Enhancing Money Laundering Investigation Through Analytic Maturity

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Abstract:

Using Analytic Maturity Model (AMM) from the Organisation for Economic Co-operation and Development (OECD) (2022) framework, this study aims to examine the analytic capabilities of Pusat Pelaporan dan Analisis Transaksi Keuangan (PPATK) as Indonesia's Financial Intelligence Unit (henceforth, FIU Indonesia) in using its resources and getting the most out of its internal and external data to produce financial intelligence reports used by law enforcement authorities to conduct money laundering investigations and/or its predicate offenses. OECD AMM consists of two perspectives: strategic and operational. Each perspective contains indicative attributes that assist in understanding what a given level of maturity means. These indicative attributes were assessed using in-depth interviews and/or results from focus group discussions as primary data and then validated using the triangulated method, with desk review as secondary data. This research found that FIU Indonesia has achieved level 3 out of 5 levels of analytic maturity based on OECD AMM from both strategic and operational perspectives. To encourage money laundering investigations, FIU Indonesia should improve the process of prioritizing cases by enhancing its analytical capabilities.

Keywords: *Financial Intelligence Unit; Anti-Money Laundering; Analytic Maturity Model; Financial Investigation*

1. Introduction

The rapid growth of technology accelerated the movement of funds and the complexity of transactions used for laundering the proceeds of crime (Akartuna et al., 2022; Jullum et al., 2020; Ünvan, 2020) including corruption. Thus, more advanced, responsive, and agile innovations are needed to disrupt and combat money laundering by all stakeholders (Cheng et al., 2021; Meiryani et al., 2023). The use of sophisticated technologies such

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as Artificial Intelligence (AI) and Machine Learning is encouraged as the solution for all anti-money laundering (AML) stakeholders to carry out their respective tasks more effectively and efficiently (Aprilia & Meiryani, 2023; FATF, 2021b; Yusoff et al., 2023). Private sector can use machine learning and AI to identify unusual transactions in real time (Jensen & Iosifidis, 2023). They also can be used for network analysis and automatic risk scoring (Han et al., 2020). Enforcement-wise, machine learning and AI can determine whether a criminal act underpins a transaction or case (Bellomarini et al., 2020; Jullum et al., 2020).

FIU has a central role in a nation's effort to fight against money laundering. It is the pipeline connecting reporting parties, such as financial institutions, with law enforcement bodies (Egmont Group, 2024; Jayasekara, 2022; Surkovic, 2021) same as FIU Indonesia. The legal basis for AML in Indonesia that still applies today is the Law of The Republic of Indonesia Number 8 Year 2010 Regarding Countermeasure and Eradication of Money Laundering (2010) (AML Law). As per AML Law, FIU Indonesia is an independent institution responsible to the President. AML Law outlines the primary functions of FIU Indonesia as preventing and eradicating money laundering by managing information and data acquired, overseeing the compliance of reporting parties, and analyzing or examining financial transaction reports and information that indicate money laundering and/or its predicate crimes. FIU Indonesia uses reporting parties' transaction reports, public complaints, audit results, and information from other FIUs as triggers to start proactive analysis. Reactive analysis is a term used to describe an analysis process that triggers from an inquiry from end-user/investigator (FATF, 2023a; Sari, 2021).

Rengganis & Susanto (2023) stated that the implementation of AML in Indonesia is already exemplary, but there is still much room for improvement, especially in its risk-based preventive and enforcement measures. This is in line with FATF (2023a) which found that Indonesia's investigation and prosecution of money laundering is relatively small considering its risk and context. Moreover, Jayasekara (2022) and Jaleel et al., (2021) conclude that law enforcement and judicial processes are the most critical factors in creating an effective AML regime. Hence, FIUs can promote the enforcement of money laundering by improving their output quality and optimizing the use of human resources. This can be achieved through the digital transformation of the FIU (FATF, 2021a).

FIU Indonesia's commitment to digital transformation is reflected in its Strategic Plan 2020 – 2024 (FIU Indonesia, 2020), followed by its Information and Technology (IT) Masterplan FIU Indonesia 2020 – 2024. One major transformation FIU Indonesia executed was implementing the new information system developed by the United Nations Office on Drugs and Crime (UNODC) called GoAML in February 2021 (FIU Indonesia, 2023). Implementation of the new system opens up opportunities for the use of Machine Learning and AI in several business processes of financial intelligence activities (United Nations, 2024) including financial intelligence analysis. The financial intelligence analysis carried out by FIU Indonesia involves gathering and evaluating data from various sources, including internal and external sources. The goal is to identify any connections or patterns between the profile of the reported party (whether an individual or entity) and their financial transactions or other relevant information. Suppose the available data does not provide a conclusive connection, but the transaction(s) are highly suspicious, the analyst may request additional information from the reporting party or other external parties.

For proactive analysis, It is a continuous process until a high level of confidence has been obtained in concluding whether the reported party has committed money laundering or any illegal act. The reactive analysis is relatively more straightforward as the predicate offense of money laundering is already known. In this case, analysts only need to connect the requested party's profile and their actual transactions with the known offense and search for possible indications of money laundering. After forming a conclusion, the analyst will disseminate the report as a financial intelligence report (FIR), which will be followed up by law enforcement agencies by conducting financial investigations as well as money laundering. The primary application utilized by FIU Indonesia for its analytic process is GoAML. GoAML incorporates several vital functions of FIU Indonesia, including data collection and cleansing, ad-hoc querying and data matching, structured analysis, workflow management, task tracking, generation of statistical reports, archiving of records, data integration and acquisition, charting, and diagramming, and report writing for intelligence purposes, connecting all stakeholders of the AML except judicial agencies. Figure 1 depicts the use of GoAML in the FIR creation process.
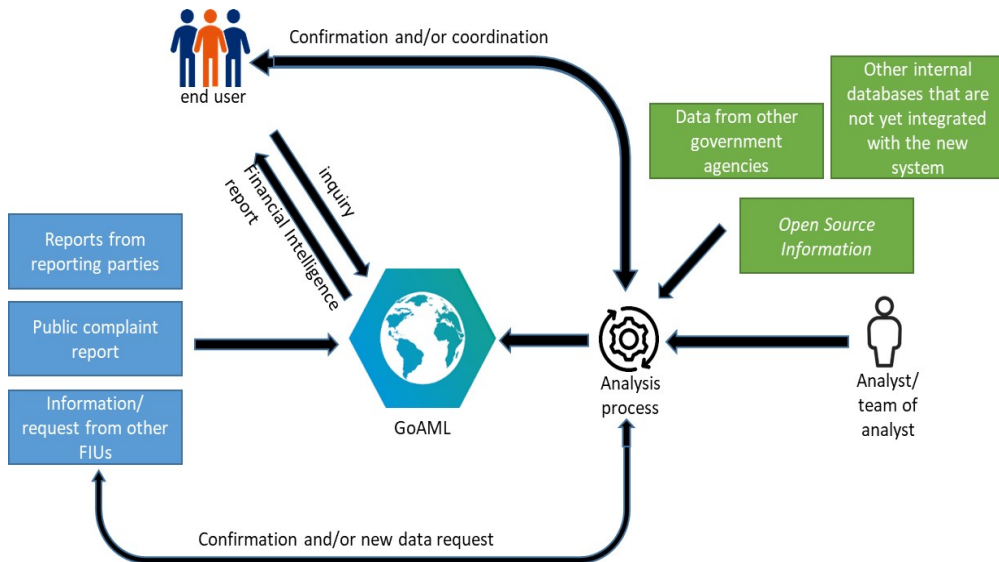
Figure 1 Outline of FIU Indonesia Analytical Process using GoAML

PPATK (2023b) evaluates the quality of FIR through a survey of end-users, who rate it on a scale of 1-10. FIU Indonesia's score of FIR effectiveness is 7.73, indicating room for improvement in its analytic outputs, which can be done by enhancing analytics capabilities (FATF, 2021a). Organizations must assess their current analytic capability to enhance it. One of the tools that can be used to assess and illustrate analytic capabilities of an organization is the Analytic Maturity Model (AMM) (Grossman, 2018; Halper, 2022). The output of analytic maturity assessment can also facilitate identifying changes needed to improve analytic capabilities within the organization (OECD, 2022).

The measurement of analytic maturity level in government institutions has not been widely studied. Prastuti & Lasmin (2021) provides an overview of the analytic maturity level in compliance risk management in Indonesia's tax administrators while identifying the importance of analytic maturity level assessment. Moreover, there is limited information about the effectiveness of FIU in conducting financial intelligence analysis. Lagerwaard (2022) describes how FIU Netherlands does its financial surveillance but not specifically about the technologies, tools, and processes used to produce intelligence information. This research aims to fill that gap by disclosing how FIU Indonesia uses its resources to process suspicious transactions and other data into high-quality information to promote money laundering investigations.

In recent years, many analytical maturity models have been developed for organizations to use (Król & Zdonek, 2020). These models are generally descriptive, focusing on processes and their outcomes. Król & Zdonek (2020) research on eleven AMMs concluded that there are three essential factors in the development of organizational analytics that are available throughout the model: human resources, infrastructure (equipment and software), and organizational management (leadership, structure, and governance). A universal AMM is not feasible for all organizations due to their vast diversity (OECD, 2022). As a result, those models serve as a reference point for discussions, and organizations may also choose what is best fit for them.

2. Theoretical Background

Money laundering is the act of hiding or disguising the proceeds of all forms of illegal activities to appear legitimate and legal with the aim of: 1) Hiding the source of funds originating from the proceeds of crime or other illegal activities and 2) Eliminating traces (audit trail) making it difficult to trace the flow of funds (Cassara, 2020; Cox, 2014; FATF, 2023b). Thus, money laundering is a continuation of financial crimes, namely crimes committed to produce wealth for the perpetrator(Achim & Borlea, 2020). To fight against money laundering, G7 countries formed The Financial Action Task Force (FATF) in 1989 (FATF, 2024b; Nance, 2018). FATF then issued the 40 recommendations which are used as global standards to combat money laundering used by countries in the world to establish effective anti-money laundering regimes (FATF, 2023b). The standards are continuing to develop and updated to the condition these days. More than 215 nations have implemented FATF recommendations under the supervision of FATF-Style Regional Bodies (FSRBs) and 40 countries have become FATF members one of which is Indonesia, which was only appointed as a FATF member in November 2023 (Cabinet Secretary of The Republic of Indonesia, 2023; FATF, 2024a).

Analytic Maturity Model (AMM)

In recent years, many analytical maturity models have become available for use by organisations (Król & Zdonek, 2020). Maturity models are generally descriptive with focus on processes and the results of these processes, so that no method can be fit to all organizations(OECD, 2022). Król & Zdonek's (2020) research on eleven AMMs concluded that there are three important factors in the development of organizational analytics that are available

throughout the model, namely human resources, infrastructure (equipment and software), and organisational management (leadership, structure, and governance).

OECD AMM

OECD AMM (2022) was developed by the analytical community within the Forum on Tax Administration (FTA) and the FTA secretariat. OECD AMM uses 11 indicative attributes as a measurement dimension, divided into strategic and operational perspectives. Strategy, governance, culture, and budget setting are attributes from strategic perspective. Meanwhile, attributes from operational perspective are IT infrastructure, system development and tools, data management, talent management, business feedback and evaluation, analytic process and project management, analytics capabilities, and usage area. OECD AMM divides maturity levels into five levels: 1 – Emerging, 2 – Progressing, 3 – Established, 4 – Leading, and 5 – Aspirational for each attribute.
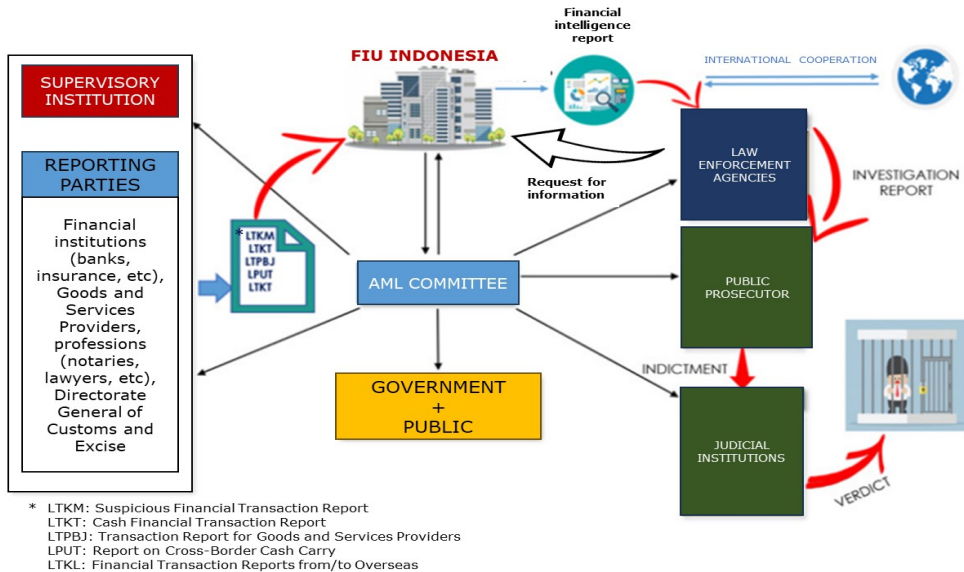
Anti-Money Laundering Regime in Indonesia

The anti-money laundering regime in Indonesia began in 2002 through Law Number 15 of 2002 concerning anti-money laundering (AML) and became the basis for the formation of FIU Indonesia. This law was passed hastily as a result of international pressure on Indonesia at that time, so it had many shortcomings and was finally amended through Law Number 25 of 2003 concerning the Countermeasure and Eradication of AML (Garnasih, 2016). Furthermore, the law relating to money laundering in Indonesia was refined with the issuance of the Law of The Republic of Indonesia Number 8 Year 2010 Regarding Countermeasure and Eradication of Money Laundering (2010) (AML Law) which is in use to this day.

The stakeholders of the AML regime involve both the private sector and the public sector (FATF, 2023b). In Indonesia, in the private sector, there are reporting parties who are required to submit reports to the Indonesian FIU following the AML Law, which are financial institutions (banks, insurance, etc.), providers of goods and/or services (property agents, motor vehicle traders, etc.), the Directorate General Customs and Excise, as well as certain professions (advocates, accountants, etc.). In the public sector, several Ministries/Institutions are members of the AML Committee as a forum for coordinating anti-money laundering between government institutions. Based on Presidential Regulation (PERPRES) Number 117 the Year 2016

Concerning Amendments to Presidential Regulation Number 6 the Year 2012 Concerning the National Coordinating Committee for Countermeasure and Eradication of Money Laundering (2016), the AML Committee consists of the Coordinating Minister for Political, Legal and Security Affairs as Chair, the Coordinating Minister for Economic Affairs as Deputy Chair, Head of FIU as Secretary and 13 members consist of Heads of Regulators/Supervisory and Regulatory Agencies over Reporting Parties and Heads of Law Enforcement Agencies. Furthermore, under FATF (2012 - 2023), FIUs worldwide are encouraged to coordinate and exchange information through the Egmont Group, so that FIUs of other nations are also stakeholders of the anti-money laundering regime in Indonesia.

Every nation is free to determine the design of its AML system which will be unique and specific to each country (Bartolozzi et al., 2022). The design is based on its legal and administrative system, financial and technical capabilities, criminal policy consideration, and other considerations (International Monetary Fund & World Bank, 2004). AML system in Indonesia is visualized in Figure 2 below:

* LTKM: Suspicious Financial Transaction Report
   LTKT: Cash Financial Transaction Report
   LTPBJ: Transaction Report for Goods and Services Providers
   LPUT: Report on Cross-Border Cash Carry
   LTKL: Financial Transaction Reports from/to Overseas

Figure 2 Indonesia Anti Money Laundering System

3. Methodology

This paper draws on qualitative research. The OECD AMM is used in this research with consideration of 1) novelty – one of the AMMs published in the

last two years, 2) testability - 41 tax administrators have joined in its pilot assessment and their feedback was taken into consideration into the final model 3) Availability - the entire model is publicly accessible, and 4) Specificity - the AMM is tailor-made for the public sector. Although FIU Indonesia is not under Indonesia's tax administrator, some other FIUs are part of their tax authority. Moreover, the Directorate General of Taxes, Indonesia's tax administrator, is one of the end-users of FIU Indonesia's FIR. OECD AMM (2022) provides criteria that need to be met by the assessed object at perspective level and for each indicative attribute outlined in detail in the model and summarized for the purpose of this research in the Appendix. The conformity of the object with the criteria for the maturity level of each indicative attribute is assessed using the results of interviews as primary data. Table 1 shows who provides primary data sources, while Table 2 indicates which respondents can explain each indicative attribute from OECD AMM. The results of observations on related documents and reports as secondary data support this primary data. Validation is carried out by triangulation by comparing secondary data with primary data.

Table 1. List of Respondents

Code	Respondents	Duty and Responsibility/Notes
A	Deputy of Analysis and Examination	Directly responsible to the head of FIU Indonesia in carrying out top-level management tasks related as per AML Law: analyzing or examining financial transaction reports and information that indicate money laundering and/or its predicate crimes.
B	Head of Information and Technology Center	Directly responsible to the head of FIU Indonesia in carrying out top-level management tasks related to Information and Technology functions within the organization.
C	Head of Internal Audit	Directly responsible to the head of FIU Indonesia in carrying out the supervisory tasks of the implementation of internal control within the organization.
D	Head of Human Capital Development	Perform mid-level human capital tasks, including employee procurement, career development, and talent management.
E	Head of IT Infrastructure	Planning and developing IT Infrastructure, systems, and tools at the mid-level.
F	Team Leader Proactive Analytic	Perform mid-level analytic tasks, including managing team performance, scoring and distributing STR, reviewing draft FIR, and leading coordination between analysts (team members) and external stakeholders.
G	Team Leader Reactive Analytic	Perform mid-level analytic tasks, including managing team performance, scoring and distributing STR, reviewing draft FIR, and leading coordination between

Code	Respondents	Duty and Responsibility/Notes
		analysts (team members) and external stakeholders.
H	Team Leader Reporting Parties' Data Management	Manage data and information from reporting parties at the mid-level.
I	Analysts as focus group participants	Consists of operational-level analysts, including two proactive analysts with five and two years of experience, and a reactive analyst with nine years of experience.

Table 2. Respondent for Each Indicative Attribute

Indicative Attributes OECD AMM (2022)	Respondents Code								
	A	B	C	D	E	F	G	H	I
Strategic Perspective									
1. Strategy	√	√						√	
2. Governance	√		√			√	√		√
3. Culture	√			√		√	√		√
4. Budget Setting	√	√							
Operational Perspective									
1. IT infrastructure, system development and tools		√			√	√	√		√
2. Data management		√			√	√	√	√	√
3. Talent management	√			√		√	√		√
4. Business feedback and evaluation			√			√	√		
5. Analytic process and project management						√	√		√
6. Analytics capabilities						√	√		√
7. Usage area						√	√		√

4. Empirical Findings/Result

FIU Indonesia: Analytic Maturity Level

Strategic Perspective

According to the OECD AMM, the strategic perspective encompasses the degree of executive sponsorship for analytics, which is evaluated based on four key attributes: strategy, governance, culture, and budget allocation. The analytics governance evaluation focuses on the administration of analytics services, prioritization of analytics projects, and adherence to ethical and transparent governance practices. The level of maturity in this perspective measures the effectiveness and quality of analytics strategy and governance and the resulting impact on a well-established analytics culture and sufficient

funding. Our analysis shows that FIU Indonesia's analytical maturity level for producing FIRs from a strategic perspective is at level 3 – Established. The characteristics of organization with level 3 – Established strategic perspective based on OECD AMM are as follows:

"*A high-level strategy and organisational structure is in place for the coordinated use of analytics, and the governance of analytics services is managed at senior level. The importance of coordinated analytics services and use of analytics for more effective tax administration is prioritised by senior leadership. This is increasingly reflected in budget setting, project planning and IT development.*" – OECD AMM (2022)

While FIU Indonesia already has sound strategies and excellent budget-setting capabilities, there are some shortcomings in governance and cultural attributes. Governance issues stem from the lack of scoring for analytic prioritization for proactive analysis and insufficient oversight from external units, especially internal audits. This is also related to culture findings, where the lack of analytics to identify opportunities could be causing less impactful FIR.

Strategic Perspective – Strategy Indicative Attribute

FIU Indonesia has achieved level 4 - Leading in OECD AMM's strategy indicative attribute. FIU Indonesia is considered to have characteristics of level 4 by 1) having a detailed strategic framework for enhancing the effectiveness and efficiency of analytics in producing FIR, 2) involving extensive internal and external feedback in developing the analytic strategy, and 3) active support from senior management. Additionally, external stakeholders are increasingly involved in developing analytics capabilities. To reach level 5 of maturity, FIU Indonesia needs to develop an effective anti-money laundering strategy with other stakeholders, which is beyond its capacity. FIU Indonesia's strategic framework was documented in strategic planning for 2020 – 2024, work plan 2024, IT Masterplan 2020 – 2024, and draft IT Masterplan 2025 – 2029. It is also reflected in an interview with the Head of IT Center, where FATF guidelines, benchmarking with other FIUs, and internal feedback become the basis for determining analytic strategies related to IT infrastructure and tools, especially for using AI.

An interview with the Deputy of Analysis and Examination explicitly informed that data quality has also become a focus for process improvement besides IT infrastructure and tools development. According to the statistical

report for the year 2023, FIU Indonesia received more than 2,8 million transaction reports each month, out of which more than 10.000 are suspicious transaction reports (STR) from at least 40.000 registered reporting parties. Data quality is crucial for FIU Indonesia, especially in prioritizing STRs to be followed up. This is essential in order to create an impactful and high-quality proactive FIR. An impactful FIR is needed to create public attention, which is expected to gain strong public control over investigations. A High-quality FIR means that the FIR already has strong indications of a criminal act, which is expected to prompt financial investigation, including money laundering.

Strategic Perspective – Governance Indicative Attribute

From a strategic perspective for the analytics governance aspect, FIU Indonesia has reached analytics maturity level 2 – Progressing due to the lack of parameters to prioritize proactive analytic triggers based on their risk ratings, The current parameters are based on the frequency and total number of transactions of the reported party, which is not enough to be able to filter 10.000 STR per month. The guidelines for prioritizing proactive analytical projects are available through publicly available documents such as National Risk Assessment, Research of AML Thypology, and FATF publications. However, in practice, the prioritization of analytical projects still relies on the professional judgment of each analyst and mass media information. Another key finding is a deficiency in the organization's analytical governance oversight. The supervision process has always been carried out simultaneously with daily business activities and relies on system logs and access, resulting in weaknesses in the analytical process. This weakness was confirmed to the Head of Internal Audit, who stated that they had not evaluated the analytical process at the Deputy of Analytics and Examination unit since using GoAML or for the last four years.

Transaction information is susceptible data and is subject to strict regulations to ensure its confidentiality. However, under the AML Law, FIU Indonesia is exempted from confidentiality provisions (Article 45 of the AML Law) in performing its duties and functions. Furthermore, as an Independent Institution by the AML Law, FIU Indonesia has the freedom to determine its analytical projects without any intervention from any party. In order to maintain control over the analytical process and prioritization of analytical projects in FIU Indonesia, the involvement of external parties must be limited. Therefore, the target for governance attributes regarding analytic maturity level is set at Level 3 – Established. This will be achieved as soon as

tailor-made criterias or even machine learning for STR scoring is available using GoAML.

Strategic Perspective – Culture Indicative Attribute

FIU Indonesia has achieved maturity level 4 – Leading from a strategic perspective in terms of its analytic culture. The Deputy of Analysis and Examination Unit's main activity is to process both internal and external data to produce FIR on a day-to-day basis, resulting in their own analytical culture and shared between analysts. FIU Indonesia was forced to keep up with the increasing variety of financial products and ways to commit financial crimes by innovating its analytical process. Thus, the culture of innovation is inherent in every analyst when assigned a particular case. The maturity target for this aspect is at level 5 – Aspirational, which is related to a culture that identifies opportunities to utilize analytics to optimize resources and enhance the impact of FIR. In some cases, FIU Indonesia reacts after a significant case is exposed to the public instead of proactively triggering a major case to be followed up by investigators.

Strategic Perspective – Budget Settings Indicative Attribute

FIU Indonesia has achieved maturity level 4 – Leading in analytic budget settings, which means the budget planning process involves all work units for organizational-level harmonization and coordination with IT functions. This ensures harmonization with FIU Indonesia's Strategic Planning and IT Masterplan for digital transformation. The Head of IT Center expressed that they have always been proactive in supporting the analysis process. They have provided various initiatives, such as accelerating system data queries and creating an AML artificial intelligence laboratory. Additionally, the Deputy of Analysis and Examination has disclosed that all planning procurements regarding technology and analytic tools are always coordinated with the IT Center. Maturity level 4 - Leading of budget setting is considered the highest level of feasible maturity level because the budgeting and spending system for government institutions in Indonesia depends on external forces, not within the institution.

Operational Perspective

According to OECD AMM, the operational perspective involves the actions of management and staff as the strategy and governance framework develops. The impact of the strategic approach on operations is analyzed through

various factors, which can be broadly categorized as the foundational technology for analytics and the utilization of analytics. The advancement in maturity is reflected in higher quality and broader scope of the foundational technology for analytics, growing support from management and staff both inside and outside of the analytics teams for the usability of analytics, increased professionalism in organizing the analytics work and utilizing the outcomes, and an expanding range of areas benefiting from analytics. The characteristics of organizations at analytical maturity level 3 – Established from an operational perspective based on OECD AMM are as follows:

"*The common analytics services infrastructure is well maintained, and necessary analytics tools are provided. All significant data sources are digitized, and there is easy access to most data used for analytics, including third-party sources, with acceptable matching levels. There is increasing proactive cooperation between analysts and operational staff. Advanced analysts have a good understanding of statistical thinking and key modeling techniques*" – OECD AMM (2022)

FIU Indonesia has developed a strong IT infrastructure, system development, and analytical tools as part of its short-term and long-term strategies. The GoAML implementation in early 2021 represents the most significant digital transformation initiative to date, enabling the digitization of all core data and improving communication and information exchange with AML stakeholders. It also allows for a more integrated analytical system. Analysts also undergo adequate training to enhance their technical capabilities, including in using available analytical tools. However, automation in each analysis process still needs to be encouraged. Some administrative and repetitive work is still done manually by analysts, which is time-consuming and ineffective. FIU Indonesia occasionally uses data mining techniques for case building and thematic analytics. However, this activity has not been conducted continuously to ensure that all existing data has been maximally utilized.

Operational Perspective – IT Infrastructure, System Development, and Tools

FIU Indonesia has achieved Level 4 in OECD AMM's IT Infrastructure, System Development, and Tools indicative attribute. The implementation of GoAML, the core analytics system heavily supported this achievement. This ensures that all core data is documented in the system, including financial transaction reports from reporting parties, information request letters from

end-users, and archived FIR. Even for stakeholders who do not frequently communicate with FIU Indonesia and information exchange from/to other FIUs, there is a dedicated team in FIU Indonesia that inputs the data to GoAML. GoAML also digitizes and records communications between FIU Indonesia and registered AML stakeholders, thus reducing FIR-making time and ensuring transparency. Since its implementation, GoAML has undergone frequent system updates based on user feedback and technological development. The newest version of version 5.4 will equip GoAML with report risk scoring based on parameters set by the user and other technical updates.

In addition to GoAML, FIU Indonesia has also developed its systems to support its functions, including SIPESAT for electronic and integrated management of CIF (customer information file), a PEPs (Politically Exposed Persons) database, and other database applications that are projected to be integrated into GoAML. Integrating multiple systems is one of the characteristics of organizations that reach maturity Level 5 in this aspect. Therefore, FIU Indonesia aims to reach maturity Level 5 - Aspirational.

Operational Perspective – Data Management

FIU Indonesia has achieved level 3 – Established in the OECD AMM's data management indicative attribute, which is characterized by a high level of data digitization, a central repository for internal and external data, and an ontology catalog supported by NIK (Citizen ID Number) for high-level accuracy of data matching. As FIU's core data, financial transaction data in the system has undergone quality assurance through two levels of validation: XML and system validation, as well as business rules validation, which is updated quarterly. In addition, Analysts are encouraged to evaluate the quality of reporting party reports through direct feedback through GoAML to ensure report quality.

Financial transaction data is supported by non-financial information such as family and relative profile information, company ownership, and other private and publicly available information. FIU Indonesia has the authority to access private information directly or through requests as outlined in Government Regulation No. 2 year 2016 regarding AML countermeasure and eradication data submission procedures. The targeted level for this attribute is level 5 – Aspirational, which is characterized by improving access to structured and unstructured data, real-time data exchange, and automated data management and protection using AI. Improvement of data access can be

realized using Application Programming Interface (API) in collaboration with related government and private institutions. While FIU Indonesia has already implemented APIs for certain data access, there are still crucial data that can only be obtained through formal requests on a case-by-case basis, rather than in real-time.

Operational Perspective – Talent Management

FIU Indonesia has achieved level 4 – Leading in OECD AMM's talent management indicative attribute due to several factors. Firstly, although FIU Indonesia follows the same recruitment guidelines as other government institutions, it sets itself apart by maintaining its recruitment strategy and upholding its reputation as a modern state institution. FIU Indonesia also participates in various forums and AML socialization activities in high schools and universities. Secondly, all financial transaction analysts at FIU Indonesia belong to a professional association. This association collaborates with the human capital unit to update analyst competency standards, which become the primary guideline for analysts' assessment for promotion. In relation to competency improvement, the third factor is the priority for the development of analyst competency regarding program making and budget availability.

Although all the criteria for maturity level 5 have been met principally, some shortcomings were still found that lowered the maturity level. The career path for analysts exists, but some feel it is not as rewarding as other positions in the organization. Another weakness is the lack of internal transfers. As a result, financial transaction analysts do not have sufficient analytical experience in other areas, such as analytical for compliance audits. Gaining experience in these areas would be highly beneficial for financial transaction analysts, enabling them to better comprehend the business processes of reporting parties and the data they provide for disclosing or identifying criminal activities.

Operational Perspective – Business feedback and evaluation

FIU Indonesia has achieved level 2 – Progressing in OECD AMM's business feedback and evaluation indicative attribute, mainly due to the inconsistent and insufficient feedback and evaluation from end-users of FIR. This has made it difficult for Indonesia's FIU to assess the quality of its FIR. To overcome this challenge, FIU Indonesia has taken proactive steps. These include requesting meetings with investigators to align perceptions and

expectations, as well as establishing consequences for investigators who fail to provide feedback and evaluations. One such consequence is lowering the priority of their inquiry to be processed by FIU Indonesia. Maturity Level 3 - Established is considered the optimal level for FIU Indonesia due to its independence. FIU Indonesia ought to regard feedback as an integral component of project delivery and a means to enhance the execution of future projects.

Operational Perspective – Analytic Process and Project Management

FIU Indonesia has achieved level 3 – Established in OECD AMM's analytic process and project management indicative attribute due to end-users involvement in the making process of FIR, standardized process, and analytic techniques. The end-users are often involved in both proactive and reactive FIR-making processes. However, due to the restrictions on classified data, as mentioned in the Governance section, end-user involvement is limited to what is presented by FIU Indonesia. The process of creating an FIR involves SOPs to ensure its quality. However, due to the unique nature of each project, analysts are often required to employ specialized techniques for data collection, which can range from gathering information from the desk to conducting on-site observations to the reporting parties's system.

In order to step up to level 4 – Leading, FIU Indonesia needs the proactive involvement of end-users to suggest new ideas, which by law cannot be accommodated by FIU Indonesia. We suggest indirect involvement of end-users by giving FIU Indonesia access to their criminal database, for example. This can only happen if institutions have a common goal and mutual trust. Thus, FIU Indonesia has already achieved the highest level of analytic maturity in the analytic process and project management attributes.

Operational Perspective – Analytics Capabilities

FIU Indonesia has achieved level 2 – Progressing in OECD AMM's analytic capabilities indicative attribute due to its hypothesis-driven analysts and the lack of advanced analysts.

"*The objective of analyzing it is to find indications of criminal acts in the flow of transactions*"- Deputy of Analysis and Examination (2024)

The deputy's statement above illustrates that the focus of analysis in FIU Indonesia is on what happened in the past. This type of analysis is called

descriptive analytics, which involves summarizing available data to understand historical occurrences (Richardson et al., 2023). Furthermore, Richardson et al., (2023) explained that descriptive analytics is the most basic level of analysis and does not require advanced statistical methods. In order to determine whether a transaction is related to a criminal offense, good descriptive analytical skills are necessary. However, advanced analytical statistical methods are required to determine the focus of the analytic project. This is crucial for ensuring optimal use of limited resources. To achieve this, it is recommended that the analytical capabilities of FIU Indonesia reach level 5 - Aspirational by forming a special data processing team supported by AI tools and automated work processes. The team will analyze data and identify potential criminal activities, while a follow-up team will connect the transaction to its predicate crime. FIU Indonesia is on the right track to achieving this goal by providing data science training to selected analysts and establishing adequate infrastructure.

Operational Perspective – Usage Area

Although analytics to produce FIRs is a crucial function of FIU Indonesia, it is not the only role FIU Indonesia plays in preventing and combating AML that can use analytics. Other responsibilities include analyzing the national risk of money laundering and ensuring compliance with AML regulations by conducting audits of reporting parties. As this research has a limited scope, the definition of usage area is narrowed down to each activity involved in creating an FIR. Based on this definition, FIU Indonesia is currently at level 3, established in OECD AMM's usage area indicative attribute. To select STRs with the highest risk of money laundering, FIU Indonesia employs both automatic and manual scoring processes. Investigators' inquiries are also scored based on various variables, which differ depending on the indication of predicate crime. The maturity level expected to be achieved by FIU Indonesia is level 4 - Leading with the main characteristic of AI-based application support. As part of the IT Master Plan, AI support in the analysis process at FIU Indonesia will include automatic information requests to reporting parties and data collection.

5. Discussion

The analysis of FIU Indonesia's analytical maturity level from a strategic perspective, as per the OECD AMM framework, demonstrates notable progress and areas for improvement. The organization's attainment of level 3 – Established, with a high-level strategy and organizational structure for

coordinated use of analytics, indicates a solid foundation. Senior leadership's prioritization of analytics for effective tax administration and the alignment of budget setting and IT development reflect a strategic commitment that aligns with findings in previous research. For example, Bartolozzi et al. (2022) emphasize the importance of governance and strategy in the effectiveness of Financial Intelligence Units (FIUs).

However, FIU Indonesia faces challenges in governance and cultural attributes, such as the lack of a scoring system for analytic prioritization and insufficient external oversight. These issues resonate with findings by Aprilia & Meiryani (2023), who highlight the necessity of robust governance frameworks to enhance the effectiveness of anti-money laundering (AML) activities. Enhancing these areas could lead to more impactful Financial Intelligence Reports (FIRs).

FIU Indonesia has excelled in the strategy indicative attribute, achieving level 4 – Leading. This success is attributed to a detailed strategic framework, extensive internal and external feedback incorporation, and active senior management support. These characteristics align with the strategic frameworks discussed by Achim & Borlea (2020), who underline the critical role of comprehensive strategies in combating economic and financial crimes. The development of an effective anti-money laundering strategy with stakeholders, as recommended, could propel FIU Indonesia to level 5 maturity.

Despite reaching level 2 – Progressing in analytics governance, FIU Indonesia's maturity in this attribute reflects deficiencies in project prioritization and external oversight. These findings are consistent with the governance challenges identified by Jayasekara (2022), who notes that effective AML regimes require stringent governance mechanisms to ensure the prioritization and oversight of analytical processes. The potential for improvement through the implementation of machine learning for STR scoring highlights a path toward achieving level 3 – Established.

FIU Indonesia's analytic culture is rated at level 4 – Leading, indicating a strong culture of innovation among analysts. This culture is crucial for adapting to the evolving landscape of financial crimes, as suggested by Cheng et al. (2021), who emphasize the importance of innovation in AML strategies. However, the need to identify opportunities for utilizing analytics more

proactively to enhance FIR impact suggests room for growth toward level 5 – Aspirational.

The organization's achievement of level 4 – Leading in budget settings underscores a well-coordinated budget planning process that aligns with FIU Indonesia's strategic and IT master plans. This achievement is indicative of a mature budgeting process that supports analytics initiatives, aligning with the findings of Meiryani et al. (2023), who discuss the effectiveness of regulatory technology in the Indonesian banking sector for AML and counter-terrorist financing.

From an operational perspective, FIU Indonesia's analytical maturity level is at level 3 – Established, with robust IT infrastructure, system development, and tools. The implementation of GoAML represents a significant milestone in digital transformation, enabling better data integration and communication with AML stakeholders. This development aligns with the advancements discussed by Han et al. (2020), who highlight the role of artificial intelligence and digital tools in enhancing AML processes.

Achieving level 4 in IT infrastructure, system development, and tools, FIU Indonesia has demonstrated significant progress. The integration of systems like GoAML and SIPESAT supports comprehensive data management and analytics capabilities. The emphasis on continuous system updates and user feedback reflects best practices highlighted by Grossman (2018), who advocates for the continuous improvement of analytic maturity through iterative development and feedback mechanisms.

FIU Indonesia's level 3 – Established rating in data management indicates effective data digitization and quality assurance processes. The high-level accuracy of data matching through NIK (Citizen ID Number) and quality assurance measures align with the data management principles discussed by Lagerwaard (2022), who underscores the importance of data accuracy and integration for effective financial surveillance.

The organization has achieved level 4 – Leading in talent management, reflecting strong recruitment strategies, professional development, and competency standards for analysts. However, there are areas for improvement in career path rewards and internal transfers, which could further enhance analytical experience and capabilities. These findings resonate with the

recommendations of Jaleel et al. (2021), who emphasize the need for continuous professional development and rewarding career paths in FIUs.

FIU Indonesia's level 2 – Progressing in business feedback and evaluation indicates challenges in receiving consistent feedback from FIR end-users. Proactive steps to align perceptions with investigators and establish feedback mechanisms are crucial for improving FIR quality, as suggested by Cox (2014), who highlights the importance of feedback in refining AML processes.

Achieving level 3 – Established in analytic process and project management, FIU Indonesia benefits from standardized processes and end-user involvement. The limitations imposed by classified data and the need for more proactive end-user involvement suggest potential for growth. Jensen & Iosifidis (2023) advocate for advanced analytics and machine learning techniques to enhance project management and analytic processes in AML activities.

FIU Indonesia's level 2 – Progressing rating in analytic capabilities highlights a focus on descriptive analytics. The need for advanced statistical methods and hypothesis-driven analysis is essential for optimizing resource use and enhancing analysis quality. This aligns with the recommendations of Jullum et al. (2020), who emphasize the importance of advanced analytics in detecting money laundering transactions.

FIU Indonesia's level 3 – Established in the usage area reflects effective use of analytics in FIR production. The integration of AI-based applications as part of the IT Master Plan represents a strategic direction toward level 4 – Leading. The potential for AI to support information requests and data collection aligns with the vision outlined by FATF (2021a), which discusses the transformative potential of digital technologies in AML operations.

In conclusion, FIU Indonesia has made significant strides in various aspects of analytical maturity. However, addressing the identified shortcomings in governance, culture, and analytical capabilities is essential for achieving higher maturity levels. By leveraging strategic frameworks, advanced analytics, and continuous improvement, FIU Indonesia can enhance its effectiveness in combating money laundering and financial crimes.

6. Conclusions

FIU Indonesia has reached maturity level 3 - Established from 5 levels available based on OECD AMM in producing FIR using OECD AMM from both strategic and operational perspectives. From a strategic perspective, this level illustrates that FIU Indonesia has a solid analytic strategy supported by sound financial capabilities. The foundation for analytic governance has been established. However, specific guidance for proactive analytic prioritization is highly needed. From an operational standpoint, level 3 - established indicates that the seven indicative attributes are already in place and executed in good practices by FIU Indonesia. Talent management, and IT Infrastructure, system development and tools at FIU Indonesia has already achieved level 4 – Leading. On the other hand, due to the underutilization of more advanced analytics, analytic capabilities have the lowest maturity level of 2 – progressing. The current condition and expectations of analytic maturity levels for each indicative attribute are shown in Figure 3 below:
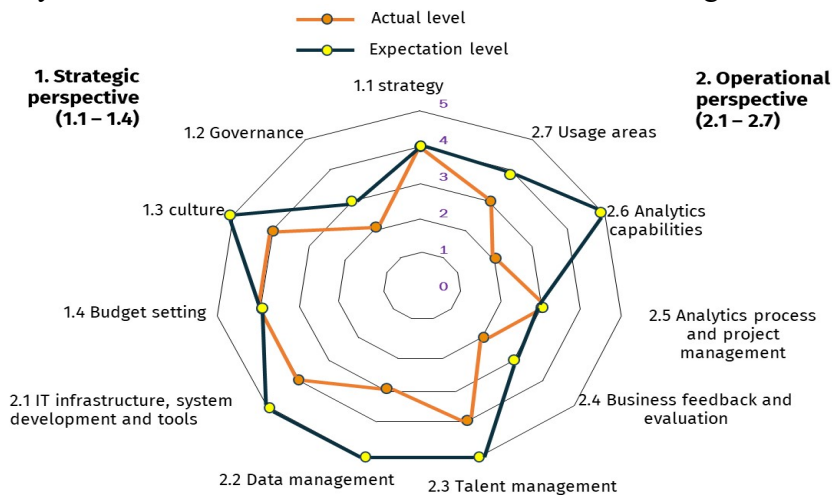
Figure 3 FIU Indonesia Analyic Maturity Assessment Result

In order to bridge the gap between the current conditions and expectations, FIU Indonesia should enhance its analytical governance by providing adequate guidelines, tools, and even AI and machine learning solutions for prioritizing STR. Therefore, appropriate logic and adequate data support must be developed. FIU Indonesian must encourage strategies to enhance data quality, increase metadata from collaboration with other AML stakeholders, and establish systems to classify unstructured data. Additionally, setting up a specialized analyst team for data processing is recommended to run more advanced analytic solutions and enhance the analytical capabilities without sacrificing the main objective of FIR.

7. Acknowledgements

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