perry, 2011).

Professional Audit Service provided by public accounting firms is vital to most businesses in providing assurance that businesses' financial reports are true and fair (Ismail, 2009). In the growthof information technology (IT), businesses progressively adopt Accounting Information Systems (AIS) to manage their business processes. Evidently, it is imperative that audit firms be able to also audit AIS and use audit technology as a support tool to audit their clients' businesses. Audit technology is an IT application in auditing that signifies the use of any computer-assisted audit tool to improve auditor's capacity in performing an audit. It ranges from a simple audit automation using spreadsheet application to an advanced practice of audit software with databases and Business Intelligence Applications (Rosli, Yeow, & Siew, 2013).

Although, the importance of audit technology is widely accepted by professional accounting bodies and audit firms, in practice audit technology implementation is not widespread among

public accounting firms. In Malaysia, despite high AIS usage among businesses (Ismail, 2009), the investment and acceptance of audit technology is still minimal as only 21% of audit firms use audit technology despite them highly acknowledging the benefits of audit technology (Ismail and Abidin, 2009).

Technological, Organizational and Environmental Contexts (TOE) framework is the primary used theory in investigating technology adoption in organizations (Venkatesh and Bala, 2012). TOE framework (Tornatzky and Fleischer, 1990), suggests that three components namely Technological, Organizational and Environmental Contexts influence the adoption process of a technological innovation. This study supports the technological components of TOE with technology characteristics of Diffusion of Innovation (DOI) theory (Rogers, 2003) and uses Institutional Theory to explain the environmental components' impacts on audit technology adoption.

Examples of technological innovations used in managing audit evidence include data analytics, digital analysis, expert systems, database modeling, continuous transaction monitoring (Janvrin et al., 2008).

The use of data analytics has advanced much more rapidly in auditing, where many organizations use continuous auditing of data that enables them to identify risks as part of their system of internal control (Murphy and Tysiac, 2015, Staub, 2012).

Many studies have been conducted subsequently, examining the auditor's application of analytical procedures and other technological innovations in the audit process. Studies have been conducted in the United States of America (USA) (Trompeter & Wright 2010), Egypt (Samaha & Hegazy 2010), and more recently in Portugal (Pinho 2014) and Yemen (Abidin & Baabbad 2015). Little is known, however, of how auditors in Africa apply technological innovations in the audit process – a gap that this study attempts to fill.

In all of these studies, the authors indicate that the demand for the use of analytical procedures is growing in response to numerous factors, of which

technological advancements (Abidin & Baabbad 2015; Samaha & Hegazy 2010) and changes in audit methodologies (Pinho 2013; Trompeter & Wright 2010) are the most significant. In addition, the extant literature highlights the usefulness of analytical procedures when used during each of the phases of the audit process (Abidin & Baabbad 2015; Pinho 2014; Samaha & Hegazy 2010; Trompeter & Wright 2010) and also shows that by increasing the application of these procedures, the efficiency and effectiveness of the audit is enhanced (Trompeter & Wright 2010).

1.2 Statement of the Problem

Many previous literatures studied the implementation of technology in audit profession, focusing on internal auditing job where technology was used by internal auditors in private companies and public organizations (Moorthy et al.,2011). Despite the wide usage of audit technology in internal auditing and the importance of audit technology (Ismail, 2009), such utilization is not extensive among public accounting firms specifically in performing external audit of their business clients (Curtis & Payne, 2008).

The consequences of the COVID-19 pandemic on financial statement reporting and audit engagements are complex and have resulted in challenges for management, those charged with governance and auditors. The uncertainty arising from the current environment may increase the challenge in obtaining the sufficient appropriate audit evidence needed to form an independent view about the reasonableness of management's estimates and judgments (IFAC,2020).

It is therefore, imperative that auditors adopt technological innovation in the audit process. Hence this paper looks at effect of technological innovations on audit evidence focusing on Supreme Audit Institution (SAI) and Public Accounting Firms in the Republic of Kenya. The study considers SAI Kenya a Public Accounting firm.

1.3 Objectives of the Study

General Objective

To establish the effect of technological innovations on audit evidence among Public Accounting Firms in, Kenya.

Specific Objectives

a. To establish the effect of technological factor of technological innovations on audit evidence among public accounting firms in Kenya;

b. To identify the effect of organizational factor of technological innovations on audit evidence among public accounting firms in Kenya; and

c. To establish the effect of environmental factor of technological innovations on audit evidence among public accounting firms in Kenya.

1.4 Hypothesis

H01*:* Technological factor of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya;

H02: Organizational factor of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya; and

H03: Environmental factor of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya.

1.5 Significance of the Study

The findings of this study will be important to various stakeholders as follows:

a. Public Accounting firms will use findings of this report to put in place appropriate policy framework for adoption of technological innovations in external audit process.

b. Professional bodies will use the findings of this report to come up with appropriate audit standards to guide application of technological innovations in managing audit evidence.

1.6 Limitations of the Study

In view of time and resource constraints, the study was limited to Supreme Audit Institution, Kenya and Professional Accounting firms in Kenya.

2. LITERATURE REVIEW

2.1 Technological Innovations

Information Technology (IT) innovativeness has been associated with the use of IT to introduce radical business models that disrupt firm practices, such as the case of internet computing in systems development organizations (Lyytinen and Rose, 2003) or the digitization of information that can intra- and inter-organizationally tie activities and processes together (Sambamurthy et al. 2003). Innovative IT is synonymous with IT excellence in that, companies characterized as innovative have used IT to create competitive advantage, improve relationships with customers and optimize internal and external business processes (Friedenberg, 2012).

Technological, Organizational and Environmental contexts (TOE) framework is the primary theory used in investigating technology adoption in organization (Venkatesh and Bala, 2012). TOE framework (Tornatzky and Fleischer, 1990), suggests that three components, namely technological context, organizational context and environmental context influence the adoption process of a technological innovation. This study supports the technological components of TOE with technology characteristics of Diffusion of Innovation (DOI) theory (Rogers, 2003) and uses Institutional Theory to explain the environmental components' impacts on audit technology adoption.

The framework is strengthened by Diffusion of Innovation (DOI) theory (Rogers, 2003) and Institutional theory (DiMaggio and Powell, 1983) to better explain the technological and environmental context influence on audit technology adoption in audit firms. It is argued that TOE framework only provides a general technological aspect influencing technology adoption without specifically addressing the characteristics of the technology. The gap of the technological aspect could be supported by the characteristics explained in DOI theory.

Besides, with the unique environmental aspect of audit profession, environmental factors in TOE framework could be best described through Institutional theory. Therefore, by combining these three theories, it could provide a comprehensive framework on the adoption of audit technology. According to Rosli et al.., 2012, the framework illustrates how Technological, Organizational and Environmental factors influence audit technologies adoption.

a) TECHNOLOGICAL FACTORS

Technology Cost-Benefit

As supported by DOI theory, benefits which are derived from technology's relative advantage, affect technology adoption rate (Rogers, 2003). According to Rogers (2003), relative advantage means a technology is "perceived as being better than the idea it supersedes" or in other words, the technology "offers improvements over currently available tools". In this study, technology cost-benefit is defined as the perceived benefits that an audit firm would obtain from audit technology outweigh the cost of its adoption.

Technology Compatibility

Technology compatibility refers to the degree to which the use of audit technology is consistent with audit needs and matches the audit tasks that need to be performed by audit firm. It is adapted from the definition of compatibility in DOI theory by Rogers (2003). This study posits that compatibility will positively influence audit evidence.

Technology Complexity

Complexity as adapted from DOI theory is defined as the degree of difficulty to understand and use the audit technology. Business firms that perceive an IS/IT to be too complicated will likely reject the system from being adopted (Rogers, 2003). Therefore, this study believe that complexity will negatively influence audit technology adoption.

b) ORGANIZATIONAL FACTORS

Top Management Commitment

Top management commitment refers to the degree of top management involvement, direction and support given to audit technology adoption in audit firm.

Top management support has been regularly found to be important in making decision for technology adoption in organization (Mahzan and Lymer, 2009). Thus, it is anticipated that top management commitment will positively influence audit technology adoption.

Organization Readiness

This study defines organization readiness as the level of firm's available financial and technological resources to adopt audit technology. With financial resource, a firm can equip its organization with necessary IT sophistication, technological facility and internal environment to support technology adoption (Venkatesh and Bala ,2012). Prior literatures on computer assisted audit tools adoption stressed that organizational physical facility and technological infrastructure influence the motivation of computer assisted audit tools adoption (Janvrin et al., 2008; Mahzan and Lymer, 2009). Hence, this study posits that organization readiness will positively affect audit technology adoption.

Human Resource's IT Competency

As supported by TOE framework, knowledge and competency of workforce are required for a firm to successfully adopt a technology (Tornatzky and Fleischer, 1990). Human resource's IT competency refers to the level of IT/IS competency and capability possessed by audit firm's employees. This study believe that human resource's IT competency will positively influence audit technology adoption.

c) ENVIRONMENTAL FACTORS

Complexity of Client's AIS

Complexity of client's AIS variable is adapted from Janvrin, Bierstaker and Lowe (2008). It is defined as the level of complexity, difficulty and volume of transactions processed by AIS which is used in client's organization. Audit firm provides audit services to its clients, among others to examine its client's business financial reporting, AIS and its internal control (Hall, 2011). Therefore, it is expected that audit technology adoption by audit firm will be positively influenced by the complexity of clients AIS.

Competitive Pressure

Competitive pressure refers to the perceived level of pressure within the business environment in which the audit firms operates. Competitive pressure is found as a factor affecting AIS adoption (Cartman and Salazar, 2011). As stressed by TOE framework and previous studies, firms are more likely to accept an IT when many competitors in its industry are adopting the technology (Zhu et al., 2005). This study hypothesizes that competitive pressure will positively influence audit technology adoption.

Professional Accounting Bodies Support

Previous literature found that there is a relationship between professional association and technology adoption (Swan and Newell, 1995**).** From the normative viewpoint of Institutional theory, a firm will follow the same norm of its professional groups and react to its environment (DiMaggio and Powell, 1983**).** In this study, professional accounting bodies support is defined as the guidance and support given to public audit firms through dissemination of audit technology use and standards. Thus, it is anticipated that professional accounting bodies support will positively influence audit technology adoption.

2.2 Audit Evidence

The auditor lends credibility to financial statements by attesting to the reliability of such statements in the audit opinion (Budescu, Peecher and Solomon, 2012). Carrington (2010) stated that "a sufficient audit is about a reliable ritual of verification that produces the comfort users need in order to trust the audited financial statements". Consequently, it can be concluded that the audit opinion is dependent on the sufficiency and appropriateness of the audit evidence obtained. Thus, at a practical level, the task faced by the auditor is to gather evidence of adequate quantity (sufficiency) and quality (appropriateness) to support the audit opinion (Budescu et al., 2012). In this regard, the study addresses the objective of the study "effect of technological innovation on Audit Evidence".

2.3 Operationalization of Variables and Conceptual Framework

Table 1 : Operationalization of variables

Particulars	Study variables	Attributes	Measurement scale	Source
Independent variable (Technological innovations)	Technological context/factor	• Technology Cost Benefit	Ordinal and Nominal	Venkatesh and Bala, 2012 and (Rosli et al., 2012).
,,	,,	• Technology Compatibility	,,	,,
,,	,,	• Technology Complexity	,,	,,
,,	Organizational context/factor	• Top management Commitment	,,	,,
,,	,,	• IT competency of firm's employees	,,	,,
,,	,,	• Firm's readiness	,,	,,
,,	Environmental context	• Complexity of client's accounting systems	,,	,,
,,	,,	• Professional accounting bodies supports	,,	,,
,,	,,	• Competitive pressure	,,	,,
Dependent variable (Audit Evidence)	• Audit evidence	Sufficiency & Appropriateness	,,	Budescu et al., 2012

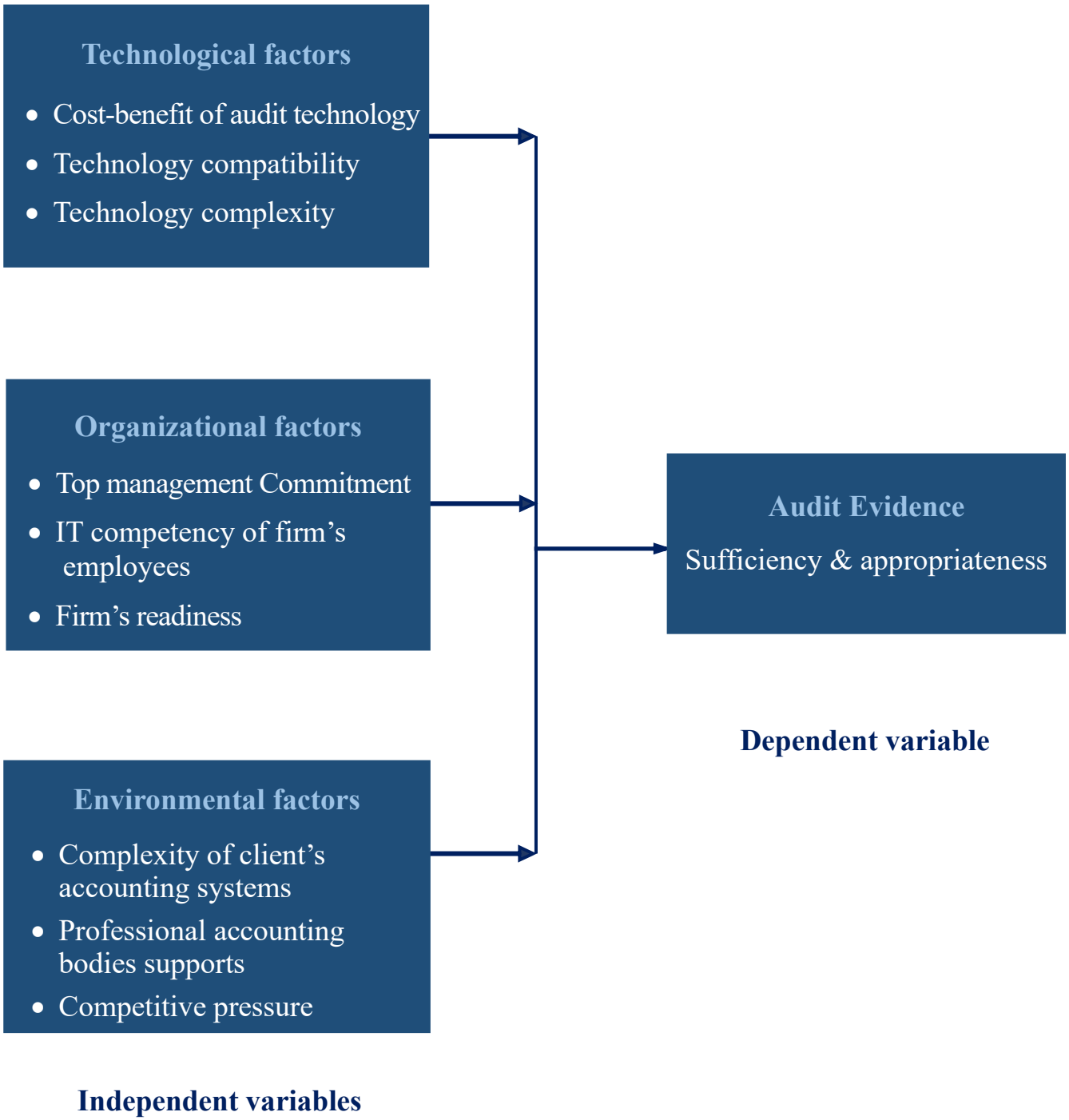

Figure 1 : Conceptual Framework

2.4 Empirical Review

Audit technology ranges from a simple audit automation using spreadsheet application to an advanced practice of audit software with databases and business intelligence applications (Rosli, Yeow, & Siew, 2013). In Malaysia, despite high AIS usage among businesses (Ismail, 2009), the investment and acceptance of audit technology is still minimal as only 21% of audit firms use audit technology despite them highly acknowledging the benefits of audit technology (Ismail and Abidin, 2009).

3. RESEARCH METHODOLOGY

Data from audit firms were gathered through questionnaire survey. The questionnaire items were mainly derived and adapted from survey instruments in the previous literatures. A five-point Likert scale ranging from strongly disagree (1-point) to strongly agree (5-point) was used to capture audit firm's effect on technological, organizational and environmental factors of technological innovations on audit evidence. According to Mugenda and Mugenda (2003), surveys enable researchers to obtain data about practices, situations or views at one point in time through questionnaires and interviews.

The Republic of Kenya has a total of 47 County Governments (Constitution of Kenya, 2010). For purpose of ensuring representation, the study stratified the country into 47 County Governments with each County Government forming strata. Through simple random sampling, the study selected one Public Accounting firm per stratum (County Government) to participate in the study. For purpose of this study, the Supreme Audit Institution of Kenya was also considered a Public Accounting firm. In this regard, the study sampled 47 Public Accounting Firms distributed in the 47 County Governments in Kenya.

The questionnaire was scrutinized by five practicing auditors to assess its validity. Reliability is if the researcher measures the same variable several times, and the results are approximately

the same (Rabianski, 2003). The reliability of the questionnaire was tested using the Cronbach's alpha correlation coefficient with the aid of Statistical Package for Social Sciences (SPSS) software. The study conducted a pilot study in Kiambu County in Kenya. The pilot also tested data for relevance, interpretability and usefulness in addressing the study objectives (Baker, 2003**).** Data entry and descriptive analysis for the questionnaire were done using Statistical Package for the Social Sciences (SPSS).

Besides using frequencies and descriptive analysis, the study used ordinal regression analysis to investigate overall statistical relationships between variables.

4. DATA PRESENTATION, ANALYSIS & DISCUSSION

4.1 Descriptive Statistics

The study established that majority of the respondents had a job experience of 1-5 years at 39.3% as detailed below:

Table 2 : Descriptive statistics

	Frequency	Percent	Valid Percent	Cumulative Percent
Btw 5-10 years	5	17.9	17.9	17.9
Over 10 years	5	17.9	17.9	35.7
less than 1 year	7	25.0	25.0	60.7
Btw 1-5 Years	11	39.3	39.3	100.0
Total	28	100.0	100.0	

4.2Technological Innovations in Audit firms

The study established that each of the sampled firms had adopted at least a technological approach in their audit works. 35.7% of the firms had adopted Data Structured Query Language (SQL) and related software's while 39.3% had an Audit Management System (AMS) embedded with Electronic Working Papers (EWP) as the major innovation. Only 3.6% of the firms had forensic toolkit as part of their audit processes a low number that compared at 3% with electronic spreadsheets as detailed below.

Table 3 : Technological innovations in Audit firms

Technological Innovations	Total number of Firms that adopted the Innovation	Total firms that have not adopted the innovation
Electronic spreadsheets	3	25
%	10.7%	89.3%
AMS embedded EWP	11	17
%	39.3%	60.7%
Forensic toolkit	1	27
%	3.6%	96.4%
Data SQl and related software's	10	18
%	35.7%	64.3%

The findings are divergent from Ismail (2009) that established that in practise, audit technology is not wide spread among public accounting firms. The increase in adoption of technological approach in audit technology could be attributed to increased automation of clients operating systems thereby exerting pressure on Auditors to adopt technological change.

4.3 Ordinal regression analysis.

Ordinal regression analysis is used to predict an ordinal dependent variable measured on ordinal Likert items like in this case. In addition, the model needs to meet the following assumptions to be feasible; One or more independent variables either needs be categorical or ordinal, there should be no multi-collinearity between independent variables and the model needs to have proportional odds. To ensure robust results from the model, multi-collinearity and proportional odds of the model needs to meet (Agresti,2010). To explore this analysis, the cumulative odds ordinal logistic regression with proportional odds will be used.

4.3.1 Testing Multi-Collinearity Assumption

Table 4 : Multicollinearity Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	TC1	.133	7.521
	TC2	.178	5.626
	OP1	.331	3.025
	OP2	.580	1.723
	EF1	.150	6.688
	EF2	.147	6.820
a Dependent Variable: Audit Evidence			

NB: all the 3 variables were measured on a Likert scale from 1 to 5, however, 1 to 2 scales were rendered redundant since they were non responsive.

- Dummy variables were created based on scale 3 to 5, hence 2 variables created.
- TC1 is dummy variable 1 for technological innovations
- TC2 is dummy variable 2 for technological innovations,
- OP1, OP2, EF1and EF2 are dummy variables for operational factors and environmental factors respectively.

Multi-collinearity results in high correlation between independent variables. Consequently, technical issues arise when considering which variable (independent) contributes and explains the dependent variable. In this regard, the "Tolerance" and "Variance Inflation Factor (VIF)" values shown in the table above are consulted. According to Laerd Statistics (2015), a VIF of less than 10 depicts a fairly reason to believe that collinearity does not exist. From the table above, VIF ranges from 7.521 to 1.723 suggesting multi-collinearity is insignificant among independent variables in our dataset. This therefore implies that the data complies with multi collinearity requirement for ordinal regression analysis.

4.3.2 Testing Proportional Odds Assumption

Having met multi-collinearity assumptions, proportional odds assumption is explored as documented by Agresti (2013) and further explored with SPSS by Laerd Statistics (2015). Proportional odds assumption stipulates that each independent categorical variable has the same influence on each of the cumulative splits of the ordinal dependent variable. To ensure this assumption is not violated in our data set, the following results are tabulated.

Table 5 : Test of proportional odds assumption

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Null Hypothesis	31.782			
General	21.753	10.029	12	.000

a. Link function: Logit.

This test compares the proportional odds model under null hypothesis and a general model without proportional odds as shown in the table above under the -2 log likelihood column.

As can be assessed on the table, the assumption of proportional odds was met when comparing the likelihood ratio test of a proportional odds location model to a model with varying location parameters, X2(12) =10.029, p=.001.

4.4 Model Results and Interpretation

Having met the assumptions of an ordinal regression model significantly, the main objectives of this section is to establish which of the independent variables- Technological factors, Operational factors and Environmental factors have any statistical effects on appropriateness and sufficiency of audit evidence.

4.4.1 Overall Model Fit

To assess the model fit, Likelihood ratio test which checks the change in model when comparing the full model to intercept only model was done. The results are as tabulated in the table below:

Table 6 : Model Fitting Information

Model	-2log Likelihood	Chi-Square	df	Sig.
Intercept only	41.257			
Final	32.782	9.475	6	.000

Link Function: Logit.

Under column -2 log likelihood column shows the model fit at 41.257 for the Intercept only as compared to a full model with all the independent variables labelled as final in the table which has a -2 log Likelihood of 32.782. The difference between the two model is shown under chi square column 9.475. Equally important, the final model is statistically significant and predicts the dependent variable (Appropriateness and sufficiency of audit evidence) over and above the intercept-only model, $\chi 2(6) = 9.475$, $p < .001$.

4.4.2 Tests of Model Effects

The ordinal regression necessitates creation of j-1 cumulative logits equations, where j is the number of categories arising from the ordinal dependent variable (Agresti,2013). As there are five categories in the dependent variable (strongly disagree, disagree, no opinion, agree, strongly agree) there are 4 equations from the 4 cumulative logits created.

However, there is need to establish how the three factors (technological factors, Operational factors and Environmental factors) influence the dependent variable. Therefore, the table below establishes an omnibus statistical test to explore if they are statistically significant overall before exploring any specific contrasts that shows up in Parameter Estimates table.

Table 7 : Tests of Model Effects

Source	Type III		
	Wald Chi-Square	Df	Sig.
Technological factors	14.372	2	.001
Operational factors	11.956	2	.001
Environmental factors	12.563	2	.001

Dependent Variable: Audit Evidence

Model: (Threshold), Technological factors, Operational factors, environmental factors.

The table above shows technological factor has a statistically significant effect on the sufficiency and appropriateness of audit evidence, Wald $\chi2(2) = 14.327$, $p = .001$. In addition, Operational factors and environmental factors significantly contribute to sufficiency and appropriateness of audit evidence as indicated by the Wald statistics, Wald $\chi2(2) = 11.956$, $p = .001$. and Wald $\chi2(2) = 12.563$, $p = .001$ respectively.

4.4.3 Parameter Estimates

In addition to test of model effects, parameter estimates are necessary to indicate how the factors differ or explain the dependent variable based on the Likert scale. Therefore, the parameter estimates represented in the table below indicates the parameter estimates of each of the independent variables.

Table 8 : Parameter Estimates

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
Parameter		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Audit Evidence=2.00]	7.0672	1.1600	4.7	9.2	36	1	.000	1172.8594	115.835	10828.043
	[Audit Evidence=3.00]	6.0672	1.5600	4.7	8.2	36	1	.000	431.4708	123.835	11828.043
	[Audit Evidence=4.00]	11.0672	2.1470	4.7	29.2	36	1	.000	64035.954	423.835	19828.043
[Technological factors=5.00]		1.034	0.7991	1.081	6.013	1.90	1	.000	2.801	2.389	11.678
[Technological factors=4.00]		1.27	0.391	0.344	5.750	2.30	1	.000	3.560	1.567	5.879

[Technological factors=3.00]	0[b]	.	.	.	.	.	.	1	.	.
[Operational factors=5.00]	1.769	0.5147	3.934	8.396	1.227	1	.001	5.864	.020	10.975
[Operational factors=4.00]	1.968	.9901	0.973	2.908	3.955	1	.004	7.156	.378	18.323
[Operational factors=3.00]	0[b]	.	.	.	.	.	.	1	.	.
[environmental factors=5.00]	1.486	2.1873	0.801	5.773	4.462	1	.497	4.420	.061	321.569
[environmental factors=4.00]	0.196	2.0861	-4.285	3.893	4.9	1	.925	.822	.014	49.042
[environmental factors=3.00]	0[b]	.	.	.	.	.	.	1	.	.
(Scale)	1[c]									

Dependent Variable: Audit Evidence

Model: (Threshold), Technological factors, Organizational factors, Environmental factors

a. Set to system missing due to overflow

b. Set to zero because this parameter is redundant.

c. Fixed at the displayed value.

4.4.4 Interpretation of results

Objective 1: Effect of technological factor of technological innovations on audit evidence among public accounting firms in Kenya

The odds of respondents who strongly agree that technological factors influencing sufficiency and appropriateness of audit evidence was 2.801, 95% CI [2.389, 11.678] times those who have no opinion, a statistically significant effect, Wald $\chi 2(1) = 1.90$, $p = .001$. This finding concurs with Trompeter and Wright (2010) who established that technological factors have a positive influence on quality of audit evidence.

The odds of respondents who only agree that technological factors influence sufficiency and appropriateness of audit evidence was 3.560, 95% CI [1.567, 5.879] times those who have no opinion, a statistically significant effect, Wald $\chi2(1) = 2.30$, $p = .001$. This finding concurs with Rodgers (2003) who found out that technological compatibility positively influences sufficiency & appropriateness of audit evidence. This study therefore rejected the null hypothesis (H01) "Technological factor of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya"

Objective 2: Effect of Organizational factor of technological innovations on audit evidence among public accounting firms in Kenya

The odds of respondents who strongly agree that organizational factors influence sufficiency and appropriateness of audit evidence was 5.864, 95% CI [0.020, 10.975] times those who have no opinion, a statistically significant effect, Wald $\chi2\,(1) = 1.227$, $p = .001$.

The odds of respondents who only agree that organizational factors influence sufficiency and appropriateness of audit evidence was 7.156, 95% CI [0.378, 18.323] times those who have no opinion, a statistically significant effect, Wald $\chi2(1) = 3.955$, $p = .001$.

These findings are in agreement Mahzan and Lymer (2009) that established that top management commitment positively influences sufficiency and appropriateness of audit evidence. Jarran et al., (2008) also came up with similar findings.

This study therefore rejected the null hypothesis **(H02)** that organizational factors of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya.

Objective 3: Effect of Environmental factor of technological innovations on audit evidence among public accounting firms in Kenya

The odds of respondents who strongly agree that environmental factors influence sufficiency and appropriateness of audit

evidence was 4.420, 95% CI [0.061, 321.569] times those who have no opinion, a statistically significant effect, Wald $\chi2(1) = 4.462$, $p = 001$.

The odds of respondents who only agree that environmental factors influence sufficiency and appropriateness of audit evidence was 0.822, 95% CI [0.014, 49.042] times those who have no opinion, a statistically significant effect, Wald $\chi2(1) = 4.9$, $p = .004$.

The findings concur with Hall, 2011, Cartman and Salazar (2011) and Zhu et al., 2005 who established that environmental factors of technological innovations positively influence audit evidence.

The study therefore rejected the null hypothesis **(H03)** that Environmental factor of technological innovation has no effect on audit evidence among public external audit accounting firms in Kenya.

5 CONCLUSION & RECOMMENDATION

In conclusion, the three factors, Technological, Organizational and Environmental factors have statistically significant effects on appropriateness and sufficiency of evidence. In addition, enhanced connectivity and applications software that would enable obtaining audit evidence in real time instead of relying on manual historical data and use of drones and the General Packet Radio Service (GPRS) for physical verification of projects were noted as ways to enhance technological innovations in audit firms.

Since there exists sufficient evidence that technological innovations influence audit evidence, it is recommended that:

- Public Accounting firms and Supreme Audit Institutions put in place appropriate policy framework for adoption of technological innovations in external audit process;

- Professional bodies should come up with appropriate audit standards to guide application of technological innovations in managing audit evidence; and
- Public Accounting firms should consider adopting Forensic Tool Kits to enhance their responsiveness to fraud risks. Professional bodies should put in place policy framework to guide the same.

6 References

Abidin, S. & Baabbad, M.A. 2015. The use of analytical procedures by Yemeni auditors. *Corporate Ownership & Control*, 12(2): 17–25.

Agresti, A. (2010). Analysis of ordinal categorical data (2nd ed.). Hoboken, NJ: John Wiley & Sons.

Agresti, A. (2013). Categorical data analysis (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Baker, T. L (2003), Doing Social Research (2nd ed). New York: McGraw-Hill inc.

BUDESCU, D.V., PEECHER, M.E. and SOLOMON, I., 2012. The joint influence of the extent and nature of audit evidence, materiality thresholds and misstatement type on achieved audit risk. Auditing, 31(2), pp. 19-41.

Cartman, C., and Salazar, A. 2011. "The influence of organizational size, internal IT capabilities and competitive and vendor pressures on ERP adoption in SMEs," *International Journal of Enterprise Information Systems* (7:3), pp. 68–92.

CARRINGTON, T., 2010. An analysis of the demands on a sufficient audit: Professional appearance is what counts. Critical Perspectives on Accounting, 21(8), pp. 669-682.

CAUSHOLLI, M. and KNECHEL, W.R., 2012. An examination of the credence attributes of an audit. *Accounting Horizons,* 26(4), pp. 631-656.

Curtis, M. B., & Payne, E. A. (2008). An examination of contextual factors and individual characteristics affecting technology implementation decisions in auditing. *International Journal of Accounting Information Systems*, *9*(2), 104-121. http://dx.doi.org/10.1016/j.accinf.2007.10.002

DiMaggio, P. J., and Powell, W. W. 1983. "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields," *American Sociological Review* (48:2), pp. 147–160.

Ernst & Young. "How Big Data and Analytics Are Transforming the Audit." EY Reporting 5.9 (2015): Web. 20 Feb. 2016.

Friedenberg, M. (2012). How to succeed in business: Award-winning IT Innovation," CIO; July 27.http://www.cio.com/article/711435/How_to_Succeed_in_Business_Award_Winning_IT_Innovation, accessed 8/13/2012.

Hall, J. A. 2011. *Information Technology Auditing*, (3rd ed.) USA: Cengage Learning.

IAASB, 2014b. International framework for assurance engagements. *SAICA electronic handbook.* Johannesburg, South Africa: SAICA.

IAASB, 2014e. ISA 230: Audit documentation. *SAICA electronic handbook.* Johannesburg, South Africa: SAICA.

International Federation of Accountants [IFAC] (2010): "2010 Handbook of International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements", New York: International Federation of Accountants [IFAC]

Ismail, N. A. (2009). Factors influencing AIS effectiveness among manufacturing SMEs: Evidence from Malaysia. *The Electronic Journal of Information Systems in Developing Countries, 38*(10), 1-19.

Ismail, N. A., & Abidin, A. Z. (2009). Perception towards the importance and knowledge of information technology among auditors in Malaysia. *Journal of Accounting and Taxation*, *1*(4), 61-69. http://dx.doi.org/10.5897/JAT09.017

Janvrin, D., Bierstaker, J., & Lowe, D. J. (2008). An Examination of Audit Information

Technology Use and Perceived Importance. Accounting Horizons, 22(1), 1-21.

Joshi, P. and Deshmukh, A. (2009): "An Empirical Analysis of Auditors' Evidence Gathering Techniques in Bahrain", Afro-Asian Journal of Finance and Accounting, Vol. 1, No. 4, pp 333-352

Lyytinen, K., Rose, G.M. (2003). The disruptive nature of information technology innovations: The case of internet computing in systems development organizations. MIS Quarterly; 27:4, 557-595.

Mahzan, N., and Lymer, A. 2009. "Examining adoption of computer assisted audit tools and techniques (CAATTs) by internal auditors: Cases of UK internal auditors," in *Proceedings of 12th International Business Information Management Association (IBIMA) Conference*, Kuala Lumpur, Malaysia, pp. 1–46.

MAUTZ, R.K. and SHARAF, H.A., 1961. *The philosophy of auditing.* New York, USA: American Accounting Association.

Mugenda, O.M. & Mugenda, A.G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press

MOIZER, P., 2005. *Governance and auditing.* Northampton, USA: Edward and Elgar.

MORTON, J.E., 2002. The dual role of audit evidence. *Academy of Accounting and Financial Studies Journal,* **6**(3), pp. 95-113.

Moorthy, M. K., Seetharaman, A., Mohamed, Z., Gopalan, M., & San, L. H. (2011). The impact of information technology on internal auditing. *African Journal of Business Management, 5*(9), 3523-3539.

Murphy, Maria L., and Ken Tysiac. "Data Analytics Help Auditors Gain Deep Insight."

Journal of Accountancy (2015): Web. 5 Mar. 2016.

PERRY, T.P.M., 2011-last update, SAS 106: Audit evidence: Is it effective? Available: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1907438 [23 November, 2012].

Pinho, C. 2014. The usefulness of analytical procedures: an empirical approach in the auditing sector in Portugal. *International Journal of Business and Social Research*, 4(8): 25–33.

Rabianski, J.S. (2003). Primary and Secondary Data: Concepts, Concerns, Errors, and Issues, *The Appraisal Journal,* 71(1), 43-55.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, Free Press.

Rosli, K., Yeow, P. H. P., & Siew, E. (2013). Adoption of Audit Technology in Audit Firms. In *24th Australasian Conference on Information Systems*, Melbourne.

Samaha, K. & Hegazy, M. 2010. An empirical investigation of the use of ISA 520 "analytical

procedures" among Big 4 versus non-Big 4 audit firms in Egypt. *Managerial Auditing Journal*, 25(9): 882–911.Saunders, M., Lewis, P. & Thornhill, A. 2012. *Research methods for business students.* 6th ed. London: Pearson.

Sambamurthy, V., Bharadwaj, A., Grover V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly*; 27(2): 237-263

Sharma, Ruby. "Big Data and Analytics in the Audit Process." EY Center for Board Matters (2015): Harvard. Web. 2 Jan. 2016.

Swan, J. A., and Newell, S. 1995. "The role of professional associations in technology diffusion," *Organization Studies* (16:5), pp. 847–874.

Staub, Walter A., "Auditing Developments During the Present Century." *Massachusetts:*

Harvard University Press (2012): p.15, 17, 26, 29

Tornatzky, L. G., & Fleischer, M. (1990). *The Processes of Technological Innovation*. Lexington MA, Lexington Books.

Trompeter, G. & Wright, A. 2010. The world has changed: have analytical procedure practices? Contemporary Accounting Research, 27(2): 669–700.

Venkatesh, V., & Bala, H. (2012). Adoption and impacts of interorganizational business process standards: Role of partnering synergy. *Information Systems Research*, 1-27. http://dx.doi.org/10.1287/ isre.1110.0404

Zhu, K., and Kraemer, K. L. 2005. "Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry," *Information Systems Research* (16:1), pp. 61–84.

The Impact of Technological Innovation on Audit Evidence

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1-Abstract

Modern audit engagements often involve examination of clients that are using Big Data and analytics to remain competitive and relevant in today's business environment, as Client systems now are integrated with the cloud, the Internet of Things, and external data sources such as social media. Furthermore, many engagement clients are now integrating this Big Data with new and complex business analytical approaches to generate intelligence for decision making. This scenario provides almost limitless opportunities and the urgency for the external auditor to utilize advanced analytics. Therefore, big data has become an indispensable resource for many organizations and has the potential to be a very valuable resource for financial data auditors.

This paper analyzes the use of big data technologies in auditing, which is the latest link in the evolution of audit technology.

2- Introduction

Technological development has become the dominant feature in the world, as continuous innovations and updates in the world of information and communication technology, software and applications do not stop, which puts the various countries of the world in front of the imperative of development, change and benefit from information technology. The world of money and business has been affected by this in terms of preparing, analyzing, displaying, storing and utilizing data and information. The auditing profession meets the technological development, which made the benefit exist between the two parties, At the same time, it opens the way for the auditing profession to employ the new technologies and technological tools in the field of auditing, to achieve the required speed, effectiveness, achievement and accuracy that characterize the audit profession. The benefit from information technology is not limited to one aspect of the audit profession; Rather, on the various processes, this benefit did not change the nature and purpose of auditing, but rather exposed the auditing profession to a great challenge to develop its tools and methods to continue providing its services with high quality, Technological developments have changed the form and nature of audit evidence, which is the main focus of the audit process, and thus the procedures and methods the auditor use to collect audit evidence to obtain reasonable assurance and achieve the objective in accordance with both local and international auditing standards.

The audit evidence is the central element in the audit process that gives emphasis to the transactions and events of the organization, and future audit processes require obtaining information through online systems, and the elimination of manual audit paths has become imminent, and the need for automated tracks and the use of electronic exchange of data will be the emerging source for audit evidence.[1]

3- The Research Problem

The technological development does not stop, which contributes to reducing time and effort, increasing reliability and accuracy at work, in addition to the ease of retrieval and comparison between data and information, which imposes on institutions the necessity of seeking to invest these technological tools in the development of performance, which applies to the auditing profession. So, the research problem is the following question:

What is the impact of technological development on audit evidence?

4- Objective of This Research

The digital transformation does not leave the audit world without change. On the contrary, auditors have already begun to adopt the digital revolution to carry out their tasks in the most efficient and effective way. The words of artificial intelligence, the Internet of things, sensors, robots, big data, Smart audit, digital audit, and blockchain have entered our daily vocabulary and embody the world we live in. Data is the basis of everything, and audits should continue to harness the latest technological developments in the field of data analysis, machine learning and artificial intelligence to enable auditors to conduct audits in a faster and more innovative way, therefore, this paper aims to:

1- Identify the impact of technological development on the audit profession in general.

2- Identify the impact of technological development on audit evidence in light of the impact of big data and its analyzes on audit evidence.

5- Research Importance

The importance of research stems from the importance of both the technological development and the audit profession to the world of finance, business and government, as well as the importance of audit evidence and procedures for obtaining it for the auditing profession.

6- Background on Financial Statement Auditing

An audit of financial statements relates to the examination of the organization's financial statements by an independent

auditor. Auditors opinion is about the fair presentation of the financial statements and related disclosures. The purpose of the audit is to add credibility to the reported financial statements and business performance. The audit went through many stages to adapt to the changing environment. The following figure illustrates the transition from historical auditing to the way auditors audit today. Initially, the auditors performed manual audits based on very small samples. It then evolved into a more automated audit with larger sample sizes. Future audits will be within 100% of the population, and will focus on patterns and data analysis of outliers and anomalies, in a form unimaginable today. Big data is part of this pile of information and will push auditors further beyond their comfort zones than traditional auditing methods. [1] [16]

The Evolution of Audit (Trumpener et al, 2017)

7- The Concept of Audit Evidence

Audit evidence is all the information, obtained from the audit procedures or from other sources that the auditor uses to reach the conclusions on which the auditor's opinion is based. The audit evidence consists of all the information supports and confirms management's assertions regarding financial statements or internal control over financial reports and information that are Contrary to these assertions; it includes all records and data or other relevant and verifiable information. The quality of the audit findings depends directly on judgment on the methodology used to collect the evidence, the quality of the audit evidence collected and the competence of the auditor who gathered it. [3] [11] [12] [15]

The traditional view of audit evidence may not be sufficient, and the audit profession and regulators should be aware of the impact of information technology on the shape and nature of audit evidence.

8- Characteristics of Audit Evidence

Evidence should be sufficient and appropriate. The characteristics of the audit evidence can be summarized as follows: [3] [7] [15]

Sufficient	Amount of evidence considered enough: i) to form a reasonable opinion (sample size, representativeness) ii) to convince stakeholders of validity of auditors opinions iii) representative of the audit universe and relevant period of time
Relevant	Extent to which the evidence has a clear and logical relationship to the audit objectives and criteria.
Reliable	Evidence that can be considered trustworthy (accurate, credible and where integrity has not been compromised); the likelihood of coming up with the same answers if audit test is repeated or information is obtained from a different source or test.
Verifiable	Evidence which can be confirmed by cross-checking with other evidence
Objective	Evidence free from bias (e.g. the auditors preconceived ideas) Evidence which accurately reflects the functioning of a system, or part of a system, operated by the auditee and that does not intentionally support/defend the interests of the auditee.

9- Audit Procedures to Obtain Audit Evidence

The auditor performs risk assessment procedures, which, by themselves do not provide sufficient and appropriate audit evidence to build the audit opinion. The risk assessment procedures must be supplemented with additional audit procedures in the form of tests of objective controls and procedures. Even if the auditor tests the controls, there are inherent limitations in internal control including the risk of management override, the potential for human error, and the impact of systems changes. Therefore, objective procedures for the classes of significant transactions, account balances and disclosures are always required to obtain sufficient and appropriate audit evidence.

10- Techniques of Collecting Evidence

The auditor obtains audit evidence by one or more of the following techniques: [3] [15]

Technique	Definition	Examples
Inquiry	Consists of seeking information of knowledgeable persons inside or outside the entity.	Obtaining written or oral information from the client in response to specific questions during the audit.
Observation	Consists of looking at a process or procedure being performed by others.	Observation by the auditor of the counting of inventories by entity's personnel, site visit at the client's facilities.
Inspection	Consists of examining records, documents, or tangible assets.	Reviewing sales orders, sales invoices, shipping documents, bank statements, customer return documents, customer complaint letters, etc.

Recalculation	Consists of checking the arithmetical accuracy of source documents and accounting records or performing independent calculations.	Extending sales invoices and inventory, adding journals and subsidiary records, checking the calculation of depreciation expense and prepaid expense.
Reperformance	Consists of independent execution of procedures or controls that were originally performed as part of the entity's internal control.	Use CAATs to check controls recorded in the database. Reperform aging of accounts receivable.
Confirmation	Consists of response to an inquiry to corroborate information contained in the accounting records.	Used to confirm the existence of accounts receivable and accounts payable, verify bank balances with banks, cash surrender value of life insurance, notes payable with lenders or bondholders.
Analytical procedures	Consist of the analysis of significant ratios and trends including the resulting investigation of fluctuations and relationships that are inconsistent with other relevant information or that deviate from predictable amounts.	Calculating trends in sales over the past few years, comparing net profit as a percentage of sales in current year with the percentage of the preceding year, comparing client current ratio to the industry current ratio, and comparing budgets to actual results.

11- Factors That Must Be Taken into Account When Judging the Quality and Quantity of Audit Evidence

[6] [7] [11]

- The purpose for which the evidence will be used.
- The level of significance of the audit findings (the higher the level of indication, the higher the level of evidence required).
- Degree of independence of the source of evidence (more reliance can be placed on evidence that emerges from independent sources).
- Cost (money and time) to obtain additional evidence to support findings and conclusions.
- The risk involved in making incorrect results or arriving at incorrect conclusions (the higher the risk of actions the higher the level of evidence required).
- Care in data collection and analysis, including the auditors' skills.

12- Linking Auditing and Information Technology

Information and communication technology is described as various technological tools and resources that are used to shape, manage, store and distribute information. With the use of accounting systems based on advanced technologies, making the audit process a subject compatible with these technologies has become important, so increasing the quality and efficiency of the audit has gained great importance, so the change in audit techniques has become, and conducting audits of these electronic environments has become a necessity. [14]

The audit activities with the help of information technology techniques have a critical importance for the auditor to achieve the audit activities as it ensures that the errors arising from the human in the accounting transactions are minimized.

The audit objectives have not changed in the case of processing the accounting information manually or electronically,

however, the methods of applying audit procedures to obtain evidence may be affected, and the auditor can use manual procedures for auditing or use electronic auditing or both methods together. [6]

The advantages that IT provides in auditing as follows: [10]

- Efficiency, productivity, quality increase, cost savings and time savings.
- New, interactive and creative auditing tools compatible with high volume of data.
- Independence and increased oversight.
- Create added value and produce information.
- The possibility of reviewing in many areas that do not contain printed documents, such as electronic commerce.

There are many risks in the IT environment which can be classified into:

- Operational risks (insufficient system security, inadequate system design, poor maintenance, misuse)
- Reputation risk (effective penetration)
- Legal risks (money laundering, violation of agreements, lack of a clear definition of rights and obligations)
- Other risks (such as market risk)

The need for special auditing appeared in the information technology environment, which was supported by scientific and professional societies and organizations at the global level, including the International Federation of Accountants, through international auditing standards. [6]

13- Electronic Audit Evidence

In response to technological development, many entities process information electronically, such as electronic data exchange with customers, suppliers, electronic commerce, and cash payments. Transaction documents may only be available in electronic form or original documents may be available only at certain points in time, and accordingly it may be difficult or it is impossible for the auditor to access certain information for examination or confirmation without the use of information technology, or the auditor may be able to reduce the risk of

disclosure to an acceptable level by performing only substantive tests for one or more financial statements confirmations, for example the possibility of incorrect occurrence or alteration of the information. Disclosure is greater if the information is produced or accessed in electronic form in such circumstances, and the auditor must conduct control tests to collect evidence to support the level of assessed control risk below the maximum assertions.[4]

The traditional view of audit evidence may not be sufficient, and the audit profession and its regulators must consider the impact of a more advanced technological environment on some traditional forms of audit evidence. [1] [2]

The purpose of electronic evidence does not differ from traditional forms, and strong electronic evidence generally depends on the effectiveness of internal controls, but there is a question that the auditor needs to address regarding the reliability of the electronic evidence obtained, the customer may not have physical documents to examine, and he may not be aware that electronic evidence lacks credibility unless the auditor examines the internal controls related to electronic evidence. [2]

14- Big data

There is no an agreed definition of big data, in general it means a huge volume of data that cannot be expected and cannot be stored, managed and processed using traditional technological tools or means. Therefore, big data is the basis for future innovations that will increase the productivity and competitiveness of the organization where it aims to improve the decision-making process and serves the executive management and focuses on the efficiency of the organization's operations. They are collections of structured or unstructured data that are distinguished by being superior in size, speed and diversity in comparison to traditional data, and they require innovative forms of information processing that exceed the ability of traditional database tools to collect, store, manage and analyze that data. [5]

The importance of big data is to forecast, or what is known as foresight, which helps avoid problems and make appropriate decisions.

Auditors are motivated to use big data in their audits for various reasons. First, the audit client has used big data in a major way in the process of accounting decision-making and judgment, which may have a material impact on the financial data. Second, the auditors' ambition to use it in risk analysis, customer evaluation, industry and assurance. As the auditing profession is highly regulated, big data has recently been incorporated into the audit environment. [6] [9]

15- Characteristics of Big Data

The following table illustrates the characteristics of big data [7]

Volume	The volume of big data is very large, and therefore you need large processors and devices capable of dealing with this data, and this may be the most important in analyzing big data
Variety	It refers to the diversity in the forms of data and includes structured data and unstructured data such as audio files, video files, web pages, etc., and it requires time and effort to prepare it in a suitable form for processing and analysis.
Velocity	It refers to the speed and appropriate timing of data processing to achieve the maximum benefit for users and beneficiaries
Great value	You need specialists with sufficient experience and skills to handle and analyze this data with appropriate analysis
Variability	The same information can mean many things
Veracity	The ability of big data technologies to eliminate biases and anomalies in data, and their ability to deal with uncertainty and unreliability of data
Multiple appearances	It must be analyzed and shown in different forms commensurate with the nature of its use, and it takes multiple forms such as statistics, numbers, geometric shapes, etc. to convey information in a more efficient manner.
Variability	It refers to how data is constantly changing, as data can change significantly periodically
Complexity	Complexity refers to the number of data sources

16-Types of Big Data

Big data can be divided into structured data (data organized in the form of tables or databases), unstructured data (text writings, video clips, websites), semi-structured data (documents) [7] [6] [18]

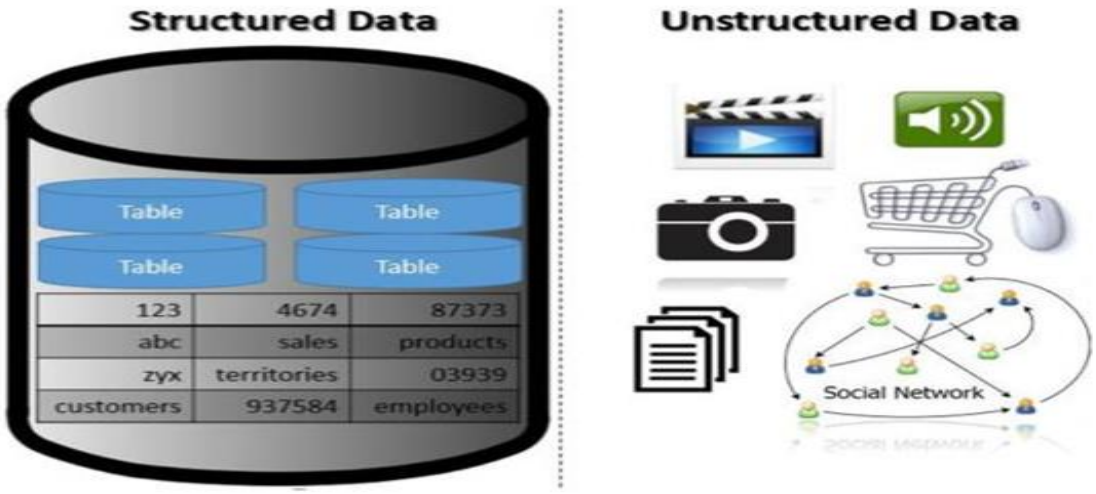
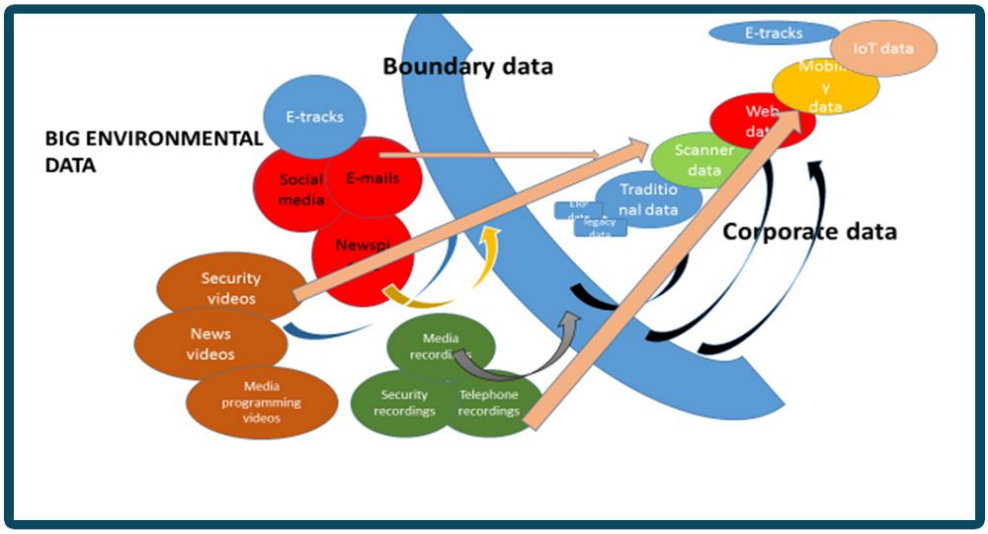


Figure: Examples of Structured and Unstructured Data (Source: IIA, 2017)

17-The emerging data environment and automatic data collection

Connecting business to external data is fundamentally changing the data environment. The first companies used a series of different virtual location arrangements on the Internet. This type of arrangements allows for flawlessly comprehensive corporate data support and facilitates better interaction with the external big data environment. [1] [5] [7]

In the past the data was prepared mainly in punch cards and paper strips, then stored on magnetic strips. Databases were of limited size. With the advent of data scanners, the process remained mainly manual, but some degree of automation was achieved in data collection, and links were established between traditional data and purchase baskets as shown in the figure.[7]



The Big Data environment (adapted from Vasarhelyi, Kogan, & Tuttle, 2015)

Later on, web data (including click information, URLs and referral links) provided more data links and a much greater volume. Once again there have been significant increases in data volume and storage, and non-structured data captured automatically has been integrated.[7] The RFID chips (Radio-frequency identification) paired with these communication devices will allow the development of "electronic paths" that will reflect the records of the available items, and ultimately more intelligent information will be combined. Institutions will integrate chips into their inventory and fixed assets, and use tracking devices on equipment and employees. They will also integrate smart devices into most of their facilities. It will raise many privacy and security concerns. [7]

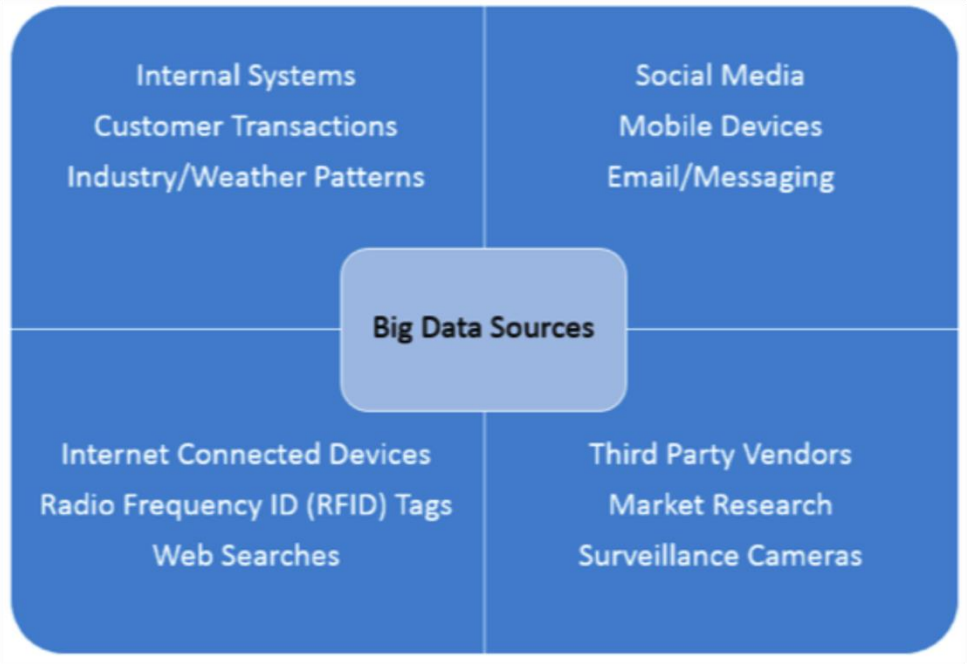
18- Sources of Big and Medium Data Evidence

Overall, the emerging data environment should be evaluated in light of its impact on the adequacy, efficiency and reliability of audit evidence. While traditional evidence tends to be primarily archival and internal evidence, evidence usually extracted from the external environment is evidence of a more probabilistic nature that must be considered in light of the characteristics of the information. A new body of knowledge must be created to understand this information and the emerging limitations imposed by the traditional audit model. [10] [13]

Applications development for managing multiple operations connects big data to the company's measurement, management, and assurance processes. For example, cameras in a company's parking lot, surrounding streets, and in stores can be used to collect a range of visual information for short-term use. It may use face recognition software to identify frequent or unwanted employees or clients. [17]

Data sources can be identified by the following sources:

- Commercial sources related to transactions, such as credit cards.
- Sources of sensor networks, such as imaging satellites.
- Sources of devices tracking data from cell phones.
- Sources of behavioral data.
- Sources of opinion data such as comments on social media sites.

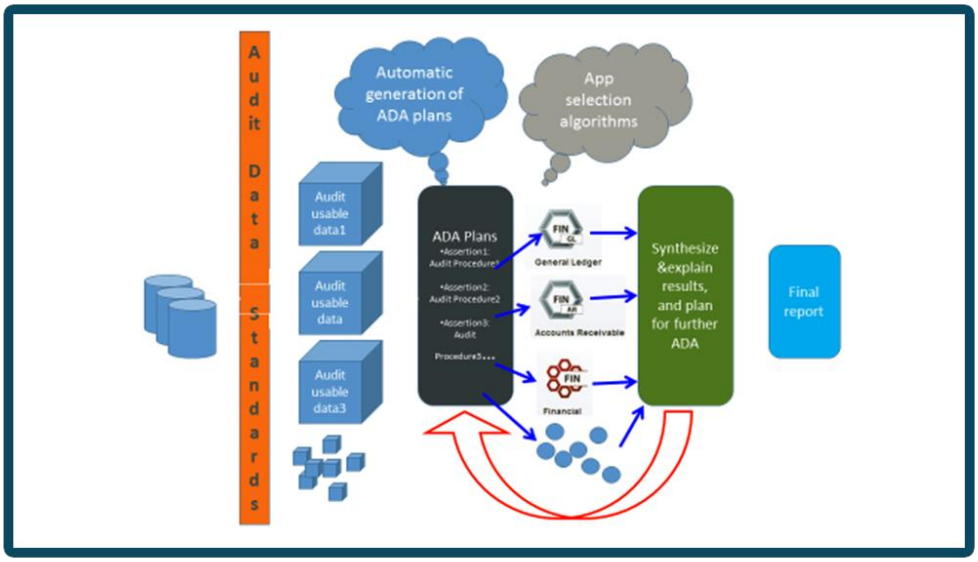


Examples of Big Data Sources (IIA, 2017)

19- Considerations of Evidence in an Evolving Data Environment

A progressive system for automatic audit

Dai (2014) suggested the usage of the Audit Data Standard and related apps into an integrated audit of the future. This audit includes a risk assessment platform generating an automated audit plan with a set of assertions, a recommender system choosing apps, results being analyzed by routines, and the process software generating internal and external audit reports. At all steps of the process, software agents would be working and generating forms of evidence.



Evolving view of an automated system using the Audit Data Standard (ADS) (from Dai, 2014)

What forms of evidence arise in the big data environment?

The audit standards largely provide guidance regarding traditional forms of audit evidence [such as evidence provided by a company or external documents] and considerations of evidence in an electronic environment [for example, information transmitted, processed, maintained, or accessed electronically]. However, these standards do not adequately address the nature of the issue of proof that will be necessary in the more complex technological environment.

The table summarizes the features required of audit evidence and issues that should be considered in a more complex large data environment. [2] [12]

Evidence Characteristics	Considerations in Big Data Environment
Difficulty of alteration	external Big Data is not under the business control
Credibility	data capture and preprocessing must be verified
Completeness	external data is practically infinite and not always accessible
Evidence of approvals	data is external
Ease of use	new automatic methods are being developed for this purpose
Clarity	external Big Data tends to be stochastic

As a result, it is important to assess how the technology is used to ensure that it meets the characteristics specified in the standards. There are several related points that should be considered: [10] [12]

1) Sufficiency (quantity) may not be the primary problem. And because the new technology will allow the auditors to inspect 100%, the shift will likely relate to the timely access to relevant data and the auditor's use of various analysis tools to analyze and interpret the data in a more serious and effective way.

2) Suitability (quality). Relevancy and reliability are two major issues and this judgment will be subject to evaluation through the formalization of various tests that will formalize computational procedures that do not currently exist. Usually, data extraction and use automatically using formal forms creates a higher level of reliability compared to manual processes.

3) The sources and types of evidence are new, and how this evidence complements or replaces traditional evidence must be better understood by researchers and the profession.

20 - Incorporating Modern Technology to Obtain Audit Evidence

Incorporating advanced technology into the audit process will undoubtedly raise questions concerning the implication of a less transparent audit trail (e.g., traceable paper documents may not exist). Although the traditional manual audit trail has become rare, computer processes can create logs with reasonable facility and these can be collected and processed in many ways not previously possible.

Another question to consider is how should traditional audit procedures change to adapt to technology? Audit procedures address assertions. Since assertions are driven by financial reporting standards, they are unlikely to change and auditors will still be required to determine audit objectives and design their audit procedures to address these assertions. The change will instead be driven by how technology impacts the nature, extent and timing of audit procedures performed. For example, most audit objectives and assertions will be formalized and programmed into repetitive apps to be applied within an automated audit that will implement a formal audit plan with elements to be repeated at predetermined times or continuously (7) (17)(18).

The use of more sophisticated audit tools will assist the auditors by automating the collection, coordination and mapping of key audit objectives and procedures. For example, these auditing tools will be greatly regulated due to the formalization of the audit plan with pre-defined application processing data at predetermined times, then unforeseen or manually disclosed evidence or judgments are evaluated and the human approach is put into consideration and its incorporation into the existing system. A feedback system that evaluates both short- and long-term results will be used to evaluate the performance of the audit system over time.

21- Smart audit and big data

What about auditors after the introduction of the ERP system, the Internet and digitization in the financial and business world? The reasonable answer would be data analytics.

The auditor must know how to examine the data to find the answer to meet the audit objectives. Accordingly, more tools, namely audit analytics, are offered to the auditors to handle big data; moreover, automation tools such as robotic process automation make the audit process hands-free. The tools not only make auditors smarter, but they also get them focused on the more productive tasks. [1]

As more information becomes available, it must be validated for decision-making, and audit agencies and organizations must develop strategic plans for data management and analytics and make greater efforts to implement such methodologies and auditors must be encouraged to integrate big data and analytics into their field work to generate better insights.[10]

In the current era of big data, auditors can collect external data from various sources such as social media and the Internet, and in addition, advanced data analysis techniques use automation and computing enable auditors to process data in more efficient and effective ways, thus obtaining more relevant evidence, and they can reduce the possibility of material misstatements and audit gaps. [4]

As the world becomes more digital, the audit should become more digital to keep pace with the changing reality, and that the first major component of what we might call digital auditing is the automation of data collection, data preparation and analysis, and the second major element in digital audit is data analysis [6]

22-Big data as audit evidence

With the continuous advancement in technology, traditional audit evidence is no longer sufficient due to the changing nature and efficiency of audit evidence. Big data, especially external, is complementary to traditional client data in case the evidence is insufficient, so auditors

must be able to access the data to ensure that they are safe, secure and trustworthy. The auditor's access to big data can contribute to the various auditing stages, gain additional knowledge about the audit client and the industry, provide support to the auditor in the risk assessment phase, use non-financial information such as social media data, provide auditors with more knowledge about their clients. Moreover, external data provides support for the auditor to detect fraud because traditional data may hide important information, so evaluating external data such as emails can be a useful tool for auditors to detect fraud, and evidence from big data is sufficient due to the size and variety of data available in real time. [6] [7] [10]

The following are the big data issues as audit evidence

Challenge of Big Data	Recommendation
How can the availability of Big Data sets be used to enhance analytics?	Research can suggest analytical techniques that take advantage of Big Data and evaluate how they improve audit effectiveness and/or efficiency.
Can the volume of data compensate for uncertain or lower quality of data?	Studies should be conducted that determine whether there exists an upper threshold of data volume, exceeding which could compensate for lower data quality. A framework for data value should be generated.
How can the amount of audit evidence provided by analytics in a Big Data context be measured?	Research should re-examine the concept of whether evidence derived from analytics is ‘‘soft,’’ and a quantitative reliability scoring system developed for all types of audit evidence. This score could then be integrated in the overall risk assessment.

Alterability: How can the auditor be assured that the data have not been altered?	Research examining various tests for the assertion of accuracy in a Big Data context should be conducted.
Credibility: How can the auditor be assured of the controls surrounding the generation of Big Data external to the client?	Research examining/suggesting certain verifications of controls should be undertaken.
Completeness: How can the auditor verify that Big Data is complete?	Research should be undertaken that can provide suggestions as to the verification of Big Data for the assertion of completeness.
Approvals: Should Big Data provide evidence of approvals/ controls validations? Is this viable?	Studies of controls measurements of Big Data at all levels of generation and extraction should be conducted. For example process-mining techniques can be used.
Ease of Use: Will Big Data require expertise to understand and extract and prepare for analysis?	What level of expertise should engagement staff attain to be competent in the modern audit engagement?
Clarity: Can this Big Data be replicated/reperformed/recalculated by the auditor?	Research should examine whether this is a viable test in a Big Data context and, if so, how to perform it. This is the level of accuracy to be demanded from Big Data analytics. The concepts of materiality and relative error in the context of Big Data audit analytics should be examined.

23-Audit insight

Here are some examples of technology being used to obtain evidence

1- Obtaining confirmations:

Previously, clients' account statements were sent in a bank through the mail so that they were delivered to the customer hand in hand to their addresses registered in the bank, to certify the balances of their accounts with the bank on the date of preparing the financial statements, provided that the customer re-sent the approval after signing them and also writing their notes They complained about their balances directly to the bank's auditor.

You might notice:

- Certifications arrive to the auditor after a long period, and after the date of the audit report.
- About 30% to 50% do not reach the bank's customers for various reasons.
- Dormant account statements or zero balances are sent to clients.

Consequently, this does not represent a significant procedure for the audit process, despite its cost, which in some years has reached 10 million pounds.

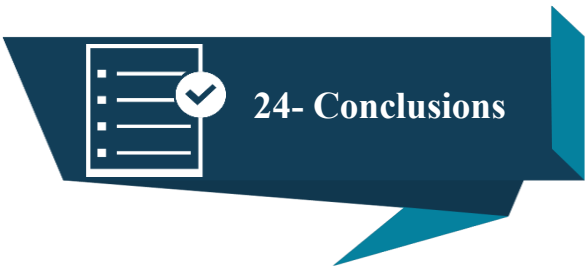
When an amendment has been made to the ATM and mobile banking applications, so that an authentication message appears that will not be overlooked to verify the balance of the bank account in the first bank transaction for the bank customer after the date of the fiscal year, and a weekly report of responses is sent directly to the e-mail of the bank's auditor.

You might notice from this procedure:

- About 90% of clients transacted on their bank accounts and responded to approval within a month from the end of the fiscal year.
- The procedure became important as a guide in the audit process.
- The procedure saves cost, time and effort.

2- Counting cash in banks

The display screens were used to inventory cash in bank branch safes located in places that the auditor could not reach to prevent travel during the COVID-19 pandemic.



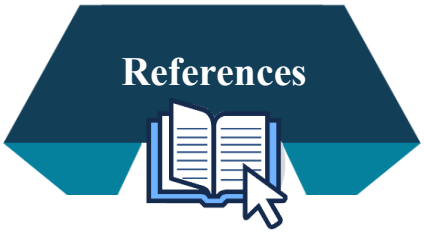
24- Conclusions

- The purpose and nature of the audit process has not changed due to technological development.
- The concept and nature of audit evidence is changing due to the emergence of big data, digital evidence, and electronic implications that RFID, GPS and IoT recording favor.
- The emerging public importance that big data and advanced analytics provide to the public audit profession cannot be ignored.
- Big data analytics will enable 100% of the parameters to be tested to find anomalies in the sample.

- Big data and business analytics are dramatically changing the business environment and business process capabilities.
- Big data analytics helps speed up analysis, understand data links, and provide new and deeper insights. This, in turn, will help improve risk assessment for better audit planning, analyze all transactions, and discern hidden links for more insightful audit results and present results in an easy-to-read manner for the reader through visualization tools. Above all, data analytics will help the SAI to focus audit resources on high-risk areas, however, to reap the benefits from big data, the SAIs will have to address issues of data quality and confidentiality, and create the infrastructure (hardware and software tools) to analyze and train the workforce on big data. This may require a comprehensive policy for managing big data in the SAI.

25- Recommendations

- Conducting more studies on information technology tools and their role in developing the auditing profession.
- Paying attention to the technical training of auditors.
- The use of information technology in general and the use of big data analytics in particular to improve the quality of auditing in terms of efficiency and effectiveness.
- Spreading the technological culture among auditors to increase their awareness.



[1] AICPA, (2015), *Audit Analytics and Continuous Audit: Looking Toward the Future.* Available at: https://www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/auditanalytics_lookingtowardfuture.pdf

[2] American Institute of Certified Public Accountants (AICPA), (2006), Statement on Auditing Standards No. 109, AU Section 314: Understanding the Entity and its Environment and Assessing the Risks of Material Misstatement. New York.

[3] American Institute of Certified Public Accountants (AICPA). 2012. Statement on Auditing Standards No. 122, AU-C Section 500: Audit Evidence. New York.

[4] Alles, M. G. (2015). Drivers of the adoption and facilitators of the evolution of Big Data by the audit profession. *Accounting Horizons, 29*(2), 439–449, doi:10.2308/acch-51067

[5] Alles, M., & Gray, G.L. (2016). Incorporating big data in audits: Identifying inhibitors and a research agenda to address those inhibitors. *International Journal of Accounting Information Systems*, *22*, 44-59, doi:10.1016/j.accinf.2016.07.004

[6] Appelbaum, D., Kogan, A., & Vasarhelyi, M.A. (2017). Big Data and Analytics in the Modern Audit Engagement: Research Needs. *Auditing: a journal of practice & theory, 36*(4), 1–27, https://doi.org/10.2308/ajpt-51684

[7] Brown-Liburd, H., & Vasarhelyi, M.A. (2015). Big Data and Audit Evidence. *Journal of Emerging Technologies in Accounting, 12*(1), 1-16, doi10.2308/jeta-10468

[8] Dai, J. A, (2014), Recommender model for audit apps using the audit data standard, Dissertation in progress, Rutgers Business School.

[9] Earley, C.E. (2015). Data analytics in auditing: Opportunities and challenges. *Business Horizons,* 58 (5), doi:10.1016/j.bushor.2015.05.002

[10] Gepp, A., Linnenleucke, M.A., O'Neill, T.J., & Smith T. (2018). Big Data Techniques in Auditing Research and Practice: Current Trends and Future Opportunities. *Journal of Accounting Literature,* 40, 102-115. Available at SSRN: https://ssrn.com/abstract=2930767

[11] International Auditing and Assurance Standards Board (IAASB). 2009. International Standard of Auditing No. 500: Audit Evidence. New York.

[12] IAASB. (2016). *Exploring the Growing Use of Technology in the Audit, with a Focus on Data Analytics.* Available at: https://www.ifac.org/publications-resources/exploring-growing-use-technology-audit-focus-data-analytics

[13] IIA. (2017). Understanding and Auditing Big Data. *Global Technology Audit Guide*. Available at: https://www.iia.nl/SiteFiles/Publicaties/GTAG-Understanding-and-Auditing-Big-Data.pdf

[14] Pompeu, G., & Alves, T. (2014). *Financial Audit the era of Big Data: new possibilities for evaluating and responding to risks in financial statements of the Federal Government*. Available at: http://revista.tcu.gov.br/ojs/index.php/RTCU/article/viewFile/62/328

[15] Public Company Accounting Oversight Board (PCAOB). 2010. *Audit Evidence.* PCAOB Auditing Standards. Washington, D.C.: PCAOB.

[16] PWC, (2013), Understanding a financial statement audit. https://www.pwc.com/gx/en/audit-services/publications/assets/pwc-understanding-financial-statement-audit.pdf

[17] Ramlukan, R. (2015). How big data and analytics are transforming the audit, *EY Reporting.* Available at: https://www.ey.com/en_eg/assurance/how-big-data-and-analytics-are-transforming-the-audit

[18] Rose, A.M., Rose, J.M., Sanderson, K., & Thibodeau, J.C. (2017). When Should Audit Firms Introduce Analyses of Big Data Into the Audit Process? *Journal of Information Systems, 31*(3), 81–99, doi:10.2308/isys-51837


DAKAR AGREEMENT
(March 2022)

Theme 1 : Audit of the Extractive Industries Sector in Africa

Theme Chairperson: Gabon Court of Accounts

Rapporteur General: CREFIAF Secretariat

Subject Matter Specialist: Prof. NDOUGSA MBARGA Théophile

Secretary: Niger Court of Accounts

Theme 2: Integrating Big Data in the Public Audit Sector

Theme Chairperson: Office of the Auditor-General, Kenya

Rapporteur General: AFROSAI-E Secretariat

Secretary: AFROSAI GS

DAKAR AGREEMENT

PREAMBLE

The Supreme Audit Institutions (SAIs), Members of AFROSAI,

Convinced of the necessity of consolidating the essential role played by SAIs in guaranteeing the accountability systems of their respective States, as well as in promoting good governance, through the creation of favorable conditions for greater openness to public debate and knowledge sharing;

Aware that professional cooperation at the regional and international levels, with a view to their improvement, is the way forward in the face of the persistent difficulties encountered in the audit of public finances and the emerging issues characterized by the advent of new governance challenges linked to increasingly evolving environments;

Having decided to address, within AFROSAI, many issues of common interest, in particular those related to the fundamental changes induced for external audit in the public sector due to, among others, the digital or technological revolution and the adoption of the Sustainable Development Goals (SDGs) and the 2063 Agenda of the African Union;

Considering that the Governing Board, at its 54th meeting, held in Yaoundé, Cameroon, from 07 to 10 August 2018, adopted, upon the proposal of the Capacity Building Committee (CBC) and the Knowledge Sharing Committee (KSC), two (02) technical themes to be addressed during the 15th AFROSAI General Assembly, namely:

- Theme 1: **"The a*udit of the extractive industries sector in Africa*";**
- Theme 2: ***"Integrating Big Data in Public Sector Audit*";**

After meeting in Dakar, Senegal, on the 17th-18th March 2022, for the second part of the 15th General Assembly of AFROSAI;

- **Considering** the importance of revenues from the exploitation of mineral resources for the economies of African States, some of which are highly dependent on them;
- **Considering** the importance of enhancing the oversight of the activities of the extractive sector and the collection and distribution of the revenues derived from it;
- **Considering** the importance of SAIs taking ownership of environmental protection issues in order to help governments build sustainable and prosperous economies;
- **Considering** the need to monitor the governance and implementation frameworks of the 2030 Sustainable Development Goals (SDGs), the 2050 Agenda of the African Mining Vision (AMV) and the African Union's Agenda 2063 for the achievement of Africa's inclusive and sustainable development;
- **Considering** the ever-increasing growth of direct investments linked to extractive industries which constitute a major challenge for SAIs in African States;
- **Reaffirming** their commitment to promote good governance by helping their governments "*to improve performance, enhance transparency, ensure accountability, maintain credibility, fight corruption, promote citizen confidence and encourage the effective and efficient receipt and use of public resources for the benefit of their citizens*";
- **Considering** also the special attention given to the need to lay the foundations for a progressive integration of the use of Big Data in the audit processes implemented by SAIs, despite environments particularly marked by shortcomings related to the technological infrastructure and its appropriation by the public administration as a whole;

- **Considering** the advantages inherent in the use of Big data that are likely to enable SAIs to overcome the shortcomings of the level of assurance based, for instance, on sampling techniques and to provide comprehensive and reliable information;
- **Considering** the Moscow Declaration adopted at the end of the 23rd INCOSAI held from 25 to 27 September 2019, in which SAIs from around the world agreed on the need to respond effectively to the opportunities brought about by technological advances.

Hereby agree, highlighting the main conclusions reached in the discussions, as well as the subsequent commitments made by them for the current strategic cycle, that they mustdo more to add value to the lives of citizens by strengthening oversight of extractive industries systems and operations (I) and by creating the conditions for the optimal use of Big data in the auditing process (II), consequently, they recognize the need to develop their own performance on these issues (III):

I. Strengthening oversight of extractive industries systems and operations

1. SAIs are encouraged to assist governments to identify and provide appropriate solutions to key organizational issues affecting the institutional frameworks applicable to the extractive industries, by notably:

- increasing the number of audits of the extractive industries sector, based on assessing the strength and effectiveness of institutional and organizational mechanisms;
- developing better communication strategies with governments and all key stakeholders for the implementation of audit recommendations.

2. SAIs are invited to contribute to greater transparency in the processes of granting the titles and authorizations required for the exploitation of mineral resources, as well as in the collection and management of the resulting resources, with particular emphasis on the fiscal and non-fiscal revenues

generated, the respect of the rules for the allocation and use of these revenues and the securing of funds for future generations;

3. SAIs are encouraged to assess the performance of state bodies responsible for managing the extractive sector by ensuring that environmental and social monitoring systems and mechanisms are in place and functioning properly;
4. SAIs are invited to ensure the effective implementation of environmental and social impact mitigation plans, as well as the rehabilitation and restoration plans of the mineral extraction sites.

II. Setting the conditions for the optimal use of Big Data in audit processes

The SAIs of AFROSAI undertake to:

1. develop a good understanding of the strategic technological choices to be made within their strategic plan and make them a priority for the SAI;
2. put in place and develop a technological infrastructure based on the needs identified and the processes that can be operationalized based on the public finance management environment;
3. develop skills in the use and analysis of Big Data in line with the technology choices made notably through:
   - professional capacity building activities for auditors;
   - the creation of IT teams specialized in big data analysis within SAIs to work with the auditors;
   - the development and implementation of a plan for the digitalization of audit processes and methods;
   - the development of platforms for collaboration, sharing of information on best practices between SAIs and between Sub-regional Organizations.

III. Improving the performance of African SAIs on the issues raised in this agreement

In order to improve their performance in these areas, AFROSAI member SAIs have decided to promote:

- the development of audit methods and tools, as well as quality control and assurance processes in the selection of subjects and the conduct of financial, compliance and performance audits in the extractive industries sector;

- the sharing of audit results and of related tools developed by Sub-Regional Organizations for adaptation to the specific contexts of SAIs;
- the appropriation by SAIs of the solutions available within the AFROSAI community through increased capacity building and peer support activities;
- the evaluation of the SAI's internal professional and infrastructural capacity in order to develop a vision and define strategies for integrating big data analysis into the audit process;
- they put in place of appropriate communication and engagement practices with external stakeholders in order to improve auditor's' awareness of the use of big data and the impact of oversight of the extractive sector;
- the integration into the SAIs' strategic planning processes of the needs related to the digitalization and automation of audit processes and the related partnership needs;
- the increase of IT audit;
- the improvement of data analysis to compliance, performance and financial audits;
- the establishment of partnerships to organize inter regional training activities on topics of common interest.

In view of these new orientations, AFROSAI members SAIs need to maintain a high level of relevance and credibility in the context of emerging challenges specific to their environment.

They thus reaffirm their commitment to the values of sharing knowledge and experiences and their determination to make a significant impact on the lives of African citizens.

Consequently, they invite the President of AFROSAI, in accordance with provisions of Article 18 paragraph 3 of AFROSAI Statutes, to ensure, together with the competent organs of the Organization, the implementation of this Agreement and to report to the next General Assembly in 2024.

Done in Dakar,
Senegal on March 18, 2022.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