**Group Interview with the Case Study Participants**

1. Assessment of the framework’s quality attributes:
2. Agree with the notion of intertwined challenges of AA;
3. Affirm the key challenges included in the framework and suggest some additional issues to address (e.g., compatibility);
4. Support the importance of awareness (readiness) to embrace AA and that it is the root issue since it influences other challenges;
5. The awareness or mindset encompasses actors’ beyond the audit team/IAF;
6. Highlight that clear regulatory frameworks must incorporate all actors’;
7. Underscore the importance of communication and collaborative spirit to support the regulatory framework;
8. Appreciate the use of common language to present the framework/principles;
9. Some additional details are needed to complete and clarify the framework’s, which will improve its practical usability;
10. Clarify connection with other types of frameworks.
11. Suggestions:
12. Add indicators or parameters to guide the practical translation of the high-level principles;
13. Practical suggestion to include environmental ‘mapping’ as a part of the strategy.

**E1**

1. Some considerations to use audit analytics, including continuous audit (instead of the traditional approach):
2. Task characteristics, i.e., repetitive, and clear risks and testing procedures; and
3. Potential value for the organization, including for the client.
4. Some challenges related to AA in particular or internal audit activities in general:
5. Clients’ reluctance to provide data access audit analytics project, due to:
   1. Concern about possible system disruption, or
   2. Lack of trust to the internal audit (either trust about data confidentiality or trust about the value of internal audit task),
6. Limited auditors’ AA-related skills, especially advance skills,
7. (Auditors’) Skills improvement may need some time,
8. Limited infrastructure to support AA project development,
9. Risk in independence and objectivity impairment for collaborative AA project, and
10. Limited understanding of the business area as the audit object.
11. Measures taken to overcome the challenges (of audit analytics implementation):
12. Good communication with the clients or data owners to capture their concerns and explain the value of the project for them; this will help to overcome clients’ reluctance to provide data for audit analytics project,
13. Communicate with senior leadership of the organization (or IAF) to explain the benefits of the project and escalate issues (if necessary) to gain support for the project or mitigate clients’ resistance,
14. Audit analytics opens possibilities to collaborate with the clients, it will help to address some challenges like clients’ resistance or data access issues; however, it may pose risk of independence and objectivity impairment,
15. Formal and technical safeguards to mitigate risks of independence impairment, either in general or in collaborative project in particular,
    1. Formal safeguards like clear roles and responsibilities of each actor involved in a project or signing an integrity pact,
    2. Technical safeguard like allowing auditors to review the script developed or test the provided result by the client,

These safeguards should be part of audit analytics guidelines,

1. Additional comments/suggestions/ideas:
2. Audit team capacity development can (and should) be performed simultaneously with the project,
3. Collaborative AA project is more suitable as an advisory engagement,
4. AA project can be performed gradually from an advisory to become assurance engagement,
5. Dedicated platform for audit analytics need to be accompanied with (or preceded by) governance mechanisms.

**E2**

1. Considerations to use audit analytics:
2. Leaders' concerns regarding the matter, and
3. The value of the project for the organization.
4. Some challenges related to AA in particular or internal audit activities in general:
5. Audit analytics require mature organization’s IT/IS (lack of the organization's IT/IS maturity may imply more challenges for AA development),
6. Data-related issues like:
   1. Data access,
   2. Data quality,
7. Limited auditors’ AA-related skills (especially the advanced ones),
8. IAF may not have the necessary infrastructure for developing AA project,
9. Collaboration with client poses independence and objectivity risks,
10. DA or AA involves many actors (with possible different interests.
11. Measures taken to overcome the challenges (of audit analytics implementation):
12. Ensure formal authority for performing the tasks and the supporting activities (including to obtain data access),
13. Good communication with the clients or data owners to capture their concerns and explain the value of the project for them; this will help to overcome clients’ reluctance to provide data for audit analytics project,
14. Communicate with senior leadership of the organization (or IAF) to explain the benefits of the project and escalate issues (if necessary) to gain support for the project or mitigate clients’ resistance,
15. Collaborate with other actors (e.g., IT unit) to address some issues (e.g., infrastructure provision to support the project),
16. Prepare formal safeguards to mitigate risks of independence and objectivity impairment, like leaders’ approval or clear roles and responsibilities, before embarking on a collaborative project,
17. A unit to orchestrate the audit analytics implementation initiative, it will help bridges different actors involved to partially overcome issues like different concerns among actors and facilitate project development,
    1. At the organization level, it helps to orchestrate the initiative,
    2. At the IAF level, it facilitates AA development,
18. Audit analytics implementation as a strategic initiative, which include joint project (if necessary).
19. Additional comments/suggestions/ideas:
20. IAF has a formal authority (e.g., in the form of audit charter) to perform its tasks and the necessary activities, however, it might not always work on its own and need to be accompanied with other informal measures (like good communication),
21. Holistic View’s statement needs to be refined, e.g., contradict whole-organization with silo mentality instead of technical projects,
22. All these principles require IAF’s credibility (i.e., IAF showing its capability in developing AA project), it implies the need for a quick win strategy,
23. Collaborative AA project is more suitable as an advisory engagement,
24. All these principles are connected and ideal, one must keep these principles in mind when implementing audit analytics.

**E3**

1. Preference to use audit analytics (in this case, specifically continuous audit), with main considerations are as follows:
2. Repetitive task, clear risk and (audit) testing procedures;
3. Reduce personnel dependency;
4. Improve efficiency.
5. Some challenges related to AA in particular or internal audit activities in general:
6. Common clients’ (auditee’s) perception that auditors (and its activities) are a nuisance with little value to the client,
7. The clients’ reluctance to cooperate with internal auditors,
8. The clients’ concern for the security and confidentiality of their data (when provided for internal audit activities),
9. The clients’ reluctance to provide data access for internal audit activities,
10. Some data might not be available in digital format (for audit analytics purposes),
11. Possible limited supporting tools, such as high spec laptop for data analysis (note: this does not happen in my case, but might be relevant in other agencies),
12. Budget limitation to develop audit analytics project,
13. Limited auditors with sufficient audit analytics skills,
14. Difficulty to develop audit analytics with distinguishable use case with the clients’ analytics project, and
15. Audit analytics requires involvement from many actors, yet, it may be outside the priority or interest of some units.
16. Measures taken to overcome the challenges (of audit analytics implementation):
17. Better communication with the clients at the top level (i.e., CAE to business units’ senior management/Inspector or Inspector General to the Director or Director General) to address the clients’ misconception of internal audit values and their reluctance to cooperate and provide data for internal audit activities (including audit analytics purposes),
18. CAE’s (at least) verbal commitment for the clients’ data security and confidentiality to overcome their concern (in that matter) and persuade to provide data access for audit analytics purposes,
19. Non-disclosure agreement between CAE and senior management as a formal measure regarding the IAF’s commitment for data security and confidentiality,
20. Utilize the platform’s rule-based arrangement (e.g., access control management in the cloud service like AWS) to satisfy security and confidentiality concerns; this approach will complement the formal measure regarding this matter,
21. Convince senior management (CAE and the client) that internal auditors require more data to provide better values, i.e., a more comprehensive instead of partial view, practically, internal auditors can make indicative insight based on available data (i.e., quick win strategy),
22. Possibility to collaborate with the clients’ personnel in developing audit analytics project to address limited knowledge and skills in auditors’ side; this approach needs a clear demarcation of each party’s roles and responsibilities and is not intended as a join project; thus, this approach and safeguard will hinder the risk of independence impairment from the collaboration,
23. Escalate to top echelons (CAE, senior management) for supporting activities regarding audit analytics implementation such as training provision for internal auditors, or to perform competence assessment for auditors (as the basis for training provision),
24. Auditors can initiate a community of practice to complement other measures to address issue regarding knowledge and skill requirements for audit analytics, and
25. The IAF can (and should) procure the necessary infrastructure and solution for audit analytics purposes using third party service, it addresses the infrastructure issue and easier to maintain compared to in house development, this approach is particularly important if the IT unit focuses more on software development instead of intermediating IT relationships among units in the organization.
26. Additional comments/suggestions/ideas:
27. Collaboration is the most important notion for audit analytics implementation, but also the most difficult to be achieved, especially in an organization with a strong silo and bureaucratic culture,
28. Top leader’s directive preceded the notion of collaboration among units in the organization, conversely, bottom-up approach will be less effective, to foster an initiative, including the required collaboration among actors, especially in bureaucracy,
29. CAE should also encourage business units to digitalize their business processes, both as a part of audit analytics implementation initiative and as a part of IAF’s role to improve the organization governance.

**E4**

1. Preference to use audit analytics, with main considerations are as follows:
2. Experiencing in staffs (internal auditors) lay-offs while required to achieve the audit plan, and
3. Expectation from senior managers to examine a particular area;

These conditions are difficult to achieve using the traditional approach.

1. Some challenges related to AA in particular or internal audit activities in general:
2. The internal auditors viewed the task in a traditional manner, e.g., no clarification of risks to the business units, hindering the development of audit analytics,
3. Auditors' knowledge and skills, including data-related skills (data processing, cleansing, etc.) and business acumen relevant to develop audit analytics project
4. Some clients perceived internal audit activities as a nuisance,
5. Internal auditors must consider the dynamics of business risks, so that the project will not be obsolete by the time it is completed,
6. Internal auditors need to ensure access to the required digital data for the (audit analytics) project, it includes the possibility of complex bureaucracy regarding data ownership and access,
7. Possible unreliable or inaccurate data used in the project,
8. Concern for security issue in the clients’ existing analytics project,
9. Possible overlap with the clients’ existing analytics project,
10. Maintaining reasonable workload for auditors in audit analytics implementation, e.g., adjusting workload with training assignment, and
11. Internal auditors must be cautious with the risk of independence and objectivity impairment due to possible collaboration in audit analytics project development.
12. Measures taken to overcome the challenges (of audit analytics implementation):
13. Auditors involve the stakeholders (clients) in the project (to discuss, obtain insight, clarify data, etc.), including obtaining the leaders’ expectations regarding the project,
14. Communicate the value of the project to the client or to obtain understanding of client's concern to build trust and offer win-win situation ,
15. Escalate the issue (in this case, related to data access) to the proper structure and/or the top leader of the organization,
16. The IAF should also avoid/limit of using/requesting highly sensitive (e.g., detailed personal data),

The above measures partially address the clients’ reluctance issue to cooperate with internal audit activities in general and to mitigate data access issues in particular,

1. Technical solutions like data masking or encryption to partially overcome concern for data security and data access issues,
2. Formal measures such as audit charter, including formal acknowledgement of responsibility regarding data confidentiality to complement the technical solutions.
3. Collaborate with other unit (as a part of the organization governance and control mechanisms) in (audit analytics) project development, e.g., with ERM team, to acknowledge the clients’/stakeholders’ concern and ensure that all relevant risks are identified,
4. Consult with the organization’s data analytics team regarding data matters (e.g., data source, tools for data access and analysis, etc.),
5. Explore data from other sources to minimize risk of data unavailability and possible overlap with the clients’ (analytics) project by adding additional data/insight,
6. Collaborate with external practitioners (or subject matter experts/SMEs) to mitigate the possible limitation of (auditors’) skills for audit analytics project, manage auditors’ workload, and also minimize the risk of independence impairment resulted from collaboration with the clients,
7. The IAF however, must ensure knowledge transfer throughout the knowledge acquisition process (e.g., through training or SMEs) while balancing the auditors’ workload,
8. The IAF might need to perform initial engagement, including consulting activities before embarking on develop audit analytics project, it will address issues like the clients’ reluctance, data unavailability, and data inaccuracy, and
9. Audit analytics project requires clear scope definition, including the possibility to pending the project if needed.
10. Additional comments/suggestions/ideas:
11. IAF has a formal authority (e.g., in the form of audit charter) to perform its tasks and the necessary activities, however, it might not always work on its own and need to be accompanied with other informal measures,
12. Clear roles and responsibilities are needed for audit analytics implementation considering it involves many different actors, e.g., ARCI matrix for the project,
13. Some issues seem pertinent to public sector (in Indonesian context), e.g., complex bureaucratic resulting in other issues like data access.

**E5**

1. Triggers to use audit analytics (in this case, specifically continuous audit), with main considerations are as follows:
2. Change in IAF’s leadership;
3. Young and motivated auditors with hard skills in data analytics;
4. Available tool to initiate AA projects.
5. Some challenges related to AA in particular or internal audit activities in general:
6. Limited understanding of business processes, especially at earlier stages of implementation when AA projects mostly developed by a centralized AA development team;
7. Matured internal auditors resigned after 4-5 years in the company, so the AA development team must be rebuilt;
8. Internal auditors’ reluctance to embrace AA (e.g., sceptic on AA's benefits for IA activities, hesitant for fearing additional tasks related to AA);
9. Internal auditors’ limited AA-related skills;
10. Limitation of data access (in particular areas, i.e., IT operation);
11. Risks of data and result integrity when using the clients’ analytics (or data);
12. It is not easy to find audit manager/executive with detailed understanding about AA, but their understanding of policy and how it implies to AA help AA implementation;
13. The need to maintain integrity and confidentiality of IAF data (and/or AA project).
14. Measures taken to overcome the challenges (of audit analytics implementation):
15. Data analytics competitions, both at the company (Datavis) and internal audit groups (Audithon) levels, including mentorship as a part of the program, massively improve employees’ (and organizations units’) awareness of the value of data analytics and auditors’ skills in audit analytics;
16. AA development team, dedicated to support internal audit team (i.e., develop AA projects) and AA implementation in the IAF (e.g., organizing Audithon), it includes distinct key performance indicator for this team;
17. Centralized infrastructure for data exchange and analysis;
18. Confirm/communicate the AA project plan to the client before development and the possibility of using the AA project as a part of business analytics by the client to avoid overlapping.
19. Additional comments/suggestions/ideas:
20. A mere formal and long-term planning and top-down approach did not work for implementing AA;
21. Traditional training approach is less useful to improve auditors’ AA-related skills, alternative approach (like Audithon) has been proven to be more effective;
22. Academic background is less relevant for auditors in embracing AA, instead, passion for data analytics seems to be more relevant;
23. Steps to implement AA: prepare the personnel, then infrastructure, collaboration, then later focus on the AA projects/deliverables.

**E6**

1. Triggers to use audit analytics (in this case, specifically continuous audit), with main considerations are as follows:
2. Repetitive internal audit tasks are suitable for CA (or AA);
3. Better value for audit clients, such as timely risk identification (instead of waiting for end-of-period).
4. Some challenges related to AA in particular or internal audit activities in general:
5. Possible limitations of data access in some audit clients;
6. Concern for data security from data owners;
7. Negative perception from audit clients toward internal audit activities;
8. Limited AA-related skills in internal auditors;
9. Possible imbalance workloads (for auditors) in AA projects;
10. Possible independence and objectivity issues due to the need for collaboration with audit clients;
11. Possible overlaps with the clients DA projects;
12. Limitations in infrastructure capacity and tools availability, implicates some limitations in data transfer or analysis activities.
13. Measures taken to overcome the challenges (of audit analytics implementation):
14. Communicate the value and benefit from internal audit activities (and AA projects);
15. Utilize existing formal mechanisms like audit charter, or formal agreements for periodic data transfer, including escalation to the top management (if needed) to obtain cooperation from the clients (e.g., regarding data access);
16. Varieties of skills acquisition strategies like training, sharing session from expert;
17. Collaborate with audit clients (to obtain specific skills if needed), cross-units approach (e.g., using personnel from unit A in auditing unit B, and vice versa) can be used to minimize risks of independence and objectivity;
18. Ensure the external personnel abide with the internal audit code of conduct;
19. Include additional risks focus and/or compare AA projects with the existing clients analytics project.
20. Additional comments/suggestions/ideas:
21. Formal measures (e.g., audit charter) may not always work, it needs to be complemented with other measures like good communication;
22. Data access issues only happened in this particular company, in the previous companies (experiences as internal auditors), this issue never occurred;
23. Skills acquisition takes time, training may not deliver an instant result;
24. Compromise the technical requirement for AA project to accommodate infrastructure limitation;
25. Passion is critical for auditors to embrace AA;
26. Develop ‘prototype’ to convince the stakeholders, e.g., to provide the necessary tools or to provide data for AA projects.

**E7**

1. Triggers to use audit analytics (in this case, specifically continuous audit), with main considerations are as follows:
2. Audit fatigue (improve effectiveness and efficiency in audit process) for the client;
3. Optimizing digitalization and utilizing digital data.
4. Some challenges related to AA in particular or internal audit activities in general:
5. Resistance from counterparts (audit clients);
6. (related to resistance from counterparts) Risks of operational disruption (due to data access by auditors);
7. Slight concern on data security (including confidentiality and privacy);
8. Difficulty to coordinate with counterparts;
9. No formal guidelines.
10. Measures taken to overcome the challenges (of audit analytics implementation):
11. Top-down direction;
12. (related to top-down direction) Formalized organization’s strategy (“transformasi”);
13. Streamlining audit and related activities (e.g., join development with client);
14. Technical solutions for technical issues (e.g., data masking, authorized on-premise access, staging model);
15. (related to technical solution) Centralized infrastructure for data exchange and analysis;
16. (particularly related to centralized infrastructure) Clear responsibility of each actor.
17. Additional comments/suggestions/ideas:
18. Proactive internal audit services to address risk of independence impairment (due to obscured barrier of assurance and advisory services).\;
19. All proposed principles encapsulate experience in implementing AA, with suggestion to improve principle #4 and additional process capability development (business process alteration and skill improvement), in addition to principle #3.

**E8**

1. Triggers to use audit analytics (in this case, specifically continuous audit), with main considerations are as follows:
2. Integrating internal control mechanisms (from first line to third line);
3. Optimizing digitalization (including the use of machine learning).
4. Some challenges related to AA in particular or internal audit activities in general:
5. Fragmented business architecture;
6. Business complexity;
7. Skill-related issues (due to personnel change).
8. Measures taken to overcome the challenges (of audit analytics implementation):
9. Strong leadership;
10. Specific unit to support business analytics;
11. Clear authorization of data access (particularly for audit activities);
12. Centralized infrastructure;
13. (related to infrastructure and authorization) Embedding governance of roles with infrastructure