AN EXPLORATORY EXAMINATION OF ANTI-MONEY LAUNDERING RISK ASSESSMENT

HENRY OGBEIDE

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ABSTRACT

This project aimed to provide an exploratory examination of anti-money laundering (AML) risk assessments in the contemporary context of the risk-based approach, in which financial professionals assess the risk to which they are exposed and adopt suitable modification actions in accordance with their levels of perceived risk. In this study, the purpose was to evaluate the quality of expert judgment and to identify factors that influence money laundering risk estimates. To proceed along these lines, three different exploratory methods were employed. First, an opinion poll was conducted on 1497 individuals who were directly or indirectly responsible for making AML risk assessments in the real world. This poll contained questions relevant to the research, such as the contexts and information that they thought were most useful to form a reasonable belief that particular transactions have potential for money laundering and the factors that were most likely to influence the quality of risk assessment decisions in this domain. This was followed by semi-structured interviews conducted on nine AML experts based on four themes: the effectiveness of risk assessments, the risk assessment process, the main factors that influence risk judgement and perceived process improvement opportunities. The interview responses were then subjected to thematic analysis. Finally, an experimental study using vignettes was designed to investigate the quality of probability judgment in this context. This measured overall accuracy of AML risk assessments along with performance on various important underlying components of judgement across level of expertise (experts v's novices) and gender. Various interesting results emerged from these analyses. For example, it was found initially from the short polls that organizational response strategies (such as formulated policies, procedures) serve as the most common choices for AML practitioners to gauge their risk assessment judgment accuracy. Therefore, despite the much-promoted risk-based approach, in which financial professionals assess the risk to which they are exposed and adopt suitable modification actions following their levels of perceived risk, professionals most often depended either on their organization processes or domicile statutory requirement to build their reasonable judgment during AML risk assessment. Moreover, this finding also strongly emerged from the semi-structured interview analysis. Intriguing results also emerged from the experimental probability judgment accuracy study. For example, it was found that both experts and novices were overconfident about their distribution judgments and this effect

was slightly more pronounced in the expert group. One manifestation of the overconfidence effect in both groups was the preference for false-positive over false-negative errors. Notably, novice participants slightly outperformed expert participants in the proportion of correct outcomes. These findings are discussed in terms of their main contributions to research and practice, potential limitations of the work are considered and directions for future research are offered.

Keywords: financial institutions, anti- money laundering, expertise, probability judgment, bias, overconfidence

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List of Abbreviations

AML	Anti-Money Laundering
FATF	Financial Action Task Force
IT	Information Technology
MPS	Mean Probability Scores
NMLRA	National Money Laundering Risk Assessment
OECD	Organisation for Economic Co-operation and Development
OCG	Organized Criminal Groups
TBML	Trade-Based Money Laundering
ML	Money Laundering

PREFACE

Research undertaken for this thesis has led to the following article submitted to Journal of Business Research.

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Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. Any ethical clearance for the research presented in this commentary has been approved. Approval has been sought and granted through the Researcher's submission to Northumbria University's Ethics Online System on 11 November 2020.

I declare that the Word Count of this Thesis is 76335 words

Name: HENRY OGBEIDE

Date: 09 January 2023

CHAPTER 1 INTRODUCTION

1.1 An Overview

This research project aims to provide an exploratory examination of anti-money laundering (AML) risk assessments in the contemporary context of the risk-based approach, in which financial professionals assess the risk to which their institutions are exposed and adopt suitable modification actions in accordance with their levels of perceived risk. The risk-based approach to AML risk assessment is mixed with element of uncertainty due to the variable nature of money laundering. There are difficulties associated with knowing when a customer intends to or eventually will get involved with money laundering related offences. There is uncertainty associated with determining potential money laundering risk and there is a reliance on judgmental professional evaluations of the relevant risk indicators. In contrast to the earlier emphasis on the use of rule-based methodology, which involves strictly adhering to state-provided rules for the identification of potential money laundering risks, the risk-based approaches emphasize that AML regulated institutions understand where their risks lie in order to carry out effective risk assessment. Appropriate judgment and confidence levels are vital in this context because under-confidence might lead to denying financial assistance unnecessarily while overconfidence could lead to trusting and authorizing a high-risk offender. However, the quality of human judgment in this area has never been examined in a systematic manner (Isa, Sanusi, Haniff, & Barnes, 2015).

Accordingly, the main aim of this project is to provide an exploratory examination of the quality of money laundering risk assessment. In order to proceed along these lines, the following sections provide a definition and an overview of money laundering behaviour, a consideration from prior literature of the most popular types of money laundering techniques and the effectiveness of AML risk assessment methods employed in commercial banks. This is followed by an evaluation of the importance of probability judgment in risk assessment and a discussion of literature focusing on expertise and probability judgment accuracy. Based on this discussion, specific research objectives are developed. Finally, an outline for the remainder of the thesis is provided.

1.2 Money Laundering: An Overview

In general, money laundering is the act of concealing the existence, source, or use of illegal acquired income to appear legitimate (Schroeder, 2001). Though money laundering activities were originally perceptive as a criminal offence strictly related to drug trafficking, money laundering crimes have now become an integral part of nearly all criminal-oriented activities aimed at generating income. Money laundering activities have contributed to the continued rise of various crimes. As such results in a more detrimental economic impact than any other kind of crime since they have many more potential victims than any other type of crime (Kumar, 2012). For instance, based on international labour organisation estimates, forced labour alone generates over USD 150.2 billion annually, making human trafficking one of the most lucrative revenue-generating crimes in the world, aside the incredibly high human costs (FATF-APG, 2018). Organised criminals, tax evaders, drug traffickers, terrorists, insider dealers, and many other criminals need money laundering to further their goals because it helps them avoid the kind of attention from the law enforcement that sudden wealth from illegal activities brings (Kumar, 2012). Each year, approximately 2-5 percent of the world's gross domestic product (GDP), or about $800 billion to $2 trillion in US dollars, is laundered worldwide, according to the United Nations Office on Drugs and Crime (Storm, 2013). Also, from the IMF reports, the money laundering industry annual revenue may be close to $1.15 trillion (Kumar, 2012).

Furthermore, globalization has integrated international financial systems and technology in a manner that made it easier for individuals and corporate entities to communicate more quickly, deeply, and effectively across the globe, thus giving criminals more opportunities to siphon enormous crime proceeds from around the world (Schroeder, 2001). The majority of cash enters the financial system through banks and other financial services institutions, and these organisations also play a considerable role in enabling international money transfers (Canhoto, 2021). Money moving through the financial system leaves a verifiable trail that, in many cases, can be used to identify illegal activity, identify those responsible, and pinpoint the proceeds of criminality that can then be recovered (De Goede, 2012). Consequently, financial information has evolved into an invaluable investigative and intelligence tool. The money laundering regulation's view money laundering as a crime and all illicit activities relating to it as criminal offences (Demetis, 2018). Banks and other private entities undergo

costly anti-money laundering procedures to help governments limit the facilitation of proceeds from crime (Berg, 2020). For instance, banks are required under laws predominantly based on the Financial Action Task Force (FATF) recommendations, to meet intricate compliance requirements, verify the identities of their customers' and sources of funding, and monitor their payments (Pol, 2020). Similarly, under the proceeds of crime regulations, all reporting entities such as banks and their employees are required to report suspicious transactions (FATF, 2014). The money laundering regulation requires regulated businesses to conduct AML risk assessments to determine the likelihood that their operations could facilitate the laundering of criminal proceeds (HM Revenue & Customs, 2021). For the staff, the most challenging aspect is developing criteria to identify suspicious behaviour or transactions (Sinha, 2014). Without quality considerations in bank AML programs, criminals might be able to evade detection. The consequences of such failures have left major financial institutions with penalties and costs in the hundreds of millions (Nyreröd et al., 2022). A common theme in the risk assessment literature is the emphasis on box-ticking, which results in a high false positive rate that undermines the AML system's efficacy, bank's reputation (dalla Pellegrina et al., 2022), and raises operating costs for law enforcement agencies that rely to some extent on these reports for intelligence (Amicelle & Iafolla, 2018; Takáts, 2011).

1.3 An introduction to AML risk assessment

Financial institutions that are regulated, like banks, commercial banks, insurance companies, securities companies, currency exchangers, and credit card issuers, prioritize AML risk assessment. As well as many other non-financial organizations, including casinos, gambling associations, football associations, and real estate developers that are also regulated by anti-money laundering laws (Unger & Van Waarden, 2013). Thus, banks and other AML-regulated institutions are developing different methods to assess money laundering risk in their customer due diligence (CDD) to satisfy AML regulatory requirements (Savona & Riccardi, 2019). Though this dissertation examines international AML standards for carrying out risk assessments by AML-regulated entities, it is primarily focused on the AML risk assessment practices of commercial banks.

AML risk assessment involves the ability to identify groups of customers with specific product preference types or exhibiting specific buying behaviour aimed at concealing the

source or destination of funds (Canhoto, 2008). The rule-based and risk-based approaches are two main approaches for carrying out AML risk assessment (Hopkins & Shelton, 2018). The rule-based approach outlines clear criteria in the form of rules given by the state to regulated AML businesses to aid them identify potential money laundering risks (Unger & Van Waarden, 2009), and report such activities as suspicious activities to regulatory authority (Hopkins & Shelton, 2019). Financial institutions and banks have been required to take reasonable steps to identify and assess money laundering risks within their businesses since 2007, as a result of the risk-based approach sponsored by the Financial Action Task Force (FATF) for adoption by regulated AML entities (FATF, 2013). With the risk-based approach, financial organisations and other AML regulated entities are required to reduce the complexity when making distinctions between suspicious and nonsuspicious cases of money laundering by focusing more on major areas of their business prone to money laundering activities (Demetis & Angell, 2007). The risk-based approach has in recent years taken over from the rule-based approach as being the main approach for carrying out AML risk assessment by financial institutions (Bello & Harvey, 2017).

The shift in methodology for money laundering risk assessment from a rule-based to a risk-based implies suspicious behaviour or activities are no longer defined by the State but rather by the different stakeholders involved in money laundering crimes prevention (Savona & Riccardi, 2019). Risk-based implementation has, however, encountered several challenges due to inadequacies in the risk theoretical framework for AML (Bello & Harvey, 2017). For example, the construction of the difference between non-suspicious and truly suspicious transaction is always challenging and this is evidence in the high number of false positive reports in most AML system around the world (Demetis & Angell, 2007). Accordingly, Demetis and Angell's (2007) work calls for more research work on how to utilize internal intelligence and other resources to help clarify ways for distinguishing between the suspicious and nonsuspicious. In practice, the management of AML risk assessment within regulated financial institutions and banks is largely dependent on professional perceptions of AML risk opinions (FATF, 2013b; Hopkins & Shelton, 2019).

Although the rule-based approach reduces uncertainty for decision-makers during money laundering risk assessment since all subjects of the regulations are faced with the same exact rules (Hopkins & Shelton, 2019), the risk-based approach focuses on the construction

of a risk-defined profile for the targeting of money laundering activities (Demetis & Angell, 2007). To aid proper AML risk assessment using the risk-based approach, information relating to customer background, geographic location, business line, product and service types are usually collected about a prospective customer and profiled in line with the institution's perceived standard risk rating of customer characteristics (Guerra, 2019). The FATF recommends the categorization of these information types into high and low risk (Bello & Harvey, 2017) in order to examine the volume of activities (Demetis & Angell, 2007). However, Demetis and Angell (2007) note that the FATF has provided no quantification for showing how to distinguish between high and low risk and that this identification is dependent on the assessor probabilities or numerical estimations of the AML risk. The work of Savona and Riccardi (2017) also notes that little guidance on AML risk assessment methodology has been provided by academic researchers and suggests the existence of a gap between researchers' knowledge in the area of money laundering risk assessment and that of practitioners, and that this space is currently being occupied by information technology (IT) and consulting companies.

Money laundering monitoring in financial institutions does not only involve the identification of customer account behaviours but it also attempts to predict future behaviours of customers. There are elements of speculation faced by the money laundering analysist during risk judgment and there is also a strong link between the effectiveness of risk-based assessment and human judgment quality in this context (Canhoto, 2008). The present study aims to identify and address the major theoretical gaps in the literature, which also create voids in guidance for effective AML risk assessment in practice. Even though scholars have noted and studied the role of risk-based approach in AML risk assessment, the studies are found to generally lack strong theoretical foundations for linking professional cognitive factors to quality of AML risk assessment in financial institutions (Jamil, Mohd-Sanusi, Mat-Isa, & Yaacob, 2022). Paradoxically, money laundering risk assessment is not just a measurement exercise but a response to set requirements introduced by the AML regulatory regime championed by the FATF (Riccardi et al., 2019). These requirements are periodically updated, and guideline statement issued by FATF. For example, the FATF in 2013 created an AML risk assessment framework to guide AML regulated bodies during the assessment of money laundering risk (Halliday et al., 2019).

According to the guideline, money laundering risks are assessed based on 'likelihoods' that proceeds from criminal activities will be laundered and associated 'consequences' if the proceeds is laundered (Savona & Riccardi, 2017). A disjunctive synthesis of both the likelihood and consequences judgments should guide the risk assessment of money laundering risk. For example, banks may report a transaction as suspicious if there is a high likelihood that the transaction is a case of money laundering occurring or if the consequences will be severe that the transaction turns out to be a case of money laundering. Money laundering risk indicators (potential red flags) are also codified in national risk assessment frameworks as a guideline for identifying instances of money laundering (Savona & Riccardi, 2017). But guidelines do not usually translate easily into provider behaviour (Reyna & Lloyd, 2006). Within AML domain, experts must be able to identify and interpret erratic trails of crime proceeds across jurisdictions (Fedirko, 2021). Financial institutions can only see a fraction of the bigger, more complex picture when dealing with transactions (FATF, 2022). In fact, criminals exploit this information gap to layer illicit financial flows between financial institutions within and across jurisdictions. Thus, circumstantial evidence becomes the foundation of inference to identify whether proceeds originate from criminal activities (Bell, 2000). Interpretation is unavoidable during AML risk assessment and all risk judgments, whether based on codified risk categories or a transaction's economic rationale, are points of inference. AML experts face uncertainty at the core during the risk assessment procedure: interpretations are contextually sensitive, and conclusions are often probabilistic (Veen et al., 2020). Yet, one critical missing element from academic literature on AML risk assessment is the lack of consideration of the accuracy of professional probability judgment in this context. The background of this area of research is discussed next.

1.4 Probability Judgment Accuracy

Several judgmental contexts (e.g., forecasting, risk assessment) require quantifying uncertainty in terms of probability distributions (Soll, Palley, Klayman, & Moore, 2022). Probability judgment accuracy concerns the ability to assess the accuracy of probabilities for the occurrence of given events (Wilkie-Thomson, 1998). When examining the quality of judgment in an assessment or prediction context, it is not sufficient to judge the performance of the assessor solely by how often he or she is correct while neglecting the

degree of confidence that he or she has in each assessment. Confidence can be defined as a subjective likelihood of its correctness and is one of several forms of uncertainty human brains encode (Fleming & Daw, 2017; Merkle & Van Zandt, 2006). An assessment of confidence involves assessing whether or not a given answer is accurate based on a retrospective assessment (Scheiter et al., 2020). Existing experimental research work suggests confidence plays a critical role in the cognitive control of probability judgments' formulation. The evidence presented thus far supports the idea that the degree of confidence in one's choices correlates with the level of knowledge of errors one has made. For example, Borracci and Arribalzaga (2018) note that confidence could be considered an essential ingredient of success in task accuracy. Several tasks involving probability judgments have demonstrated these patterns (Trejos, van Deemen, Rodríguez, & Gomez, 2019), for instance in judgment tasks relating forensic assessments (Mattijssen, Witteman, Berger, Brand, & Stoel, 2020), currency forecasting (Wilkie-Thomson, 1998), and news judgments (Lyons, Montgomery, Guess, Nyhan, & Reifler, 2021). However, most attempts to document the relation between judgment confidence and judgment accuracy have either lacked statistically significant results or arrived at mixed results. Miller et al. (2015) study, synthesized 40 years of research from 36 studies and assessed clinicians' confidence ratings with mental health or psychological issues based on the accuracy of their judgments. They demonstrated that confidence is better calibrated of judgment accuracy using a random-effects model, with a small but statistically significant effect (r=.15; CI=.06, .24). While, in Luna and Martín-Luengo (2012) study with students making judgments about cued recall versus general knowledge in response to a viewed video of a bank robbery, the study found that confidence could be a good marker for accuracy with cued recall. However, Luna and Martín-Luengo work suggested the need for further studies using ecological tests and robust data analysis methods to confirm the validity of their work. In contrast, Carlin and Hewitt (1990) found no significant relationship between confidence and accuracy among clinical psychologists.

Another underlying aspect of judgment that can be identified from a confidence/accuracy analysis is resolution (Scheiter, 2020), an ability to discriminate between instances where an event is likely to take place from when it is not (Sanders, 1963). An individual's resolution is measured as the correlation between judgment (e.g., confidence) and success (e.g., correct

answer, yes/no) across items (e.g., a question) within a task (Scheiter, 2020). Most study suggests that appropriate resolution decreases with an increase in decision difficulty arising either from decreases in discriminability or from increasing demands for speed at the expense of accuracy (e.g., Baranski & Petrusic, 1994). Metacognitive studies have shown that poor calibration and resolution may result from inconsistent probability estimates from the assessor, which again would be a critical problem in the present context as similar instances should be evaluated in an equivalent manner (e.g., Lingel & Schneider, 2019; Yates, 1982). Calibration is the measure used to describe the degree of consistency between allocated probabilities and actual occurrences (Attali, Budescu, & Arieli-Attali, 2020; Lichtenstein et al., 1977). For example, a perfectly calibrated assessor would be correct on all occasions where he or she provided a probability of 100%, would be correct on seventy out of one hundred occasions where he or she provided a probability of 70%, and on 50% of occasions where he or she provided a probability of 50%, and so on. The most recognised cause of poor calibration is overconfidence or overreaction (Doyle, Ojiako, Marshall, Dawson, & Brito, 2021; Lichtenstein, Fischhoff, & Phillips, 1982; Wallsten & Budescu, 1983; Wilkie-Thomson, 1998). In the context of accuracy, overconfidence is the difference between mean confidence and overall accuracy (Attali et al., 2020; Brenner, Koehler, Liberman, & Tversky, 1996). The concept of overconfidence has been described as a type of miscalibration in which the assigned probability of the answers given being correct exceeds the true accuracy of the answers (Skala, 2008). It occurs when judges overestimate the probability of correct answers relative to the probability of their accuracy, underestimating the probability that the truth may be much further away (Soll et al., 2022). Several studies have demonstrated that calibration in probability judgment is adversely affected by overconfidence (McKenzie et al., 2008). For example, Skala (2008) found that the principal facets of modern behavioural finance's conventional dominant view of overconfidence are miscalibration, better-than-average effect, the illusion of control, and unrealistic optimism. The consequences of miscalibration and overconfidence have grave consequences in the real world because these estimates guide actions that have significant and consequential results. Fischhoff, Slovic, and Lichtenstein (1977), among others, identified an essential concept in overconfidence research, the “hard-easy effect”. In similar trend, most recent studies on calibration studies (e.g., Attali et al., 2020) are general overconfidence and the hard–easy effect. Overconfidence tends to emerge most frequently during difficult or very

difficult tasks, whereas underconfidence occurs at easy tasks (where correct answers exceed expressed probability judgment). Therefore, understanding the manifestation effects of AML distribution judgments and how money laundering risk are mis-calibrated becomes crucial. Although, it is desirable that AML experts can defy the biasing influence from overconfidence, and they should be more suitable at doing so than novices in an AML context. However, no prior study in this domain has systematically examined whether this is actually the case. Experimental manipulations that affect accuracy provide insight into the underlying mechanisms. In the literature, a number of statistics have been proposed for examining probability judgment accuracy, and the background of this area is discussed next.

1.5 Key theories for estimating probability judgment accuracy

Various statistics for examining probability judgment accuracy have been proposed in the literature. Bayesian Networks (BNs), for example, express causal relationships between events using graphical inference and can be used both for predicting the probability of unknown variables or updating the probability of known variables based on evidence (Kabir & Papadopoulos, 2019). It follows a mathematical models of reasoning based on Bayesian inferences, a process for drawing conclusions given observed data in a way that follows probability theory (Costello & Watts, 2014). In a comprehensive review, Musharraf et al. (2013) evaluated the use of BNs to assess human error probabilities during offshore emergencies. They demonstrate that the BNs approach adequately assesses human error likelihood based on their comparative study. Similarly, the application of BNs in system safety, reliability, and risk assessment, was recently presented by Kabir and Papadopoulos (2019). Though BNs have gained popularity in risk assessment applications due to the model's flexible structure, there have been criticisms of Bayesian models' estimation of likelihood functions and priors (Endress, 2013; Marcus & Davis, 2013). The Bayesian theory permits too many arbitrary alterations to likelihoods and priors. Bowers and Davis (2012) explain that this flexibility of the Bayesian theorem-based model could allow the usage of the model for explaining almost any behaviour as optimal.

The Mean Probability Scores (MPS) is another frequently used approach for studying likelihood judgment (Yates & Curley, 1985). The MPS is linked to Brier (1950) and is often referred to as the 'Brier Score'. It measures the difference between the assigned probabilities and whether or not the events transpired. The MPS statistic is a wide gauge of

overall accuracy that can be broken down to reveal important underlying aspects of performance, such as calibration and resolution (e.g., Murphy, 1973a; Murphy, 1973b; Yates, 1982). Sanders (1963) analysis on the subjective process of probability forecasting suggested that the Probability Scores (PS) may be expressed as a sum of components which classify the different underlying aspect of the judgment validity, and nearness to certainty or deviation. The Sanders decomposition of the PS can be applied only to forecast restricted to a limited set of categories (Yates, 1982). Murphy (1972a, 1972b) further expanded Sanders' decomposition of the PS to explain aspects of the forecaster judgment influenced by external factors beyond the control of the forecaster and factors controlled by the forecaster. However, Yates (1982) work on external correspondence first reviewed both the Sanders and Murphy decomposition before presenting a covariance decomposition of the PS that can be useful for either continuous or discrete forecasts, whereas the others employ only discrete likelihood.

The present study will adopt an approach that was based on Yates (1982), as outlined by Wilkie-Thomson (1998) in the context of currency forecasting. This approach and the relating statistics will be described in detail in the thesis. However, in the meantime, research that has utilised probability judgment accuracy approaches to examine the quality of professional judgment is reviewed next.

1.5.1 The Effects of Expertise in Probability Judgment Accuracy

Findings from existing literature show inconsistent conclusions across different professional domains (Wilkie-Thomson, 1998). In some fields, experienced professionals are found to be more accurate in their probability estimates than novices. For example, in the domain of clinical science, Benjamin, Mandel, and Kimmelman (2017) examined the extent to which experts could predict more accurately than novice researchers the likelihood of replication of significance levels and effect sizes from original cancer studies. However, despite their overall better performance, the study also noted that experts with specialised knowledge exhibited significant overconfidence in their area of expertise. Similarly, in other settings such as forensic science (e.g., Martire, Growns, & Navarro, 2018), experts have been found to produce accurate and well calibrated judgments. In addition, the work of Trueblood, Holmes, Seegmiller, Douds, Compton, Szentirmai, Woodruff, Huang, Stratton and Eichbaum (2018) on cancer image identification found experts' probability values were associated with

a higher degree of discriminability than that of novices. While Larson and Billeter (2017) demonstrated in their study on expert judgment accuracy in rating 20 vocalist's performance in a competition, that experts gave more critical ratings for low performance than novices. However, the results of Murray et al.'s (2011) study, which examined how internal and external manipulations of crime causality affected clinical judgment across three levels of expertise, showed that both experts and laypeople displayed similar patterns of judgment when determining the dangerousness and responsibility of offenders.

Conversely, other studies have demonstrated 'inverted-expertise' effects whereby experts have performed worse than novices. For instance, Parr, Heatherbell, and White (2002) examined the correlation between confidence and accuracy for experts and novices in a wine odorants identification experiment and discovered a stronger association between confidence and accuracy for novices (r= .60) than for experts (r= .24). Other studies in financial contexts have illustrated inverted expertise effects (Muradoğlu & Önkal, 1994; Yates, McDaniel, & Brown, 1991). For example, in a stock price forecasting study, Yates et al. (1991) found that the predictions of novices were better than those with professional experience. These authors accounted for these effects in relation to the dangers of experts' more established cognitive interpretations of the task. They indicate that more experience within a domain can lead to a greater number of beliefs being formed about the kinds of data that are predictive of important occurrences. False opinions are straightforwardly amended in areas where rapid and trustworthy feedback is forthcoming. But in areas of high uncertainty and less reliable feedback (such as in financial forecasting) greater experience can result in a greater dependence on weak cues.

1.5.2 The Effects of Gender in Probability Judgment Accuracy

Another important consideration in the risk assessment domain is the inconsistent risk calibrators across gender. According to studies in cognitive psychology and marketing, gender may play a role in influencing judgment performance at an individual level, with gender's impact changing as task complexity increases (Chung & Monroe, 2001; Tusaie-Mumford, 2001). The financial industry still faces gender imbalance in the workplace, including in roles associated with anti-money laundering risk assessment, which are predominantly male. For example, a recent report on the number of full-time financial and insurance employees in the United Kingdom showed that as of 2021, there were 516

thousand male full-time workers compared to 344 thousand female full-time workers (Statista, 2022). Understanding how gender plays a role in the calibration and confidence literature is therefore important. Similarly, experimental literature suggests females tend to be less overconfident in high-stakes decision-making environments than males (Lackner & Sonnabend, 2020). It is, however, difficult to support this claim in the context of money laundering risk assessment due to relatively few studies on the individual-based role (Isa et al., 2015). Currently, suspicious activity reports derived from AML risk assessments, most from financial institutions are of poor quality (Pol, 2020), evidenced by the high number of false positive reports reported in most AML systems (Demetis & Angell, 2007). Hence the motivation to investigate whether gender might be a factor in how well AML risk judgments are made in the financial industry- a sector where gender inequality persists among the workforces. Particularly in roles involving AML risk management, which are overwhelmingly male dominated (Statista, 2022). Identifying opportunities for interventions that can improve the quality of AML risk assessment reports from financial institutions may depend on understanding whether gender differences influence cognitive style in money laundering risk judgment.

Most studies suggest that females are least confident in male-typed endeavours such as mathematics (Mura, 1987), technical problems (Rustemeyer, 1982). According to Beyer and Bowden (1997), females underestimated their overall performance and displayed poorer calibration on perceived male dominated tasks. In their study, they found that females had greater psychological tolerance for underestimation of errors i.e., low confidence when one is right, than males. Different levels of confidence may also explain observed differences in risky behaviour across gender (Estes & Hosseini, 1988). For instance, Lackner and Sonnabend's (2020) study on gender differences in overconfidence and decision-making in a high-stakes environment concludes that women, on average, are less likely to show overconfidence than their male counterparts. Fisk (2018) study analysed scores from engineering exams grading for gender effects and concludes that females are less likely to achieve the top outcomes because they are less risk averse than males. A study conducted by Barber and Odean (2001), examined the stock investments of males and females separately. Their result found that males traded 45% more than females, resulting in lower earnings for males. They conclude that males are probably more overconfident than female.

Estes and Hosseini (1988) also looked at how certain personal characteristics affects investor confidence. The subjects used in their experiment were asked to examine hypothetical company's financial statements and then decide how much money to invest. After assessing the correctness of this investment decision, the subjects were asked to determine their degree of confidence in it. The study concludes that female's confidence in making investment decisions was substantially lower than that of men. In an experimental study conducted by Eckel and Grosmann (2001), females tend to be more risk-averse than males. A similar experimental study by Jianakoplos and Bernasek (1996) also demonstrated that females possess a portfolio with a lower degree of risk than their male counterparts. Hence, there is common assertion that has emerged from existing literature that suggests that females are likely to less confidence than their male counterparts. Nevertheless, overconfidence effects may take precedence in AML risk assessment if male perceive themselves to be knowledgeable in cases of actual instance of money laundering.

In conclusion, different contextual settings such as level of expertise and gender difference can influence the accuracy of probability judgment and the above discussion has guided the formulation of the following research objectives itemised in the next section.

1.6 Research Aim and Objectives

Despite official guidelines, reports of suspicious financial transactions are often made even when there are no reasonable grounds to suspect that a financial transaction involves proceeds from crimes (Amicelle and Iafolla, 2017). Data collection for the purpose of making a decision needs to be conducted with a level of due diligence, which allows experts in this field to make reasonably certainty that they have taken reasonable care and taken reasonable ethical steps (Maurer, 2005). Due diligence is casuistic in that it eschews definitive conclusions but is provisional, probabilistic, and the outcomes are never really known in advance. A well-known problem in the literature is distinguishing between suspicious and non-suspicious behaviours (Bello & Harvey, 2017). False-positives and false-negatives are both controlled to enhance quality control of suspicion transaction reporting; however, the pressure is most critical for missing false-negative reports (Amicelle and Iafolla, 2018). This could lead to reputational risk, personal cost, and related financial cost (for example in some jurisdiction financial cost may be up to $2 million plus five years' imprisonment). With banks becoming more concerned with AML risk assessments, there is

increasing debate about the effectiveness of the risk-based approach, which gives businesses discretion over what constitutes suspicious transactions. Money laundering detection, for example, is significantly dependent on human judgment, as there are no physical indicators to detect money laundering risk (Sinha, 2014). The quality of AML risk assessment is poor (Pol, 2020), and this has a considerable implication in practice since law enforcement rely to some extent on the result of the risk assessment for intelligence and investigation activities. Human errors seem inevitable in the risk assessment process due to the considerable involvement of humans in monitoring, managing, and making decisions (van Duyne, Harvey, & Gelemerova, 2018). Despite these concerns, there have been relatively few studies on the effectiveness of individual-based roles in assessing money laundering (Isa et al., 2015). Some recent literature on money laundering points to a need for more research to link cognitive factors to the accuracy of AML risk assessments in financial institutions (Jamal et al., 2022). Even though scholars in this field have noted and studied various risk assessment approaches, the studies are found to lack strong theoretical foundations for linking expert cognitive factors to the quality of AML risk assessment in financial institutions (Jamil et al., 2022). This thesis responds to this call by pursuing the following research objectives.

- To examine the quality of AML risk assessment
- To provide an understanding of how likelihood judgments are formed within the context of AML risk assessment
- To develop a quantitative methodology for assessing the quality of AML risk assessment

As stated above, the main aim of this study is to provide an exploratory investigation of the effectiveness of professional AML risk assessments. A method was developed to examine the quality of AML experts risk judgment in terms of performance on two underlying accuracy components, calibration, and resolution. This method has been analysed using vignettes developed from actual cases of money laundering incidences. In this way, probability judgments have facilitated the study of money laundering risk likelihood judgment. With proper use of this method, it opens up the opportunities for discovering a wider variety of those variables that may enable researchers comprehend when and how AML experts make correct decisions related to money laundering risk.

The rest of this thesis is outlined as follows. Chapter 2 reviews the existing literature of specific cases of money laundering behaviour. In doing this, the most common and potentially serious types of money laundering behaviours are identified which, in turn, provide data to assist in the formulation of vignettes and their subsequent use as experimental materials (described in detail in the methodology section). Chapter 3 describes the risk assessment framework for the commercial banking sector. Chapter 4 outlines the thesis specific research questions address in this study, general methodology used in the thesis, and describes the construction of the experimental vignettes' instruments. Chapter 5 presents the first study on factors influencing AML risk assessment. Chapter 6 presents an experimental study that examines the quality of AML risk assessment. Chapter 7 concludes the thesis by discussing the findings in relation to the original research questions, by considering the implications of the findings for research and practice, by considering potential limitations of the thesis and by providing suggestions for future research.

CHAPTER *2 MONEY LAUNDERING AS A FINANCIAL CRIME*

2.1 Background

Chapter 2 describes the background and context of money laundering crimes and highlights some key potential factors that drives the continuous expansion of money laundering operations identified in the literature. Chapter 2 also discusses how various money laundering schemes resulted in anti-money laundering regulations that the banking industry has subsequently implemented in carrying out AML risk assessment. In this study, money laundering is viewed as a criminal offence that is based on a prior crime, and as a process designed to distort the link between wealth obtained from illicit acts by using various techniques that vary in complexity. In chapter 2, examples are presented that illustrate how banks are exploited by criminal organizations using potentially serious money laundering techniques that are outlined in appendix 1. Continuing the literature review on anti-money laundering regulations in the next Chapter of this thesis, Chapter 3 describes the risk assessment framework for the commercial banking sector.

2.2 Money laundering crime

It is not uncommon for criminals to commit crimes for the purpose of making money. A money laundering scheme is an action aimed at concealing ill-gotten gains that are intended for use and making them appear to originate from legitimate sources (Baldwin, 2003; Levi & Soudijn, 2020). In fact, money laundering, anonymity and predicate offences are often closely connected. According to Schroeder (2001), the three main reasons why criminals engage in money laundering are as follows. First, money is used by criminals to sustain payments for reoccurring operational cost necessary for the survival of their criminal enterprise and extravagant lifestyles. Therefore, since money is the lifeblood for their sustainability, there is a need to make the proceeds acquired from their illicit activities appear to be from legitimate sources while spending it. Second, criminals disguise the source of their wealth to avoid any linkage with the illicit activities generating the proceeds because the trail can represent incriminating evidence of participation in the illicit act when detected by law enforcement agencies. Third, criminals must conceal the existence or shield ownership of acquired assets obtained through proceeds of illicit activities to avoid their forfeiture, which is of significant focus aimed at by State prosecutors during crime prosecution.

But why money laundering crimes continue to thrive globally is an important question that comes to mind. Findings from existing literature show inconsistent conclusions across various authors. For instance, Darbar's (2019) research on the topic of money laundering in India discovered that there had been no concerted international efforts to stop the crime, which is a barrier to the current success of fighting money laundering. Conversely, a similar study by Alkaabi, Mohay, McCullagh, and Chantler (2010) suggested that international collaboration on the fight against money laundering has yielded considerable success within the last decade. The study noted that, despite this success, more efforts need to be directed at cultural and historical differences among different countries when constructing strategies to combat money laundering because these factors have significant influence on nation's AML regulatory framework and the character of their financial system. According to Van Wegberg, Oerlemans, and van Deventer (2018), in their study on the ways cybercrime proceeds can be laundered, there are vulnerabilities in the international financial system, and these vulnerabilities are being exploited for the purpose of laundering proceeds acquired from illicit activities. In fact, FATF (2018) has expressed concern that it has become increasingly difficult for countries to enforce their national laws in a borderless commercial environment due to the globalization of trade and communications. Globalization has integrated international financial systems and technology in a manner that made it easier for individuals and corporate entities to communicate more quickly, deeply, and effectively across the globe, thus giving criminals more opportunities to siphon enormous crime proceeds from around the world (Schroeder, 2001). Schroeder (2001) also faulted globalization as a major vehicle for the growth of money laundering crimes because globalization offers opportunities for free-market capitalism expansion that exposes international financial systems for criminals to access freely. The main factors contributing to the vulnerability of a financial institution in Yeoh's (2019) study on insights into why money laundering persists in banks are competitive pressures, shareholder returns imperatives, and lucrative misaligned incentive structures for management. But Mugarura and Ssali (2020) suggest the weakness of global regulatory response to money laundering has contributed significantly to the growth of the money laundering crime.

In contrast, criminals carrying out money laundering may believe that they can disguise the source of their illicitly acquired proceeds without revealing the illicit act (Johari, Zul, Talib, &

Hussin, 2020) by exploiting weaknesses in the financial system (Van Wegberg et al., 2018). The findings of most authors on money laundering show that the ultimate goal for the act of committing money laundering crime is to ensure criminally acquired proceeds in form of cash or other assets derived from illicit activities are in the final form that makes it accessible for reuse without raising public suspicious on the fund's source of origin (Roberge, 2007). To many, the several services offered by financial institutions make it a preferred choice for laundering proceeds gotten from illicit activities (Isa, Sanusi, Haniff, & Barnes, 2015; Mabunda, 2018). Statistical pieces of evidence and reoccurring cases of successful money laundering crimes published by various countries' law enforcement agencies annually, to a large extent, support the assumption that financial systems are indeed the gateway through which most criminals transform their illicitly acquired proceeds into the legitimate economy. For example, a recent study carried out by Korystin, Mihus, Svyrydiuk, Likhovitskyy, and Mitina (2020) found the global estimates of the extent of money laundering related activities to within the ranges of 2-5% of the global GDP (gross domestic product). While Alkaabi et al. (2010) found some important variation from Korystin et al. (2020) estimates for the extensiveness of money laundering in Australia to be 12% of their GDP and that of the United Arab Emirates (UAE) to be approximately US$ 1 billion or 1.32% of their GDP, pointing out cultural and religious differences as contributing root causes for variations in success noted against the fight of money laundering crimes across countries. Section 2.2 of this chapter outlines some cases of successful instances of money laundering crimes consummated through financial systems, and banks in particular.

According to the nature of money laundering, it is a criminal offense that stems from another prior crime (Favarel-Garrigues, 2005). Money laundering activities offer the promise of a process with means to distort the linkage between wealth obtained from indulging in illicit act. This promise has enormous appeal to potential criminals, especially in circumstances to conceal the source of the wealth, which may serve as evidence of participation in an illegal activity liable for persecution by State authorities and further seizure of the acquired proceeds (Dobrowolski & Sułkowski, 2020). Ironically, money laundering is a criminal phenomenon with evolving methods (Van Wegberg et al., 2018). It can be facilitated through a human medium such as money mules (persons who help third parties transfer funds using their own personal identities for commission (see Raza, Zhan, &

Rubab, 2020) or information technology enabled channels like virtual currencies (Anichebe, 2020). Criminals exploit these mediums to smuggle bulk cash, run cash-intensive businesses, structure financial transactions, use trade-based laundering, operate shell companies, and launder various forms of digital currency (Darbar, 2019), which often offer varying levels of anonymity during the wealth concealment process (Kruisbergen, Leukfeldt, Kleemans, & Roks, 2019). The most identifiable feature of the various criminals' payment preference behaviour is their preference for cash payment, despite the rapidly changing face of criminality and the rise of cybercrime (Kruisbergen et al., 2019). According to Dalinghaus (2017), their preference for cash is partly due to cash being a public good that promises ease of use, convenience, and privacy and is associated with interminably enduring behaviours and social practices. While Angel and McCabe (2015) suggested that cash payments are directly between buyer and seller, resulting in no third-party involvement in the payment settlement process, unlike other forms of payment, such as checks or debit cards, which require third parties, and requires varying levels of trust.

Findings from existing literature show an inconsistent pattern of what criminals do with the proceeds of crimes. In this regard, Levi and Soudijn (2020) suggested that the nature of crime committed, the amount of proceeds derived, the criminal's personal own goals, as well as the existing AML laws in the country of the predicate crimes are determinants of the ultimate destination of proceeds of crimes and the method of laundering. This implies that the process of money laundering can vary from being simple to sophisticated. Consequently, any approach that help facilitate significant amount of proceeds in an effective and quick way without detection thus becomes a vulnerability in any financial systems. Thus, the concept of risk-based assessment of AML risk became an important foundational principle to respond to money laundering risk. In the context of the FATF (2013) money laundering risk assessment guideline, a money laundering vulnerability is what enables or facilitate occasion for money laundering crime. This is because money launderers always strive to identify and exploit vulnerabilities. Combating laundering crimes involves a judgment call that considers the impact of mitigating actions like regulation, supervision, and enforcement to a perceive threat and vulnerability. However, the vulnerabilities may result from an exposure created by any particular financial product or industry, supervision inefficiency, poor enforcement structures, or regulatory loopholes missed by AML legislations (US-

Treasury, 2018). Taken together, these findings indicate that money laundering techniques evolves in response to perceived available opportunities and changes in financial services, enforcement structure and operating regulatory framework.

In this chapter, a review of existing literature on specific cases of money laundering behaviour is carried out. Therefore, the remaining sections are presented in the following order. Section 2.3 describes the money laundering cycles, types of money laundering techniques and case examples. Section 2.4 provides an overview of AML Scheme in detection of money laundering activities. Finally, Section 2.5 provides the conclusion of the chapter.

2.3 Money laundering cycle and techniques

The analysis above has demonstrated that money laundering does not occur in isolation. The idea that criminals use a three-phase transition (placement, layer, and integration) model to make their acquired illicit income appear to come from legitimate sources has been extensively discussed in the literature (e.g., Akyay, 2001; Aljawder, 2018; Liu, Zhang & Zeng, 2008; Singh & Best, 2019). Singh and Best (2019) distinguished the three phases as follow: Placement refers to the processes by which proceeds acquired from illicit activities enters the financial system as either through cash deposits or through the use of cash for the procurement of financial assets Including various forms of prepaid cards and money orders, with the hope of a possible lodgement into a future predetermined account and location. Layering, on the other hand, is the process in which the criminally generated funds already successfully transmitted into the financial system are transformed through arrays of financial transactions (such as transfer of the funds to various accounts in different location across the globe) to break the trail between the final state of the funds and the initial entry point of the funds into the financial organisations. Last but not least, integration is the procedure by which the successfully layered funds are reintroduced into the legal economy through an investment of choice or a direct purchase of luxury goods.

Not much attention has been paid to the preliminary stage that precedes the placement stage in most existing literature because most cases of money laundering crimes fit into this three-stage model (Soudijn, 2016). Hence the preceding stage to placement does not have significant relevance to the objective of this thesis. In the remainder of this section, no

recourse will be drawn outside the three-stage model and money-laundering crimes will be taken to imply activities within any of the cycle of the placement, layering, and integration stages.

Bergström, Svedberg Helgesson, and Mörth (2011) have shown that the existing strategic alliance between the banking sector and public stakeholder involved in the combating of money laundering and other financial crimes may appear straight forward in theory but distinguishing funds from legitimate sources and those from the illicit origin is ambiguous in reality. Darbar (2019) suggests criminal inconsistent behaviours in choice of money laundering approaches as one of the possible factors that contribute to this ambiguity. Additionally, research by Irwin, Choo, and Liu (2012) on launderers' methods shows that criminals have preferences for the placement, layering, and integration techniques they use and that this is based on the specific circumstances of each individual case. For instance, some money launders may prefer to use the proceeds of crime to purchase expensive items, while others may prefer to launder the money through a farming operation, a nonprofit organization, or an online store. Similar to how cultural norms can vary by nation, so can behaviourally patterns on how to launder money may differ across the globe (De Koker, 2009). Irwin et al. (2012) found criminals tend to use more than one type of technique simultaneously during the process of money laundering because of the conviction that the more techniques they employ, the more cash they are likely to successfully launder or conceal within the quickest time.

A common contention that has become apparent from existing literature in the domain of money laundering risk related topics is the notion that criminally generated proceeds go through financial systems unnoticed. For example, the work of Schneider (2004a) concludes that banks and other financial related institutions have a strategic important role in the overall success of any money laundering techniques employed by criminals. They noted that financial institutions represent the major portal for the transition of criminally generated proceeds from the underground economy to a legitimate economy. Sterling (2015) suggests that the process of evolution for the financial sector in response to competitive market pressure and anticipated customer new demands has also continued to fuel the growth for money laundering crimes. In addition, Isa et al. (2015) demonstrates in their study on how banking institutions assess money laundering risk, that money laundering is a real

challenging risk that banking institutions are facing. The following analysis of real-world cases involving banks' participation in various money laundering schemes and existing literature on the main categories of money laundering risks can help to further develop these findings.

2.3.1 Bulk Cash Smuggling

Bulk cash smuggling is the act of physically moving large sums of cash from one location to another in an effort to hide the proceeds and avoid being discovered by law enforcement officials (FATF, 2015). A vital question is whether bulk cash smuggling and money laundering usually occur together? Criminals have an abiding desire to avert establishing any form of evidential trail that provides a path for law enforcement agent tracking (Cassella, 2004). In addition, existing findings on criminal behaviour suggest that cash is still being accepted as the most predominant form of payment for criminal related activities such as illegal drugs sales, bribery and corruption and other forms of illicit activities or services on the street (Sterling, 2015). Singh and Bhattacharya's (2017) study on currency in circulation using annual panel data of 54 countries found that the proportions of cash in circulation, both cumulative and volume of large denomination bank currencies are statistically significant determining factor of corruption. This assertion is possibly explained from Sterling's (2015) view, that criminals believe that cash payments signify a high level of certainty of the final settlement. However, the continuous receipts of cash payments outside the legitimate financial system led to gradual stashing of huge cash payments outside the walls of the financial system and are vulnerable to theft (Angel & McCabe, 2015). Also, it has been noted that the desire to place the acquired illicit funds into different sectors of the mainstream economy is crucial to the continuous survival (for instance, the repatriation of drug money by distributors' to sellers' destination) of the criminal groups that generate the proceeds, and therefore the need for a process with the least evidential trail is usually sought after (Farah, 2010). The choice of direct lodgement of these funds into an account should be a first option but Foley (2007) has demonstrated that the success of law enforcement organizations in enforcing domestic financial institutions' reporting of currency transactions has caused some criminals to shift their attention away from using banks for their transactions and toward further consideration of other alternatives, such as bulk cash smuggling for the movement of their cash proceeds.

Criminals who smuggle large amounts of cash as a technique for money laundering typically take advantage of the higher bills of each currency (Soudijn & Reuter, 2016) because proceeds converted to higher currencies notes are less bulky during transportation, when compared to similar value in lower denomination notes. For example, the Portuguese government's initial refusal to introduce 500-euro bill to their economy was due to the primary concern that it will facilitate the movement of crime proceeds (Buchanan, 2004). The target of most criminals who employ the use of bulk cash smuggling techniques is to get their fund to a jurisdiction with poor financial system regulations, where it will be easy to place these criminally generated proceeds into the legitimate economy. For instance, after the money has been physically moved out of the country, it can be deposited into a foreign bank that might not be subject to any currency reporting requirements. If the money is successfully deposited into the foreign account, it may then be possible to transfer the money back to the originating jurisdiction in the form of a transfer from a foreign corporation or to invest it in property abroad (Cassella, 2004).

Some investigators (e.g., Cassella, 2004; Kobor, 2007; Riccardi & Levi, 2018) have shown that bulk cash smuggling is a preferred method by criminals for the transfer of illicitly acquired cash proceeds across countries' borders because it does not create any track for law enforcement agents to trail. Another reason why criminals use the bulk cash smuggling techniques for money laundering across borders is because when proceeds derived from an unlawful act in a country leaves that country of crime origin, it becomes more problematic to trace the funds due to the non-availability of a substantive audit trail in the form of transaction records. Furthermore, when the cash arrives at the criminal desired location, it provides the criminal opportunities with options to invest the illicitly acquired proceeds directly in any cash-intensive businesses such as bars, restaurants, retail shops or the direct purchase of cash-intensive assets such as cars which can then be traded in the legal commodity market (Riccardi & Levi, 2018). See Appendix 1, for some identified bulk cash smuggling related cases. The next section examines structuring techniques used by criminals to avoid reporting requirements (Schneider, 2004a).

2.3.2 Structuring

Rules such as the standard reporting threshold of $10,000 and the recordkeeping requirement in the Bank Secrecy Act (BSA) were developed, among other reasons, to ensure

huge financial transactions consummated through domestic financial institutions are reported to the law enforcement agency for further review to aid detection of criminals involved in illicit activities (Meltzer, 1991). However, criminals determined to avoid the paper trail that the BSA requirement creates will be tempted to manipulate their transactions to fall below the set statutory reporting threshold, through a process called structuring (Linn, 2010). Schneider (2020) noted that transaction structuring is one of the techniques that can be employed by criminals during the movement of criminally acquired proceeds through the financial system to avoid raising suspicious of their financial transactions.

Structuring refers to the intentional act of splitting an initial large amount to multiple smaller transaction amounts below financial institutions reporting threshold of US$10,000 and recordkeeping requirement (Schneider, 2020). The Bank Secrecy Act is the statute that governs structuring (Discussed in section 2.3). While this technique may successfully evade the currency transaction report (CTR), but it does occasionally lead to a suspicious activity report-SAR filing by the financial institution if detected. However, to avoid any form of suspicious behaviour during the adoption of the structuring techniques in the money laundering crime, criminals employ the services of multiple entities to carry out various independent lodgements to split large amount to fall below the reporting limits. Structuring technique is most often employed during the placement stage to launder illicit acquired proceeds into the financial system (Dobrowolski & Sułkowski, 2020). See Appendix 1, for some identified structuring related cases. The next section examines cryptocurrencies, another tool used for money laundering (Dupuis & Gleason, 2020).

2.3.3 Virtual/Crypto assets

The term "crypto-asset" refers to a wide variety of assets today. Crypto assets exist in many forms, but no widely accepted definition exists (Houben & Snyers, 2020). For the purposes of monitoring and supervision, regulatory authorities and standard-setting bodies have adopted a number of definitions crypto-assets. A digital representation of money or legal rights that can be electronically transferred, stored, or traded is referred to as a "crypto-asset" (JMLSG, 2020a). The crypto asset is also regarded as a right or interest for the purposes of defining a provider of a crypto-asset exchange. In the same way that fiat currencies serve as a medium of exchange, units of account, and stores of value, crypto

assets are digital representations of value like Bitcoin, Ether, and Ripple (Sykes & Vanatko, 2019). Though a virtual currency can be used to purchase real-world goods and services, it has no legal tender status in some countries. There are currently various types of virtual currencies, and the majority of accepted virtual currencies are created with cryptographic algorithms and use the blockchain technology to file all executed transaction records in decentralised, anonymous and irreversible forms (Mabunda, 2018). Surprisingly, the rapid growth of virtual currency as an alternative means of payment to the existing fiat currencies has opened new horizons for investment opportunities both for legitimate usage and by cybercriminals for money laundering purposes (Levi & Soudijn, 2020; US-Treasury, 2018). Transaction anonymity is an important feature enabled by most payment gateways such as darknet market that accepts cryptocurrency as a means of payment for promoted illegal goods and services traded in their platforms (Kruisbergen et al., 2019). These illegal e-commerce platforms allow users to operate perceived or actual anonymity during transactions and offer an escrow service that relies on technology that conceals their location and identity from law enforcement agents tracking (US-Treasury, 2018). Some countries do not recognize virtual currencies as legal tender, despite the fact that they can be used to purchase real-world goods and services. Due to this, privacy-enhancing cryptocurrencies like Monero and Zcash were developed. These currencies are made specifically to limit the trailing analysis that is possible with digital currencies like Bitcoin (Fauzi, Meiklejohn, Mercer, & Orlandi, 2019).

According to the U.S Immigration and Customs enforcement (ICE) forecast, the use of virtual currencies for money laundering and other illicit acts will continue to grow as a result of continuous innovation targeted to improve virtual currencies anonymity during transactions (US-Treasury, 2018). For example, the outcome of most recent investigatory activities on cases of money laundering crimes has shown that virtual currencies such as Bitcoin are increasingly being used in the proliferation of online money laundering because it possesses features that attract the usage by criminals (Anichebe, 2020; Mabunda, 2018). Typically, criminals exploit the use of virtual currencies to amount wealth gained from illicit activities such as Ponzi scheme, online drug sales and corruption because of the promotion of such illegal trades in the dark web in exchange for virtual currencies (Vo, 2020). But what

are these features in cryptocurrencies that makes it suitable for the act of money laundering?

Cryptocurrencies operate on the blockchain technology which is a decentralized financial system that is free from the regulatory intervention (Griffin & Shams, 2019) with an appealing feature that allows the transfer of value in more rapid and cheaply manner even across borders than through the banking systems with greater anonymity and reduced oversight (Brito, 2013). The work of Teichmann and Falker (2020) found cryptocurrencies lacked the identification obligations and regulatory supervision found in the regulations that govern fiat currencies operations in the legitimate economy and as such makes cryptocurrencies an instrument extremely suitable for money laundering activities. In their study, they demonstrated how illicit funds can be laundered using virtual currencies and concluded that virtual currencies are suitable instruments to commit the act of money laundering, particularly during the placement and layering phases. Similarly, the work of Mabunda (2018) on the examination of cryptocurrencies found that criminals make use of virtual currencies to skirt existing AML regulatory structure during the act of money laundering. Also, Lorenz, Silva, Aparício, Ascensão, and Bizarro (2020) found that proceeds from illicit activities cannot be easily detected in the Bitcoin network because criminally generated transactions hide within clusters of legitimate transactions. Though virtual currencies pose a serious threat as an instrument for money laundering related offences (Haffke, Fromberger, & Zimmermann, 2019), the transaction ease, IT-enabled anonymity, universally acceptability and decentralization capabilities associated with the user makes virtual currencies a financial innovation appealing for criminals during the act of money laundering. See Appendix 1, for some identified virtual currencies related cases. The next section details a review at some additional strategies that were employed to give the impression that illegal funds came from legal sources (e. g., incorporating businesses, and then declaring the proceeds of crime as legitimate income) (Schneider, 2004a).

2.3.4 Misuse of legal entities (Shell companies)

Shell company commonly known as an anonymous company or entity that exists without a physical presence or asset and often used for a wide range of illicit activities such as tax evasion, corruption, bribery, and money laundering (Tiwari, Gepp, & Kumar, 2020). According to Pacini, Hopwood, Young, and Crain (2019), a shell company is a limited liability

company or business entity that can exist as a privately owned entity or publicly owned, and with no significant physical asset or business activities. In some jurisdiction, the incorporation processes for shell companies' formation are deliberately cheap to establish and very quickly online as part of reforms targeted for growing the number of small businesses present in the jurisdiction (Findley, Nielson, & Sharman, 2014). However, the international rule requires those saddled with the responsibilities for company formation to confirm the identity of the beneficial owner of the business during company incorporation because a company is a legal entity that represents a group of people either natural persons, entities created by State or a mixture of both, with a specific purpose. Implementation of these responsibilities varies across different jurisdiction and circumstances, and therefore a factor with so many uncertainties. For example, Findley, Nielson, and Sharman (2013) work on the effectiveness of the international standard across 182 countries found a significant level of non-compliance with the standard requiring providers obtained certified proof of identity credentials from beneficial owners when creating shell corporations. A similar study conducted by Allred, Findley, Nielson, and Sharman (2017) across 176 counties found a substantial number of firms within the OECD countries were more willing to flout international standard than their counterpart in developing counties or tax havens (These are jurisdictions with the low tax rate for business, flexible supervisory regimes, and strong bank secrecy law).

The misuse of shell companies for illicit acts such as money laundering is a growing phenomenon that has continuously attracted academic attention in the field of money laundering over the last two decades. Although the formation of a shell company is lawful and, can be used for legitimated purposes such as mergers and acquisitions (Aydogdu, Shekhar, & Torbey, 2007), but most recent literature on shell companies has focused on the use for illicit activities. For example, the recent Panama Paper leak exposed how public figures used registered offshores shell companies to conceal the true identities of their wealth from the public through a complex layering of ownership structures (Jancsics, 2017). Similarly, the work of Pacini et al. (2019) on the use of shell company to facilitate crime found criminals use shell entities layered in an array of complex networks to conceal their identity from wealth originating from proceeds of illicit activities. Their work identified three principles that motivate criminals to adopt the use of shell companies to conceal their

wealth during the process of money laundering: First, most jurisdictions do not have an adequate legal structure that encourages record-keeping for beneficial owners of incorporated shell companies, and as such increases the challenges for identifying the natural persons behind most shell company's control and benefits. Second, the availability of complicit professionals like accountants, lawyers, and other professionals with specialist skills on existing AML structure, for recruitment by criminals to help provide the required expertise needed to conceal criminal's identity using arrays of shell companies. Third, criminal has the flexibility to set up arrays of shell companies incorporated from different jurisdictions governed by different laws, to increase the difficulties faced by law enforcement agencies during assets beneficial owner tracking. Surprisingly, some developed countries law enforcement agencies have publicly acknowledged the challenges encountered during the investigation of crime proceeds involving the use of shell companies. For example, the U.S Immigration and Customs Enforcement (ICE) agency noted in the US national risk assessment report for 2018, that criminal consistently makes use of arrays of shell companies to conceal their criminally generated assets and that there is currently no systematic ways for unveiling information relating to the beneficial owners of corporate entities (US-Treasury, 2018). They further noted that this complication resulted from the ease at which shell company are established with little information about the entity's owners and activities provided during shell company incorporation process.

Lacey and George (2002) analysed the effectiveness of domestic and multilateral policy reform and found that criminals are more likely to use shell companies registered in the offshore jurisdiction during the layering stage. For example, a criminal can use series of fund transfer transactions aimed to conceal the source of illicit funds by transferring these funds to different offshore bank accounts opened in the name of their shell companies and hide beneath the layers of the bank secrecy laws of the offshore countries. To facilitate transactions under secrecy, offshore shell banks equally exist solely to facilitate fund transfer services for customers who requires the processing of their transactions under the bank secrecy provided by the offshore jurisdiction of operation. While Wilkes (2020) work concluded that criminal incorporate shell companies mainly to shield their identity and conceal the wealth created from their illicit activities. However, with reference to shell companies in tax havens, the recent attempt of having a minimum of 15% corporate tax on

global companies tackling profit shifting - was euphemistically called Transfer pricing - that is now signed by over 130 countries representing most of global economy. This will impact at least this source of money laundering. It also shows money laundering success is highly dependent on policymaking will and global policy integration. See Appendix 1, for some identified misuse of legal entities related cases. The involvement of complicit professionals in money laundering is examined in the following section.

2.3.5 Complicit Professionals

In recent years, the role of certain professionals in the Legal, real estate, financial services and accounting professions as potential accomplices in the act of money laundering crimes, have continued to attract focus by various jurisdictions law enforcement agencies and nongovernmental organizations such as FATF (Benson, 2016). For instance, the FBI in 2016 renewed its focus on investigations that target professionals, such as brokers, accountants, and lawyers, who may be able to help criminals move money. This was done as part of efforts to address the threat of proceeds of illicit origin passing through the international banking system and across borders (FBI, 2016). While HM-Treasury (2017) noted in the UK national risk assessment report for 2017, that professional services are a crucial gateway for criminals to disguise the origin of their fund. These professionals' services are often sought for by clients during the execution of some trade-related transactions involving properties, shell company's formation, bank accounts opening and other types of assets acquisition dealings. As a result of their professional engagement in these transaction types, they act as an intermediary between their clients and financial institutions. However, this position of trust is often misused by complicit professional to facilitate the act of money laundering on behalf of others, because they knowingly participants for personal benefits or they lack compliance with applicable AML procedures unwittingly exploited by criminals for the act of money laundering. According to FATF (2018), using specialists and professional intermediaries is a tactic used to hide beneficial ownership, especially when the proceeds of crime are sizable. Benson's (2016) research on the role of professionals in the facilitation of money laundering concluded that the actions, purposes, actors, and relationships involving professionals like lawyers and financial professionals during the act of money laundering are complex and varied. But how then can the involvement of professional executing

transactions on behalf of money laundering client be identified is an important question yet to be fully explained or understood (Middleton & Levi, 2015).

Cummings and Stepnowsky (2011) review of investigated money laundering cases demonstrated that the services of a legal practitioner were used to launder money in approximately fifteen per cent of cases examined and they made a further call for lawyers to maintain good practices during dealings with clients to avoid the risk of clients abusing their services for money laundering. Similar work focused on English and Wales solicitors by Middleton and Levi (2005) suggests that some legal practitioners occasionally provide professional assistance to organized criminal groups (OCG) to facilitate money laundering and this conclusion was made based on evidence from the reoccurring high number of solicitors being persecuted for the act of money laundering related crimes annually. While Soudijn (2014) demonstrated that criminals seek out professionals' accomplices only at the point to integrate the criminally acquired wealth into the legitimate economy because they act as a facilitator, that is an outsider whose expertise is contracted by the criminal to solve logistic bottlenecks. The vulnerability of professional services to criminal exploitation as willing conspirators or gullible facilitators has recently come under increased scrutiny (Newbury, 2017), there have been calls from the academic scholars and law enforcement agencies for a more stringent regulatory regime for some professional like lawyers and reals estate who act as middlemen to facilitate the hidden flow of money (Bromwich, 2018). See Appendix 1, for some identified complicit professional related cases. Finally, the next section examines trade-based money laundering techniques.

2.3.6 Trade-based money laundering

As increased regulatory activities targeted on banks and other financial institutions to ensure the safety of the financial system from being abused by criminals continue to yield success, the vulnerabilities in the international trade system have gradually become an alternative method for criminals to exploit for movement of proceeds from illicit activities. Trade-based money laundering, according to the FATF, is the process of hiding the proceeds of crime and relocating value through trade transactions to hide their illegal source (Soudijn, 2014a). Trade-based money laundering is the deliberate exploitation of legitimate trade transaction for the movement of illicit proceed. It is a method whereby criminals use potentially unlawful activities such as false invoicing, mischaracterizing legitimate trade-

related transactions to circumvent existing AML controls to move proceeds of crimes (FATF-EgmontGroup, 2020). Trade-based money laundering involves the movement of funds consummated by the initiated trade-related transactions targeted at circumventing existing AML controls. The crime of trade-based money laundering is unlike other forms of trade-related crimes that involve the movement of stolen goods of goods obtained from an illicit act. According to Hataley (2020), trade-based money laundering TBML is an almost undetectable technique that transnational organized criminal groups currently use to launder the proceeds of their criminal activity. Identifying legitimate transactions and their associated genuine documentation is a risk faced by commercial banks during AML risk assessment (JMLSG, 2020a). Particularly, the trade initiators are largely responsible for dictating the quantity and kind of documentation that a firm receives. Furthermore, with the diversity of documentation required in trade finance transactions, banks may not be experts in many types of trade documents received. Such risk is higher in circumstances where the initiators of those commercial transactions are in alliance to disguise the true nature of the transactions involved. Similarly, existing literature findings have identified activities of trade-based money laundering as a major cause of discrepancies during the measurement of international trade-related data. For example, Yeats (1990) assessed African trade figures and found significant differences in trade figures between African countries and their partners. Yeats work suggests the cause of this gap resulted from false invoicing of trade activities and smuggling related activities. Similarly, Berger and Nitsch (2008) demonstrated in their study on the case of international trade data using import figure of the five largest importers for the period of 2002-2006, that trade data significantly correlated with countries level of corrupt bureaucracies and volume of smuggling activities.

Most country law enforcement agencies have acknowledged that the risk associated with the use of trade-based activities for money laundering purpose is significant and not easily detectable. The United States Customs and Border Protection agency suggest that trade-based money laundering technique is a method currently being employed by criminals to launder illicit drug's sales proceeds (US-Treasury, 2018). JMLSG (2020a) suggests that launderers usually adopt the trade-based money laundering techniques during the layering and integration stages of money laundering. However, they further noted that there is little likelihood that the trade-based approach is use during the placement stage. Their work also

suggests that the enormous volume of transactions and complexities in financing arrangements associated with trade finance allows for the commingling of legitimate and illicit, which helps obscure individual transactions. Typical TBML methods includes activities relating to overbilling and underbilling of goods and services, multiple billing of goods and services, fictitious trades, the use of shell companies, and the investment of incriminated money in expensive goods (e. g. automobiles, jewellery, watches, gold, houses, and works of art. In these situations, working with the private sector and the ensuing reporting practices of the required parties are continually very crucial in helping to increase awareness of the TBML risk (FATF-EgmontGroup, 2020). These trustworthy supply chains are broken into by criminals, who use them as a conduit for smuggling illegal funds into the financial system. Instead of utilizing any of the standard TBML techniques, they take advantage of these legal supply chains to transfer their illicit profits to various jurisdictions.

The FATF 2006 report named several methods that serve as the cornerstone of TBML:

• Overcharging and underbilling for goods and services: The essential component of this technique is misrepresenting the cost of the good or service to transfer value. The importer and exporter being complicit in the misrepresentation in this kind of arrangement is a crucial enabling factor.

• Misrepresenting the quantity of goods or services, including "phantom shipments" where no product is moved at all, is referred to as over- and under-shipment of goods and services. Once more, it depends on collusion between the importer and exporter.

• Multiple billing for the same shipment of goods or delivery of services: This does not call for misrepresenting the cost; rather, it focuses on reusing previous records to support multiple payments for the same shipment of goods or provision of services. To make it more difficult for one institution to recognize the documents, criminals or terrorist financiers further exploit this by reusing these documents across multiple financial institutions.

• Phantom Shipping: No goods are transported, and all paperwork is wholly fabricated (JMLSG, 2020a).

• Falsely described goods and services: This refers to misrepresenting the nature or quality of a good or service, such as shipping a relatively cheap good that is represented as a more expensive item, or an entirely different item, to justify value movement.

And FATF (2008) noted that over and under-invoicing of goods and services in international trades is perhaps the most basic approach adopted by criminals for transferring illicitly acquired proceeds across jurisdictions with a low rate of detection by law enforcement agencies. While de Boyrie, Nelson, and Pak (2007) work on capital flows due to trade mis-invoicing in 30 African nations suggest mis-invoicing as an instrument used mainly for laundering illegally obtained funds, smuggling related activities and tax evasion. However, Forstater (2018) argues that trade mis- invoicing is not an approach used by criminal alone but also an instrument used by some major multinational companies for illicit financial flows. The findings from these authors suggest that activities of international trade can be a disguise for the actual movement of crime proceeds across various country's borders without raising suspicious attention both from the law enforcement agencies and financial institution used to finance such trade. Financial institution role in failing to detect transactions involving proceeds of crime during the facilitation of international trade-related payment raises some serious concerns among academic scholars, and some reasons outlined in the existing literature. For example, Naheem (2017) showed that banks currently do not have a complete understanding of the types of activities that trade-based money laundering could present to the bank and how to adequately assess their risk of exposure to trade-based money laundering risk. In his study, he found that, for criminals to bypassed existing customer due diligence instituted by bank AML systems, they can use bank's existing and well-established clients within the bank as front businesses for their money laundering activities. The work of Menz (2019) suggests that financial institution perception of trade-based money laundering risk in trade finance is underdeveloped. While Naheem (2019) work on trade-based money laundering risk assessment found that the current checkbox system employed for risk determinant of money laundering during transaction review is not sufficient to detect international trades payments transactions involving crime proceeds. Naheem's work pointed out the need for a more flexible approach to determining the overall individual risk. And Leonov, Yarovenko, Boiko, and Dotsenko (2019) concluded that the process of identifying transactions involving proceeds of crimes is quite arduous,

periodic in nature and significantly dependent on personnel decisions. This study uses the following case study to highlight how criminals use trades to launder proceeds of crimes. The United States in 2018 released a report that TBML remains a crucial method of money laundering connected to cartels and drug trafficking. The report also emphasized how organise criminal groups are increasingly using TBML and how this can break the connection between the underlying crime and any associated money laundering, making it more challenging to link drug traffickers to money laundering activity. The increasing usage of TBML was also raised as an explanation for the steadily declining number of bulk cash seizures across the United States. Similarly, FATF-EgmontGroup (2020) also confirmed that the decline in seizures might be a sign that criminal groups are increasingly using covert methods of moving money, like TBML. Clothing and second-hand textiles, like foodstuffs, are a convincing example of a low-value, high-volume product that allows for an extended supply chain, making them appealing for exploitation in TBML schemes. In terms of price misrepresentation to support the laundering activity, the extreme price variability is also attractive.

Most respondents from the private sector, primarily financial institutions believe that TBML is the most difficult type of ML activity to identify (Naheem, 2017). Since TBML is extremely adaptable and can take advantage of any industry or commodity, it is challenging for financial institutions to allocate resources and incorporate the most recent insights into their business rules and compliance frameworks. Financial institutions can only see a small portion of the network because in practice, TBML schemes can involve many front companies and funds being transferred between several banks. TBML schemes are so fragmented, it is inherently difficult for FIs to identify potential TBML schemes based on an analysis of the entire chain, and in many cases, this hinders their ability to spot discrepancies in supplemental documentation and customer profiles. See Appendix 1, for some identified trade-based money laundering related cases.

2.3.7 Summary findings of likely indicators of money laundering evidence from the above case study

TABLE 1 EXAMPLE OF ML RISK LIKELY INDICATORS

Money Laundering Techniques	Likely Indicators
Bulk Cash Smuggling	Customers who only use cash to pay deposits into an account. (2) Multiple payments from third parties and subsequent withdrawal of these funds in cash. (3) Disclosed personal profile to bank mismatched the account operation. (4) The pattern of cash lodgement is usually with higher bills currency or extreme low bills like 5, 10 and 20. (5) Often exchanging bank notes into higher denomination/foreign currencies.
Structuring	Customer depositing/withdrawing cash more frequently with amount usually below the statutory reporting threshold limit of $10,000. (2) Substantial account balance arising from numerous amounts of cash deposits into bank accounts over a period. (3) Multiple cash lodgements into an account from across different geopolitical locations.
Virtual Currencies	Several transfers across operated bank accounts of the same companies. (2) Reasons stated as the purpose of fund transfer is inconsistent with prior transactions records of the same beneficiary. (3) Multiple transfers to receivers overseas. (4) Sources of account funding largely dependent on cryptocurrencies sales. (5) The company have no existing strong AML structure in place to safely guide its usage for money laundering. (6) Currency exchangers-imposed transaction fees that were significantly higher than those imposed by traditional banks or payment processors for similar money transfers.
Misuse of legal entities (Shell companies)	Transferring large sums of money into an international bank account, especially if the nation is a location of concern. (2) Companies' ownership structures composed of layers of directors represented as directors/shareholders. (3) Shell company operating in a high-risk area with no known legitimate business purpose. (4) Frequent transfer of funds from company operation jurisdiction to company accounts in an overseas jurisdiction. (5) Different companies using the same company registered address and same identity of directors. (6) Identical accounting records, with look-alike material facts used by more than one registered company. (7) Use of Shell companies incorporated in offshore locations.
Complicit Professionals and Financial Services Employees	The company source of funds is unknown. (2) Professionals managing resource owned by politically exposed persons (PEP)/high net worth individual. (3) The use of similar entities with identical ownership structure and trading activities for banking transactions. (4) Professionals use their office address as a registered office address for clients during company registration office address. (5) Purchases made on behalf of clients by professionals.
Trade-based money laundering	Movement of large sum transfer transactions between personal accounts and company trading accounts. (2) A large sum of debit payment from company account used for real estate and luxury art purchases. (3) Multiple credit payments from overseas third parties credited to the company accounts and subsequent withdraw in cash. (4) Account inflow exceeded declared anticipated turnover. (5) A significant number of transfers in and out of a gambling account. (6) Account inflows from third-party transfers used for funding large cash withdrawals and extravagant expenditure (7) Payments that deviate from the customer's typical behaviour. (8) An importer who regularly makes cash payments in advance. (9) Making use of a personal email address rather than a work-related one. (10) Depending on a financial institution's (FI) data storage capacity, the obvious recycling of prior documentation with little to no edits, even down to the date, is permitted. (11) According to FI research, the exporter has no trading presence at all. Using residential rather than commercial space was part of this.

2.4 Overview of AML Scheme in detection of money laundering activities

2.4.1 Money laundering risk and the bank secrecy act

In the year 1970, the Bank Secrecy Act (BSA) was enacted by the U.S. congress as a result of criminal usage of the financial system for laundering proceeds from drugs trades (Eldridge, 1986). The act stimulated a recordkeeping requirement that compels financial institutions to keep records of the identity of persons involved in currencies related transactions within the threshold of US$10,000 and above. This act was to achieve the following aims: First, was to ensure financial institutions retained evidential trails in the form of transaction records required by law enforcement agencies to trail proceeds originating from illicit activities. Second, the financial institution sends routine reports of these sets of transactions called currency transaction reports (CTR) to an arm of government with the responsibility to gather intelligence on a central basis. Third, this act was introduced to discourage the use of financial institutions for laundering of profit generated from drug sales and other activities considered by the State as unlawful (Meltzer, 1991). Fourth, the implementation of this act will discourage criminals from using the financial system laundering of their proceeds and force them to get the proceeds of their illicit activities through other ways that increase chances of detection-such as smuggling of cash (Linn, 2010).

Notably, the reporting requirement for filing returns on a transaction of over US$10,000 became the cornerstone for the development of AML strategies use for combating money laundering crimes across the world (Naheem, 2019). The initial enforcement of the BSA reporting requirement raised some concerns around reporting parameters and financial institution liabilities in certain circumstances of failing to render these returns. For example, when customers deliberately structure their transactions to fall below the reporting threshold. In 1986, the U.S. Congress expanded the Bank Secrecy Act to include the anti-structuring provision, which addresses the situation where customers intentionally structure their transactions to keep them below the US$10,000 reporting threshold and financial institution reporting liabilities in such circumstances (Meltzer, 1991). Within this framework, structuring of a single transaction into multiple transactions to evade reporting threshold is considered an illegal activity that financial institution must report as suspicious activity reports commonly called SAR (Linn, 2010). The early enforcement of the BSA reporting

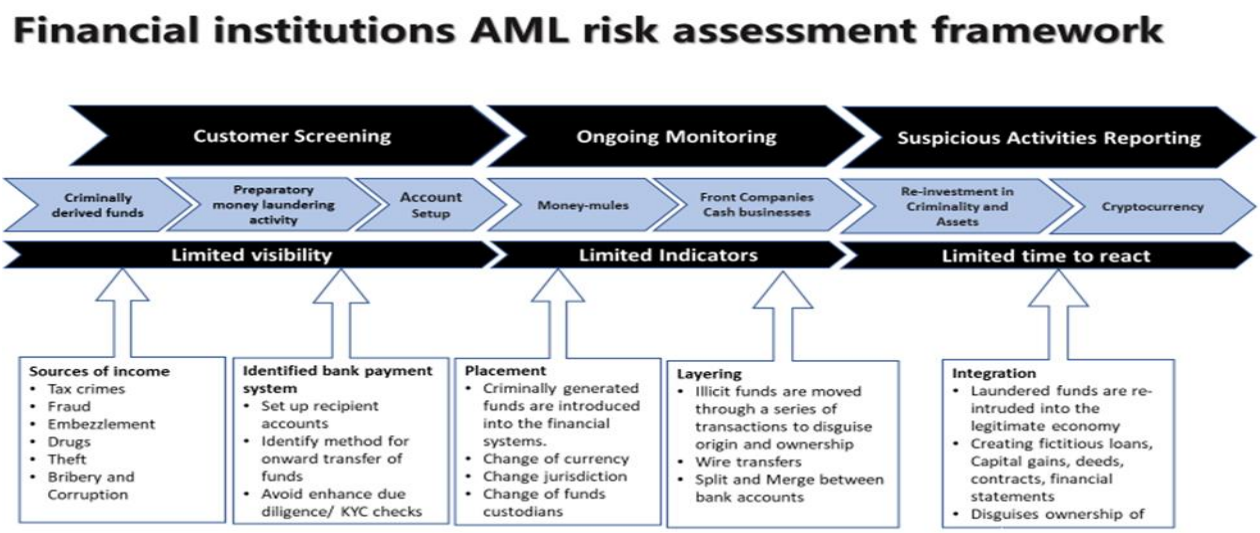
requirements lead to initial total returns filing of 500,000 CTR by mid-1980 and progressively passed 8 million annual filings by early 1990s (Meltzer, 1991).

The proactive review of these reports is the main source for law enforcement agents to detect highly risky behaviour (Linn, 2010; Sharman & Chaikin, 2009). But there were calls in the BSA regulated community to simplify and streamline the CTR returns reporting requirements, as more burden is brought to regulator services due to the high volume of CTR filings (Linn, 2010; Wilkes, 2020). Good reasons were put forward to why certain types of currency transaction over US$10,000 should be exempted from being filed as CTR. For example, there is a need for the free flow of legitimate currency from the banking system to the retail business environment (Meltzer, 1991) and the ultimate goal of the BSA act is to filter out transactions that are typically likely to be involved with funds that originate from illicit related offences. Subsequently, certain customer transactions were exempted on the ground that the exempted transactions relating to retail and other legitimate cash-intensive businesses must be within a reasonable judgment of the financial institutions, do not exceed amount commensurate with the customary conduct of the lawful, domestic business of the customer.

It has been a long-standing tradition for people to conceal the sources of wealth. However, this old tradition was brought into light when the US made money laundering a crime as part of its war on drugs in the 1980s. Aware of the global nature of money laundering, the US put pressure on its G-7 allies to join the fight. They established the FATF together in 1989 to coordinate their efforts. Although it is only a task force in name, the FATF operates more like an intergovernmental organization, with a small secretariat based in Paris. At first, only the G-7 countries and a few other OECD (Organisation for Economic Co-operation and Development) members could join, making membership extremely exclusive. The FATF published a report on money laundering in 1990 that included 40 recommendations and backed the BSA reporting requirements as well as the global adoption of KYC policies (Mulligan, 1998). Due to the club like nature of the organization (Drezner, 2007), the members were able to quickly come to an agreement on a set of standards, the "Forty Recommendations," which served as a standard for national anti-money laundering legislation. The 40 FATF recommendations were developed with the goal of having the required nations and entities adopt them as the minimum requirements for their AML

structures to combat money laundering crimes (JMLSG, 2020b). They serve as recommendations, which are standards of conduct that States may choose to voluntarily adopt. The recommendation does outline a financial institution's responsibilities for reporting and observing suspicious activity. However, the Annunzio-Waylie AML act of 1992 also expanded the BSA act by establishing the suspicious activity report (SAR), which gave financial institutions the authority to determine which transactions are suspicious rather than the government (Wilkes, 2020). This amendment in the BSA act imposes certain duties on financial institutions to have a proper understanding of their customer, which consequentially compelled the need to develop know-your-customer (KYC) standard. Banks, professionals, and other AML-required entities developed policies and procedures in response, and as part of their customer due diligence (CDD) process, they evaluated the risk of money laundering that their clients posed (Savona & Riccardi, 2019). The CDD is a continuous process that evolves with responses to perceive money laundering threats. It provides a framework for financial institutions to obtain relevant information about a customer that may be necessary to evaluate and determine the customer's transaction if it is commensurate with the customer's legitimate business to decide when to file SAR. Figure 1 illustrate the risk assessment framework adopted by financial institutions to mitigates money laundering crimes.

FIGURE 1. MONEY LAUNDERING RISK RESPONSE FRAMEWORK



Source: Present author (The information used in designing this framework was drawn extensively from information gathered during the interaction between AML practitioners and AML-related training seminars).

Since the early-21st Century, considerable change has taken place in the methodology for money laundering risk assessment from the rule-based to the risk-based, as promoted by the FATF (FATF, 2013a). In contrast to the earlier emphasis on the use of rule-based methodology, which involves strictly following state-provided rules for the identification of potential money laundering risks, the risk-based approaches emphasize that AML regulated institutions understand where their risks lie to make the risk-based approach effective. Implying, AML regulated entities now take ownership to ensure reasonable steps in the identification and assessment of the money laundering risk within their business. Given such shift, there is uncertainty associated with determining, predicting potential future money laundering risk and there is a reliance on judgmental professional evaluations of relevant risk indicators. Although the implementation of the AML risk-based approach methodology has differed from one organization to another, the establishment of global standard and the establishment of AML regulatory framework has been generally regarded as the natural system for AML coordination without paying attention to the accuracy of judgements made by AML professionals.

One line of thinking is that suspicious activity reports (SARs) which form the cornerstone of the AML framework, globally hang on the loose scales of suspicion (Sinha, 2014; Wilkes, 2020). In reality, what appears to be a straightforward decision is actually a complex scheme, historically carried out by public agencies such as prosecutors and courts, now entrusted to financial professionals. To fulfil this obligation, financial professionals must be able to discern suspicious behaviour within complex financial transactions using a procedural risk assessment framework (Cindori, 2013). Chapter 3 provides a description of the commercial banking sector's risk assessment framework. It also examines bank AML risk assessment decision processes to understand how suspicious and non-suspicious behavior are recognized.

2.5 Conclusion

Money launderers use a variety of sectors, services, transactions, and professionals in the legal economy in their efforts to legalize the proceeds of illegal activity. Corporations, domestic banks, money service providers (such as currency exchange firms, check cashing businesses, and cash transfer firms), and a host of many other financial institutions are susceptible to money laundering because of their capacity to conceal beneficial ownership. Despite its criminal undertones, the money laundering process itself is not an economic outlier; for the most part, it thrives on the same commercial and financial transactions that are carried out by most law-abiding individuals and legitimate businesses. Ensuring that the transactions used to convene the criminally generated proceeds appear as legitimate as possible is, in fact, a key principle of money launderers apply (Schneider, 2020).

This chapter provided case studies on the relationship between money laundering, anonymity, and predicate offences. In doing this, the most common types of money laundering behaviours and their likely indicators are presented. The review suggests that bulk cash smuggling, structuring, virtual currencies, misuse of legal entities, and complicit professionals are some of the most common used techniques for committing the act of money laundering crime. I analyse these techniques by using actual cases of money laundering crime committed across 14 countries, in order, to understand their likely indicators. Furthermore, these money laundering cases, in turn, provided a structure that assisted in the formulation of 12 vignettes and their subsequent use as experimental materials in this thesis.

Another consideration in this chapter is the connection established between money laundering risk and the bank secrecy act. The review discovered that AML professionals frequently report and monitor suspicious activities in the real world as opposed to government agencies like prosecutors and courts. A common assertion that has emerged from existing literature in the field of money laundering is the notion that the construction of the distinction between suspicious and nonsuspicious is always problematic and this is evident in the large proportion of false-positive reports in every AML system (Demetis & Angell, 2007). Similarly, since the early-21st century, considerable change has taken place in the methodology for money laundering risk assessment from the rule-based to the risk-based, as promoted by the FATF (FATF, 2013). In contrast to the earlier emphasis on the use

of rule-based methodology, which involves strictly following state-provided rules for the identification of potential money laundering risks, the risk-based approaches emphasize that AML regulated institutions understand where their risks lie to make the risk-based approach effective. Implying, AML regulated entities now take ownership to ensure reasonable steps in the identification and assessment of the money laundering risk within their business. Given such shift, there is uncertainty associated with determining, predicting potential future money laundering risk and there is a reliance on judgmental professional evaluations of relevant risk indicators. Although the implementation of the AML risk-based approach methodology has differed from one organization to another, the establishment of global standard and the establishment of AML regulatory framework has been generally regarded as the natural system for AML coordination without paying attention to the accuracy of judgements made by AML professionals.

This Chapter highlight the background and context of money laundering activities as a criminal offence in an effort, to provide a better understanding of the nature of money laundering crimes and the motivating factors for their continual expansion. Money laundering crimes also been highlighted as a growing concern for both banks and regulators due to the anonymity provided by money laundering schemes (Kruisbergen et al., 2019). Similarly, money laundering risk contributes to several key problems for the financial sector due to the inherent vulnerabilities within financial institutions' services. Intentionally hiding illegal financial proceeds in legitimate transactions presents a number of opportunities for criminal organisations. The Chapter also highlighted specific case studies on money laundering cases linked to financial institutions involving proceeds from various types of predicate crimes, including, but not limited to, illicit narcotic drug trafficking, illicit drug trafficking, corruption and bribery, fraud, and smuggling. The most common money laundering techniques involve bulk cash smuggling, structuring, virtual currencies, misuse of legal entities, and complicit professionals.

In response to the emerging issues on risk judgment raised in the preliminary literature review done in this Chapter, the second section of the literature review presented in Chapter 3 will be focused on the risk assessment framework currently employed by banks to combat money laundering risk and the role of experts in AML risk assessment.

CHAPTER 3 EXAMINING THE AML RISK ASSESSMENT FRAMEWORK FOR COMMERCIAL BANKS

3.1 Introduction and Background to AML Risk Assessment

This chapter carries out a literature review of the risk assessment methods currently used by banks to assess money laundering risk in order to improve the understanding of the risk-based approach in risk judgment. This Chapter aims to provide an understanding from existing literature on how suspicious and non-suspicious behaviour are detected during AML risk assessment in financial institutions.

Most authors agree that AML risk assessment in the context of the risk-based approached (that emphasizes the need for professionals to understand where money laundering risk lies) is a potential problem in money laundering research. Earlier discussions on the likely elements of uncertainty in the risk-based approach date back well over a decade (Bergström et al., 2011; Demetis & Angell, 2007; Ross & Hannan, 2007), and interest in this topic appears to have continued relatively persistent to date (Cociug & Andrușceac, 2020; Gelemerova, Harvey, & van Duyne, 2018; Gilmour, 2020; Helgesson & Mörth, 2016; Isa et al., 2015; Naheem, 2019; Riccardi, Milani, & Camerini, 2019; van Duyne, Harvey, & Gelemerova, 2018).

The elements of uncertainty involved during the conceptualization of risk contribute to the vulnerability of the risk-based approach during money laundering risk assessment (Ross & Hannan, 2007). Existing literature on psychology and economics often suggest that people react to risk and uncertainty based on individual preference (Frey, Richter, Schupp, Hertwig, & Mata, 2021). Leonov et al. (2019) noted the human interface as the most vulnerable during money laundering risk assessment. This is partly because it takes a lot of time, effort, and judgment to identify transactions that are related to money laundering. Human judgment threatens the validity of the decisions in the AML risk assessment process, as it is widely recognized to have incorporated both the human biases and social consensus in response to specific AML risk threat that suits the decision-maker (van Duyne et al., 2018). Although both types of this human error are complicated. The human biases in risk assessment is a remarkably fundamental problem because different experts have diverse conducts of dealing with the uncertainty of their objects and the uncertainty of their claims

to understanding (Fedirko, 2020). Bergström et al. (2011) noted that one of the main sources of human bias is operation variance that may arise from a variety of procedures to detect illicit funds based on money laundering typologies and indicators. Risks related to the customer, the nation or region, the product or service transaction, or the delivery channel are all considered in this procedure (Esoimeme, 2018). While Gilmour (2020) work on current challenges during the implementation of the risk-based approach found the approach to be indecisive due to errors resulting from misinterpretation by professionals during adoption. Gilmour (2020) also noted that FATF provided no definite guidance for the identification of appropriate risk assessment to ascertain the right due-diligence process for the identification of money laundering risk.

However, regardless of the risk-based approach procedure adopted, human bias can have a major confounding impact on anti-money laundering risk assessment decisions, yielding potentially incorrect judgment (Isa et al., 2015). For example, let us assume that an AML risk professional is interested in reviewing a client's financial transaction for the purpose of knowing whether to file a suspicious transaction, one would expect a review of available customer financial records in addition to evidence supplied by the client for justification that each transaction in contention is sufficient to arrive at a decision whether to render a suspicious activity report or not. Expert opinions may bias judgments about whether or not to file a suspicious transaction report if the actual AML risk of the client differs from the estimate of the expert opinion. Thus, at least partially, expert bias poses an explanation for the error observed between the assigned client risk and actual money laundering risk posed by the client.

Within the above context, the purpose of this chapter is to contribute to existing process of linking this stand-off by identifying a number of guiding principles that are (a) based on decision science and existing approaches to AML risk assessment, (b) of practical use to AML professionals working to screening out true negative during AML risk assessment, and (c) ethically defensibility.

This chapter is presented in the following four sections. Section 3.2 examines the element of context of risk and Anti-money laundering risks assessment. In Section 3.3, the core challenges confronted by AML risk professional during AML risk assessment decision are

identified and discussed. Finally, Section 3.4 examines the AML risk judgment and concludes the Chapter.

3.2 Context of risk and assessment.

According to Ross and Hannan (2007), risk refers to circumstances where loss is both possible and preventable. In order to understand and make logical decisions when faced with the dangers and uncertainties of life, humans created the concept of risk (Elms, 2019). Risk itself does not exist. By figuring out a way to visualize risk, Demetis (2010) argues that humans can transform the fear of uncertainty into confidence in a clearly laid out strategy for managing risk. In order to get a tenuous handle on uncertainty, humans impose some sort of structure, but in so doing introduce new uncertainties (Demetis & Angell, 2007). Making decisions is still necessary despite knowing the statistical probabilities of risk outcomes and making them one after the other may alter the likelihood of future risk (Ross & Hannan, 2007). Such a requirement has drawbacks and paradoxes because what is observed is not risk itself but rather an internalized representation of that risk that must fit into a category that observation has established for it (Luhmann & Rasch, 2002). In the world in which humans live, knowledge is used to generate and build circumstances. Within the various literature, a considerable amount of evidence has accumulated regarding the extent to which an individual's perception of risk influences their decision-making processes. It appears people use their internal risk preference (Frey et al., 2021), and a combination of their cognitive ability during decision making to evaluate risk outcomes (Dohmen, Falk, Huffman, & Sunde, 2018). Studies relating to decision-making provides substantial evidence that people's perception of risk is an inherent part of their decision-making process (Williams & Noyes, 2007). Perhaps compelling evidence comes from Alhakami and Slovic (1994), who examined the variables that affect how risk and benefit judgments interact, as was observed in earlier research. They found variance in both risk and benefit judgments are influence by changes in the perception of risk and perception of benefit. Their work suggests that humans depend significantly on individual perception when dealing with risk. A similar pattern of findings emerges from Slovic and Peters (2006) study on risk perception and affect. While Williams and Noyes (2007) also suggested that an individual risk perception defined their assessment of risk

In addition to the above findings on the extent to which risk perception influences individual risk assessment, there is also an increasing body of research examining when human judgment can be relied upon during the decision-making process relating to risk assessment (e.g., Noroozi et al., 2013; Deacon et al., 2010). This focus became imperative as most studies on decision science conclude that human judgment is highly subjective, and the magnitude of subjectivity inherent in any risk assessment decision process varies across different professional domains (O'Donnell & Johnson, 2001). In some fields, risk assessment decisions are predominately dependent on human judgment. For example, in violence risk assessment, clinician judgment is reported to be the most used practice. However, there have been high criticism that most clinical assessment of violence is incorrect (Steadman & Cocozza, 1974). Besides, from the 1970s onwards, experimental research by psychologists, mainly employing student participants, illustrated that human judgment was subject to systematic and predictable biases when dealing with risk (Kahneman & Tversky, 1972, 1973). More recent research (e.g., Valaskova, Bartosova, & Kubala, 2019), has illustrated the existence of cognitive biases in various financial decisions -making contexts. Yet other literature (Gigerenzer, 2007; Gigerenzer & Goldstein, 1996; Gigerenzer & Todd, 1999; Litwack, 2001) has questioned the highly negative view of human judgment that has gradually emerged over the years.

Some vital conclusions can be drawn from existing studies on human judgment when faced with uncertainty. Individual variations in social value orientation, for instance, seem to affect people's ability to make decisions (Emonds, Declerck, Boone, Vandervliet, & Parizel, 2011). Similarly, causes of variability in risk assessment, assessing the severity of the incident that may occur and its probability of materializing are significantly related to age and experience in the profession's field (Trillo-Cabello, Carrillo-Castrillo, & Rubio-Romero, 2021). Given this, it is disturbing that limited studies have examined the human role in assessing money laundering risk (Isa et al., 2015). Despite evidence that the evaluation of risk can be hamper when AML professionals have varying comprehensions of money laundering threats, vulnerabilities, and consequences. All three elements (threats, vulnerabilities, and consequences) of AML risk should be evaluated together in an AML risk assessment (FATF, 2013-2017).

3.2.1 Anti-Money laundering risk assessment

According to Gordon (2011), the purposes of anti-money laundering risk assessment in the financial institution focus on three main objectives. First, it helps to serve as a tool for filtering out suspected identified criminal's profiles from having access to financial services to aid money laundering activities. Second, it serves as a transaction records tool that may be an evidential instrument required by state actors for criminal persecution purposes. Third, it serves as a channel to advise state actors on potential money laundering suspicious behaviour/transactions. Conventionally, the AML risk assessment is focused primarily on the customers and their transaction patterns. Where the scope of the transaction reviewed is dimensioned to cover four components: the client, transaction data, geography (country-specific, regional risks and cost) and third-party involvement (Naheem, 2019). However, money laundering risk assessment is not a specific risk measurement exercise but a response to set requirements introduced by the AML regulatory regime championed by the FATF (Riccardi et al., 2019). These requirements are periodically updated, and guideline statement issued by FATF. For example, the FATF in 2013 created an AML risk assessment methodology to guide AML regulated bodies during the assessment of money laundering risk (Halliday, Levi, & Reuter, 2019). But a critical assessment of research findings on the banking sector AML system suggests that several factors are mitigating against the effectiveness of the existing AML structure embedded within the banking system (Nasir, 2019). In particular, the chances of criminally generated proceeds passing through the financial system are high, but the likelihood of a transaction among the millions of transactions process daily is very low (JMLSG, 2020a). For example, Bergström et al. (2011) found that the process for carrying out an AML risk assessment to identify the act of money laundering seems ambiguous irrespective of the adopted risk assessment methodology. They also found that the operationalization of the risk-based model for carrying out AML risk assessment lack complete details but left for the obligated entities interpretation during necessary procedure setting. Several publicly available AML risk assessments methodological have emerged to provide AML practitioners systematic guidance on how to arrive at a logical conclusion during AML risk assessment of clients (Savona & Riccardi, 2017). The FATF has specifically created the customer due diligence (CDD) framework, which is primarily intended for use by AML practitioners to assist them in gathering information for a process of judgment that will allow one to be reasonably satisfied that one has taken

reasonable care and reasonable steps during the entire risk assessment (Maurer, 2005). In accordance with FATF recommendations, financial institutions are required to perform CDD in order to identify their clients and gather information pertinent to their financial behaviour. Financial institutions are required to comply with CDD standards in order to effectively identify, verify, and monitor their customers and financial transactions (FATF, 2013-2017). Banks may be able to prevent criminals from having easy access to financial services by carrying out CDD effectively.

Money laundering functions through usage of financial transaction activities, which are not in themselves unlawful. Hence, AML risk assessment involves the capability to discern suspicious behaviour within complex financial transactions using a procedural risk assessment framework. But this poses a range of ethical, empirical, and pragmatic obstacles when finding specific instances of money laundering (Demetis & Angell, 2007; Naheem, 2017; Singh & Best, 2019), and is even more problematic when the client under risk assessment has no existing records relating to any known predicate offence (Naheem, 2019). From a decision science standpoint, there is good reason to argue that the guideline around AML by emphasizing an administrative method over a qualitative method to money laundering risk administration cannot work and that the implementation of the risk-based strategy in the development of the AML risk assessment system is neither empirically nor practically defensible. Also, looking from the perspective of those involved in combating money laundering, they are tasked with preventing a crime with very distinct patterns of operations and are duty-bond to complete risk assessments, on some level at least, for all clients who carries out financial transaction with them or through their various owned platforms. It is, therefore, important for this study to understand and distinguish the main risk assessment approaches for the identification of suspicious behaviour.

Typically, researchers and practitioners distinguish between three approaches to AML risk assessment: rule-based approach, case-based approach, and risk-based approach (Ross & Hannan, 2007). These three approaches differ on some dimensions but, most important, on the extent to how the understanding of the attributes of risk applies to money laundering. The rule-based process involves risk predictions that are based solely on the clear formal criteria given by the state to AML regulated entities for identification of unusual or suspicious transactions, as decided by the state (Dalla Pellegrina, Di Maio, Masciandaro, &

Saraceno, 2020; Unger & Van Waarden, 2013). For example, the FATF 40 recommendations as promulgated in the year 1990 set out the basis of a rule-based AML decision-making system (Ross & Hannan, 2007). In it, some rules specify that certain kinds of activities are prohibited, require certain regulatory arrangements such as reporting transactions over a specific value to a central regulatory agency, and require action from by agencies with regulatory responsibilities such as customer due diligence, record keeping, reporting of suspicious transactions. Like the FATF Recommendation-10, which expressly prohibits financial institutions from maintaining accounts that are anonymous or with clearly fictitious names (FATF, 2012-2020b). Decision making under the rule-based approach is straight forward because the action outlined in the rule applies whenever a behaviour meets the conditions specified in the statutory law.

Here, the assessor's risk perception or skills plays no role in ascertaining what is required to make the judgment, as all subjects to the regulation are approach with the precise norms (Unger & Van Waarden, 2013). However, at the core of this approach, the assessor makes two important high-level decision tasks. First, suspicion assessment decision, which is the process of deciding whether a financial transaction or a case meets a definition of suspicious as outlined in the rule. The Second task is to deduce which prescribed predicate offence underlies the given transaction or case under assessment (Bellomarini, Laurenza, & Sallinger, 2020). Rule-based reasoning is a deductive approach widely employed during the development of several automated AML risk assessment applications (Chi & Kiang, 1991). However, the effectiveness of rule-based reasoning is dependent on how well the risk is well defined, as the approach uses existing risk knowledge as the rules to inference about new problems. Implying any transaction below this threshold is considered non-suspicious. This feature itself brought about the privileges for criminals to manipulate their money laundering activities below the threshold of what is defined as the suspicious threshold by a state. Hence, the rule-based approach is relatively inadequate in detecting suspicious transactions alone (Shaikh, Al-Shamli, & Nazir, 2021) and has also been criticized for its rigid, formalistic, bureaucratic, entailed high administrative burdens (Unger & Van Waarden, 2013), and excessive erroneous suspicious activity reports (Dalla Pellegrina et al., 2020).

Advocates of the rule-based risk assessment in this context have argued that the rule-based framework augments by case studies analysis that provides the necessary basis for informed

decisions on AML (FATF, 2005). This suggests that the rule-based may function more effectively if implemented from experiences obtained from the case-based analysis, which is another approach to money laundering risk assessment. The case-based approach to money laundering risk assessment has an intrinsic foundation on a decision-making theory, which postulates that people tend to choose acts that performed well in similar cases in the past (Gilboa & Schmeidler, 1995). In this approach, the decision-maker bears in mind key money laundering features/indicators noted in previous money laundering cases analysis to uncover hidden leads and patterns that may prove valuable or timely and perspective of money laundering trends (Gao & Ye, 2007). It is an inductive reasoning approach, which draws inferences of a new case based on the experiences learned from previous cases analysis (Chi & Kiang, 1991; Watson, 1999), and precedent-based justification. Case-based judgment is an experience-oriented task approach and requires decision-makers to have detailed and expert knowledge of money laundering activities (Ross & Hannan, 2007). The assessor makes two important high-level decision tasks to arrive at a judgment. The first task involves skimming for simplified cases that incorporate the most relevant similarity features with the task at hand. Then the second task, adapt the features from the selected case-study to match features present in the new assessment. The case-based decision-making process has been used in other experience-oriented domain to acquire solutions for problems which are not well understood. For example, in new product development (Haque, Belecheanu, Barson, & Pawar, 2000), coordinating price and capacity decisions (Jahnke, Chwolka, & Simons, 2005), clinical diagnosis and sentencing decision process (Tata, 1997).

However, the risk-based assessment differs from the rule-based and case-based because it gives decision-makers some freedom to decide whether a case was risky, whether it could be a money laundering case, and whether to disclose it as suspicious (Unger & Van Waarden, 2013). The risk-based approach emerged as a measure introduced to make regulated entities focus on actual money laundering risks during suspicious activity reporting. In this way, the data reliability and accuracy of the SARs reports submitted by banks should be more productive for usage by regulatory agencies (Dalla Pellegrina et al., 2020; Ross & Hannan, 2007). Another strength of the risk-based approach is that it enables entities to allocate their resources towards potential vulnerability (van Duyne et al., 2018).

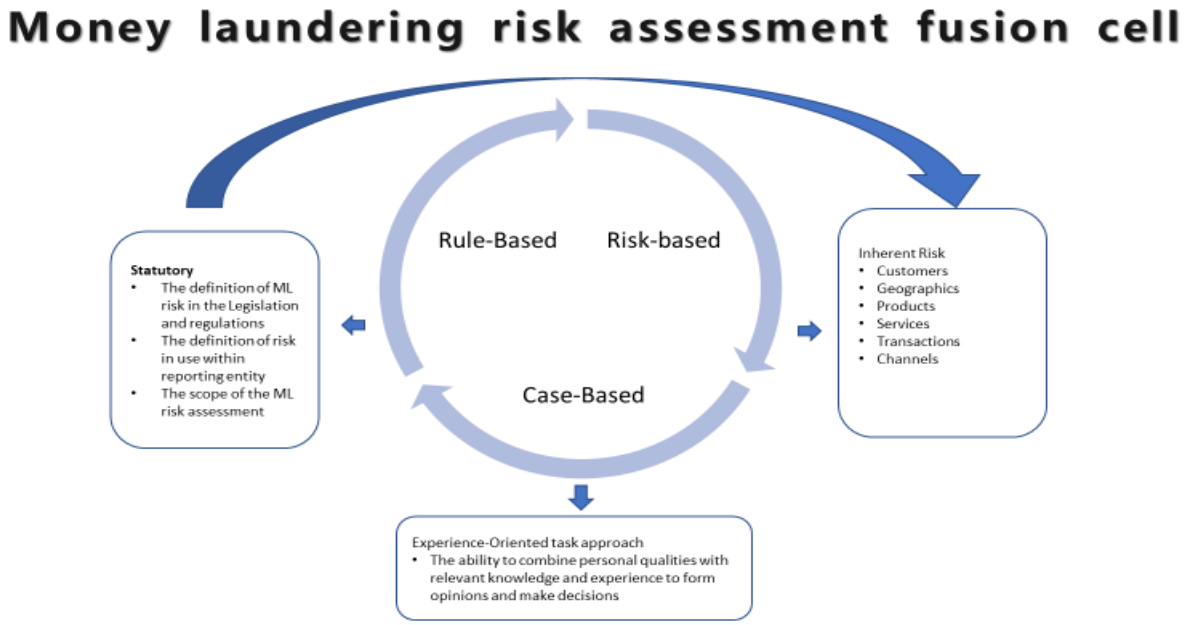
An underlying assumption promoting the risk-based approach is that it concedes money laundering risks vulnerabilities varies across customers, jurisdictions, products, and delivery channels. And this allows for more effort concentration on mitigation and controls resources towards areas of higher risk vulnerabilities (JMLSG, 2020b). The risk-based approach brought about licensing regimes, KYC, and ongoing monitoring under the customer-due-diligence (CDD) obligations, and suspicious transactions reporting (STR). According to the FATF, a risk-based approach to AML entails that nations, competent authorities, and financial institutions identify, assess, and comprehend the money laundering risks to which they are exposed and implement AML measures commensurate with those risks to effectively mitigate them (FATF, 2014). The risk-based approach suggests a shift in accountability from public authorities to the private sector by shifting the locus of regulation to allow businesses to self-regulate (Ross and Hannan, 2007). Therefore, experts would be best suited to evaluate money laundering risks. Hence the risk-based approach regimes give room for the makeover, for appraisal, for sound judgment to those closely involved. That is, AML practitioners are encouraged to assess money laundering risk that is comprehensive and, includes sufficient breadth and depth about potential threats (FATF, 2013a).

The dependence on expert opinion, which is a conclusion derived from their intelligence data interpretation of known threats, rather than any systematic analysis of known threats to a business/client, may either understate or overstate the assigned measures for identified threats during the risk assessment. For example, Ferwerda and Kleemans (2019) have noted that using expert opinions to assess money laundering risks can produce risk misjudgement, served by self-selection that hides the actual relationships between threats indicators. Their work indicated that the use of expert opinions to assess money laundering risks often appear to possess attributes driven by individual's interest and preferences (e.g., utility theory, where individuals make decisions to increase personal gains when faced with uncertainty about the outcome-Tversky, 1967). These findings are consistent with Ruan, Yin, and Frangopol's (2015) work, which demonstrated that risk assessors integrate risk attitude based on utility theory during risk matrix formation and associated risk assessment.

Some of the uncertainty that exists in AML risk assessments results from the fact that the elements that determine the risk of each threat are elaborate and challenging to turning the

concepts into measurable observations (i.e., no clear measures of threat across business sectors) and, therefore significantly based on expert opinion (Savona & Riccardi, 2017). Though, the risk-based approach can be used in any country, by any financial services institution, and by firms in a range of other sectors, for structuring AML efforts. But the implementation of this approach is still at a primordial state (Demetis, 2010). As bodies on the national level are left to set up their necessary procedures for this approach to work, and this promotes diversity rather than stringent standard (Bergström et al., 2011). Ultimately, each financial institution must demonstrate that their designated AML programme maintains a reasonable and risk-based set of controls in line with applicable law and regulation instituted to mitigate the risks of the financial institution being used to facilitate the act of money laundering (WOLFSBERG, 2021).

FIGURE 2. RISK ASSESSMENT METHODOLOGY



Source: Present author.

Ross and Hannan (2007) suggest three conditions for the implementation of the risk-based assessment. First, an agreed AML risk definition; second, measurement model; third, in-depth expert knowledge. While the FATF defined money laundering risk as a function of three factors: threat, vulnerability, and consequence, and that the risk assessment should be based upon a risk-based approach, agreed by those parties involved with the risk identification and analysis (FATF, 2013c). Countries, competent authorities, and banks must therefore determine how the money laundering threats they identify might affect them in

order to assess money laundering risk (FATF, 2014). As shown in table 2, money laundering risk varies across banking activities.

TABLE 2. EXAMPLES OF ML RISK ASSOCIATED WITH DIFFERENT BANKING ACTIVITIES

Banking Activities	Associated Money laundering risk
Retail banking	Services offered to companies that use cash frequently, high transaction volumes, high-value transactions, and variety of services.
Wealth management	Financial services and products are complex, PEPs are involved, high value transactions take place in multiple jurisdictions, and beneficial owners are difficult to identify.
Investment Banking	Assets transferred between parties as exchanges for cash or other assets, layering and integrating.
Correspondent banking	The source of funds and remitter information is limited, especially when conducting transactions with a bank located in a country not compliant with FATF Recommendations or insufficiently compliant, PEPs may be involved in the ownership of a bank, and transactions with high values.

(FATF, 2014)

Ambiguity in the conceptualization of AML risk can confuse risk assessment decisions and lead to potentially deceptive conclusions. This ambiguity exists despite the freedom that banks have in determining the best way to address AML risk associated with their operations, including those identified in the national risk assessment or by the banks themselves. Realistic decision-making often occurs with insufficient time to gather all possible evidence before a decision must be taken, requiring an efficient process for prioritising between potential action sequences. Due to its elusive nature and paradoxical nature, the concept of risk creates an element of ambiguity that makes auditing such risk-based approaches challenging (Demetis, 2010). While the implementation of the risk-based approach has undoubtedly been a significant step forward in terms of regulation, little is known about what particular factors influence expert's risk estimates the most during risk assessment. To proceed along these lines, this study explored the ambiguity faced during risk assessment in Chapter 5 (study 1) of this thesis.

According to Bergström et al. (2011), the risk-based approach, for instance, presupposes the existence of routines and systems that respond whenever a customer makes transactions that are deemed to be outside the normal course of business. It also makes it necessary to find or create normality models that can depict daily operations. When something is out of the ordinary, it is marked as suspicious. This framework raises questions regarding the

attribution of a "grey" identity to law-abiding customers. The risk-based analysis system may judge them as "not legitimate enough" (Geiger & Wuensch, 2007) even though they may not view them as criminals, which can cause them a variety of issues. When exploring the risk-based based AML framework, a key aspect that emerges is the role of and function attributed to AML professionals within the banking sector, who have been enlisted in policing activities. As a result, several international organizations have urged bank supervisory bodies to ensure banks follow specific due diligence procedures with regard to customers by issuing guidance such as the FATF Recommendations, the Basel paper sound management of risks related to money laundering, and the International Organization of Securities Commissions (IOSCO) Principles paper (JMLSG, 2020b). This is especially clear given that the regime demands that banks check the clients they serve and alert law enforcement to any potential problems. Practically speaking, laws and policies based on FATF standards mandate that millions of financial institutions and other businesses adhere to complex compliance obligations, confirm the identities and sources of funds of their clients, keep an eye on financial transactions, and report specific types of transactions and suspicious activities to the appropriate authorities (Pol, 2020). Thus, the next section of this thesis examines how AML professionals operate in practice through the customer due diligence.

3.2.2 Customer due diligence (CDD)

Customer identification has become an essential element of internal control of financial institutions because suitable customer identification is necessary for financial institutions to avoid likely misuse and fraud by customers involved in the act of money laundering (Laurinaitis, Stitilis, Rotomskis, Novak, & Lysenok, 2021; Mugarura, 2014). Customer identification is also known as Know-Your-Customer (KYC), and it is a principle that seeks to ensure that all activities within the financial system are trail to specifically identifiable persons (Sharman & Chaikin, 2009). KYC covers the verification process performed by banks and other financial institutions to ascertain the identity of customers or businesses they intend to enter into a financial relationship with (Kumar & Nikhil, 2020). The identity of a customer may be reasonably satisfied after the verification of some principal elements by banks. These elements may include the customer given names, residential address, employment and business career (JMLSG, 2020b). Furthermore, banks must be able to

identify and verify beneficial ownership to corporate entities customers (Sharman & Chaikin, 2009). The challenges involved in locating beneficial owners (i.e., the natural person(s) that control or ultimately own a client on whose behalf a transaction is processed)(JMLSG, 2020b; McLaughlin and Pavelka, 2013). In order to assist AML professionals in overcoming these challenges, a number of policies and guidelines have specifically developed. For instance, in order to address concerns regarding the adequacy of controls and procedures that enable a bank to know the customers with whom they deal with, the document "Customer Due Diligence-CDD for Banks" was published in October 2001 (McLaughlin & Pavelka, 2013). It is part of CDD to identify a customer and confirm his or her identity using documents, data, and/or information obtained from reputable sources. This information may include specifics pertaining to the customer's name, address, date of birth, source of income, and other official identification. The identity of customers or beneficial owners must be verified in accordance with the money laundering regulations, and this requires relying on documents or information from a trustworthy source that is not the customer. Documents issued by a government agency on behalf of the client may be among the sources (JMLSG, 2020b).

In executing CDD, banks are not just verifying customer's identities, but also engaging in a practice that always has the potential to fold back on itself and is provisional, probabilistic, open-ended, and the ends are never really known (Maurer, 2005). CDD is not a specific measure under certainty but rather proceeded from the legal doctrine of reasonable care. This doctrine is an act requiring a high degree of caution and consideration to the risk that a typically discreet and rational individual would use in a similar circumstance. This is a subjective test to determine whether or not a person was negligent and therefore liable. Consequently, the act of CDD covers all the processes of gathering specific AML related data about a customer to carry out risk assessment and activities monitoring and will allow one to be reasonably beyond doubt that one has taken reasonable care and steps ethically to warrant a regulated person’s identity. The bank's judgment, which may be based on a risk-based approach, will determine how much identity information or proof to request, the balance between what to verify and to be reasonably satisfied as to a customer's identity, and other relevant issues (JMLSG, 2020b).

FATF (2012-2020a) states that banks are required to take CDD measures when: (i) establishing business relationships; (ii) transactions exceed the applicable designated threshold (USD/EUR 15,000); (iii) there is a suspicion of money laundering; and (iv) the financial institution has concerns about the accuracy or sufficiency of previously obtained customer identification data. Nevertheless, despite the adoption of CDD policies and practices, the anticipated operational issues – interpretation, compliance costs, and scope continuecontinue to persist (McLaughlin & Pavelka, 2013). For example, statutes interpretation and clarification of terms continues to be a problem during the execution of CDD policies and procedures by banks (Bergström et al., 2011; Dobrowolski & Sułkowski, 2020; Menz, 2020). Additionally, it has been challenging to strike a balance between business efficiency and compliance with CDD measures, both in terms of defining what should be accepted and putting in place a risk-based strategy that meets the necessary criteria while actual business operations are being conducted (Moreno, Seigneur, & Gotzev, 2021).

For low-risk financial products or services that offer appropriately defined and constrained services, FATF permits a streamlined customer due diligence process under Recommendation 10 (FATF, 2014). After a business relationship has been established, banks can use these more straightforward measures to confirm the customer's and the beneficial owner's identities. As a result, gathering less information (e. g. , not asking for information about the potential client's address or job), and/or asking for less conclusive confirmation of the client's identity and the goal and intended nature of the business relationship (FATF, 2014). The term "customer risk" in this context refers to the money laundering risk that a bank perceives to be attached to a specific customer. A risk-based approach starts with the premise that most customers do not pose a threat of engaging in illegal money laundering. They must, however, set up systems to profile any customers who may meet the criteria set forth by the bank policies or AML applicable regulations and may suggest that they pose a higher risk of doing so (JMLSG, 2020b). This risk results from the perceptions of risk related to the characteristics that make up a customer's profile as well as the risk related to the products, services, transactions, or delivery channel risk factors that the customer uses.

The verification of low-risk customers must be postponed until a risk trigger occurs, according to Jayasekara (2020), who advocates for streamlined due diligence. The risk of

money laundering is diminished, for instance, when there is a low threshold for transactions, a small number of transactions per period, and no cross-border transactions. As a result, simpler measures might be adequate (FATF, 2013b). While increased customer due diligence is required for politically exposed individuals (JMLSG, 2020b) and high-risk clients like trusts or other vehicles used to hold personal assets, nonresident clients from nations without adequate AML/CFT systems or safeguards, or firms with nominee shareholders or shares issued in bearer form. These customer groups are those who practice particular professions or use banking services and products where there is a high risk of money laundering. The following steps are taken by the financial institution to conduct enhanced due diligence on this group of customers: (i) obtaining additional identifying information from a wider range or more reliable sources and using the information to inform the individual customer risk assessment; (ii) conducting additional searches (e.g., verifiable adverse media searches) to inform the individual customer risk assessment (iii) commissioning an intelligence report on the customer or beneficial owner to better understand the risk that the customer or beneficial owner may be involved in criminal activity (iv) confirming the source of funds or wealth involved in the business relationship to be satisfied that they do not constitute the proceeds from crime (v) requesting more information from the customer (FATF, 2014). As a further guidance, the FATF (2012-2020a) introduced and regularly update lists of potentially increased and potentially reduced money laundering risk factors, structured according to three criteria: customers, product/ service and from a geographical point of view. For example, Table 3 below shows an extract of these factors.

AML regulated entities such as banks are required to follow a risk-based approach to CDD, but the review of current practises indicates that the actual efforts appear to have shifted from assessing money laundering risk to collecting documents needed to satisfy regulatory requirements (Menz, 2020). However, current practice suggests most banks do not focus their AML risk assessment on a government priority basis but rather channel their priorities to meet technical compliance. Today, the majority of financial institutions do not prioritize governmental priorities in their AML/CTF risk assessments. Instead, and largely in response to supervisory expectations, AML/CTF risk assessments are cantered on technical compliance with requirements rather than the success of the financial institutions' efforts to

prevent and detect financial crime (WOLFSBERG, 2021). An enterprise-wide risk assessment, which usually follows this exercise and is very lengthy, intricate, and results-focused rather than process-oriented, serves as its typical conclusion. As a result, there is growing concern that CDD is evolving into a document-collection exercise to avoid failing to comply with regulator expectations rather than an effort to identify and manage risks associated with the business relationship. However, proponents of risk assessment in this context have argued that the CDD measures will allow banks to create a customer risk profile, which will support banks' decisions regarding the amount and type of ongoing monitoring to assign to the various risk categories of customers (FATF, 2014; JMLSG, 2020b). Applying CDD measures is meant to give an institution a solid basis for believing that it is aware of each customer's true identity, as well as each account beneficial owners, and that it is confident enough to know the kinds of transactions and financial activities of their customers (JMLSG, 2020b). Risks associated with money laundering can be evaluated based on a variety of variables. By allowing businesses to subject customers to proportionate controls and oversight, the application of risk categories to customers or situations can then provide a strategy for managing potential risks. The three main risk factors are customer risk, product/service risk, and country or geographic risk. Depending on the specifics of each institution's situation, different weights may be assigned to these factors (individually or collectively) when determining the overall risk of potential money laundering. As a result, financial institutions must decide on the risk weights on their own. A firm's discretion may be restricted by parameters imposed by law or regulation. A proper risk assessment will also assist the bank in deciding whether to begin, maintain, or end a business relationship with a client.

TABLE 3. FATF RISK RATING

Examples of potentially higher and potentially lower money laundering risk factors		
Factor	Higher risk	Lower risks
Customer risk factor	• The business relationship is conducted in unusual circumstances (e.g., significant unexplained geographic distance between the financial institution and the customer) • Non-resident customers, Legal persons or arrangements that are personal asset-holding vehicles. • Companies that have nominee shareholders or shares in bearer form. • Business that are cash-intensive • The ownership structure of the company appears unusual or excessively complex given the nature of the company's business.	• Financial institutions and DNFBPs – where they are subject to requirements to combat money laundering and terrorist financing consistent with the FATF Recommendations, have effectively implemented those requirements, and are effectively supervised or monitored in accordance with the Recommendations to ensure compliance with those requirements. • Public companies listed on a stock exchange and subject to disclosure requirements (either by stock exchange rules or through law or enforceable means), which impose requirements to ensure adequate transparency of beneficial ownership. • Public administrations or enterprises.
Country or geographic risk factors	• Countries identified by credible sources, such as mutual evaluation or detailed assessment reports or published follow-up reports, as not having adequate AML/CFT systems. • Countries subject to sanctions, embargos or similar measures issued by, for example, the United Nations. • Countries identified by credible sources as having significant levels of corruption or other criminal activity. • Countries or geographic areas identified by credible sources as providing funding or support for terrorist activities, or that have designated terrorist organisations operating within their country.	• Countries identified by credible sources, such as mutual evaluation or detailed assessment reports, as having effective AML/CFT systems. • Countries identified by credible sources as having a low level of corruption or other criminal activity.
Product, service, transaction, or delivery channel risk factors:	• Private banking, Anonymous transactions (which may include cash). • Non-face-to-face business relationships or transactions, Payment received from unknown or un-associated third parties.	• Life insurance policies where the premium is low. • Insurance policies for pension schemes if there is no early surrender option and the policy cannot be used as collateral. • A pension, superannuation or similar scheme that provides retirement benefits to employees, where contributions are made by way of deduction from wages, and the scheme rules do not permit the assignment of a member's interest under the scheme.

		• Financial products or services that provide appropriately defined and limited services to certain types of customers, so as to increase access for financial inclusion purposes

(FATF, 2012-2020a)

The bank must first be aware of the customer's economic activities in order to determine which CDD approach is appropriate for the customer before beginning CDD. Simplified customer due diligence applies to a list of customers set out by the jurisdiction AML/CFT Act. There is no requirement to verify such a customer's identity. For example, the AML assessment of an individual abstract money laundering risk situation can be assessed based on the customers, product/ service and geographical criteria. Each of these criteria is rated to reach an overall score. If the customer gets an overall score that is within the low-risk limit, which is the high limit for low-risk simplified due diligence, or the low limit for enhanced due diligence, the bank has the discretion to decide which risk category the customer will fall into, based on existing similar customers in their portfolio (FATF, 2013-2017). The classification of clients in a class of risk category is dependent on the existing suspicions of the customer economic activities to money laundering risk vulnerability. Suspicion is higher when CDD outcome of customer economics activities appear complex, strange or lack legitimate rationale. While the suspicion is lower if CDD information point to a legitimate rationale. The international practice recommends the use of a specific risk questionnaire through which a score will be given to the client, based on its characteristics, which will place it in the risk categories provided by law, respectively: high risk, medium or low (Grosu & Mihalciuc, 2021).

Consequently, according to JMLSG (2020b), banks must conduct CDD and monitoring for two main reasons: to assist them in being reasonably satisfied that customers are who they say they are, to know whether they are acting on behalf of another, and that there is no legal barrier (e.g. government sanctions) in exchange for supplying them with the good or service they've requested, as well as enabling the company to help the law enforcement by making information about their clients or the subjects of their investigations available. In the end, the CDD program results in the filing of reports about suspicious activity, also known as "suspicious activity reports" or SARS (McLaughlin & Pavelka, 2013). The FATF recommendation 11, requires that financial institution process transactions that are

apparently economic or visibly of lawful purpose for a client, and to pay special attention to transactions that appears complex, unusually high, and out of known customer transaction pattern. The financial institution must file a suspicious report in circumstances when it suspects or have reasonable ground to suspects that a transaction appears to be proceeds from an illicit activities (Gordon, 2011). The assumption is that, compared to routine activity, a disproportionate amount of unexplained activity is connected to crime (Axelrod, 2017). As a result, odd behaviour may be a useful indicator of criminal activity. The reporting requirement effectively turns banks into governmental agents and erodes the bond between banks and their clients (Amicelle & Iafolla, 2018; Hall, 1995). An obligation similar to the reporting requirements imposed on certain other professionals such as physicians and teachers that have benefitted from licensing and bear significant professional duties of care. Clearly, the benefits of licensing and the costs of professional regulations support the justification for equivalent reporting obligations in the banking sector. It seems reasonable to require bankers to report suspicious financial transactions if physicians are required to report suspicious wounds and teachers are required to report suspicious child abuse. Money laundering suspicions must, however, apply to all customers of a bank (JMLSG, 2020b). Although there are numerous flows of filed reports about suspicious transactions, it is still unclear how many of these are of high quality. Additionally, it is likely that a sizable portion of high-quality intelligence remains in-house rather than reaching the appropriate Financial Intelligence Units in the absence of proper definitions of suspicion and risk (Gelemerova, 2009). The next section examines decision making during risk assessment of suspicious activity report.

3.2.3 Suspicious transaction and activity report

Suspicion, typified as lacking in trust, often revealed by the unwillingness of people to enter into any bonds with others without intensely monitoring the risk of breach of trust (Offe, 1999), is not a new concept to scholars. Researchers in the different academic disciplines have explored the role of suspicion across a host of job-related constructs, yet the full effects of the act of suspicion remains significantly unclear (Fedirko, 2021). Within the context of risk assessment, the production of suspicion harnesses the legitimacy distribution of normal and abnormal conduct, while on the other hand, riskiness drives the level of monitoring intensity (Amicelle & Iafolla, 2018). This duality is encapsulated concisely within

the risk-based approach, where risk appraisal plays a critical role in the alignment of monitoring resources against varying levels of suspicion. That is, higher monitoring intensity correlates with a higher level of suspicion (Guittet, 2015).

Suspicion is a learned sense that helps systematic guide the search for traces of proceeds of crimes hidden in volumes of financial transactions. Banks must reach the RGS suspicion threshold to submit an STR/SAR. An activity or transaction is deem linked to proceeds from crimes to report when the suspicion is trigger by what FINTRAC coined the reasonable grounds to suspect (RGS) and reasonable grounds to believe. Suspicion is the searching for, and interpretation of unreliable signs left by launders during the movement of proceeds of crimes (Fedirko, 2020). RGS refers to circumstances whereby AML assessors consider the facts, context and money laundering indicators related to a financial transaction to support their suspicion that a transaction is an act of money laundering without necessarily carrying out further verification. When there are verified, facts related to transactions that make it likely that money laundering has taken place, then this means that there are reasonable grounds to believe that the act was committed. Amicelle and Iafolla (2018) categorise money laundering indicators under visible and transferred suspicion. 'The visibly suspicious' refers to simple transactions involving known money laundering patterns that are easily identifiable. The transaction patterns are deemed obvious and require less logic to determine it as highly risky. 'Transferred suspicion' usually involves a high level of anonymity and scanty obvious direct links with predicate offences. Table 4 proposes a categorized money laundering technique indicators under visible or transferred suspicion.

Identification of suspicious financial transactions remains being a complex problem encountered by AML practitioners. There are several reasons for this complexity, including the lack of specific criteria for determining whether a transaction is suspicious, the conscious decision of money-launderers to remain anonymous, and the difficulty in validating the results obtained (Raza & Haider, 2011). However, Sinha (2014) also suggests the claim of Mr Shah court case judgment pointed out that banks cannot accurately identify proceeds of crimes.

TABLE 4.TYPES OF MONEY LAUNDERING TECHNIQUES TREND TYPES

Money Laundering Techniques	Information sources most useful to form a reasonable suspicion of known indicators	Visible/ Transferred
Bulk Cash Smuggling	Physical cash lodgements/withdrawal pattern	Visible suspicious
Structuring	Transaction pattern and bank records	Visible suspicious
Virtual Currencies	Mixers or tumblers, advance mixers, and privacy wallets	Visible suspicious
Misuse of legal entities (Shell companies)	Information obtained from outside sources about the flagged client or its affiliates, such as adverse media reports, requests from law enforcement, as well as court orders and records.	Transferred suspicion
Complicit Professionals and Financial Services Employees	Information obtained from outside sources about the flagged client or its affiliates, such as adverse media reports, requests from law enforcement, as well as court orders and records.	Transferred suspicion
Trade-based money laundering	Information obtained from outside sources about the flagged client or its affiliates, such as adverse media reports, requests from law enforcement, as well as court orders and records.	Transferred suspicion

Source: Present author.

The FATF, "Recommendation 20 requires countries to mandate that if a bank suspects, or has reasonable grounds to suspect, that funds are the proceeds of crime or are related to terrorist financing, it shall report its suspicions promptly to the relevant FIU. Banks should have the ability to flag unusual movement of funds or transactions for further analysis" (FATF, 2014, p.22). This suspicious report obligation raises two vital questions on the practical definitions of two concepts (Forget & Hočevar, 2004). First, what is the threshold definition of suspicions within the limit of money laundering? Second, what is define as an activity that generates illicit fund? The FATF recommendation 13 refer to illicit funds as money generated from criminal activities, though some national laws vary slightly with this standard. However, the concept of suspicion and reasonability remains vague from a practical perspective due to the absence of definitive guidance as to what constitutes reasonable ground to suspect, nor the availability of a standard to measure deviations (Loh, 2020). There is less theoretical clarity on the benchmark to define the obligation to report the suspicious transaction, but some conceptual legislative frame has acted to limit the discretion of reporting entities. For example, the FATF recommendation requires the financial institution to consider and examine to a full extent all transactions that appear complex, unusual large transaction amounts, and with patterns different from expected customer behaviour, and determining their economic intention behind such transaction

(Mugarura, 2014). Despite that, the function of a reporting entity does not include the investigation of suspicious transactions but just assembling facts necessary to establish that a transaction may suspiciously originate from crime proceeds (Forget & Hočevar, 2004). Still, the process to identify suspicious transactions linked to proceeds of crimes is invariably a complex problem (Raza & Haider, 2011). Hence, this section reviews the current suspicions construct within the AML risk assessment process during suspicious transaction reporting.

According to FATF (2014), financial institutions should ensure continual monitoring of customers transaction to determine consistency with the CDD documented risk and customer activities profile. This monitoring process is a vital component of the AML risk assessment framework for screening for and singling out unusual movements of potentially suspicious transactions (Amicelle & Iafolla, 2018). Failing short to detect suspicious activities that result in an actual case of money laundering consummated through a financial institution, regardless of how obscured, is seen as a total failure. For instance, the bank may be fined for AML violations if a customer used the bank's systems to send or receive a bribe and the bank neglected to identify and report the transaction (Gelemerova et al., 2018). Not only is the compliance standard for monitoring transactions high and sanctions overly harshly, but compulsively tracked. Though there is a general feeling of frustration among AML professionals about the lack of or inconsistencies in the guidelines provided by AML regulators regarding the core components of their AML obligations, like CDD checks and STR/SARs (Zavoli & King, 2021). The lack of clarity regarding the role of suspicion during suspicious transaction review partially stems from two major challenges. First, from the literal broad scope of suspicious behaviour (Raza & Haider, 2011). Second, the capability for banks to adequately develop suitable criteria to identify the money laundering transaction behaviour (Sinha, 2014). Critically, even when set compliance standards are met, it is still likely that substantial amounts of quality intelligence remain within the bank and never get passed onto the relevant statutory agencies due to the absence of definitive boundaries of the concept of suspicion and risk (Gelemerova, 2009).

The work of Zavoli and King (2021) on the challenges of implementing AML regulation found SARs as an activity that is dependent on expert perceptions and choice. They pointed out the lack of a specific standard during transaction review as a noted reason why AML professionals depend upon their individual's perceptions and choice. Suspicion tendencies

are often driven by the perceived topology of money laundering indicators discern during customer transactions scrutiny (Gise-SproÏe, Liodorova, Murniece, & Voronova, 2020). This is usually achieved using a test of economic rationality ascertained from information gathered through CDD measures (Axelrod, 2017). In this instance, the CDD measures provide the evidence base justification for a reasonable ground to suspect which transactions are proceeds from illicit origins (Hall, 1995; McLaughlin & Pavelka, 2013). Implying the act of suspicious activities reporting relies on the AML professional probability judgment on what constituent's unusual transaction. Hence, the practice of transaction monitoring and the underlying reasoning of intuition has turned suspicion into verifiable, actionable intelligence. Ideally, actionable intelligence allows experts to choose between available alternatives with a course of reasonableness (Gandy Jr, 2012). However, the judgment formulation process to arrive at reasonable suspicion justifies questioning the possibility of experts to access sufficient objective information on money laundering acts, required to estimate the level of risk in each transaction (Ferwerda & Kleemans, 2019). These findings further lead to a fundamental question bordering around the overall effectiveness of professional AML risk assessment judgment. How do AML professional build the judgment process to arrive at a given estimated probability of the likelihood to suspect or not to suspect?

An expert must apply an economic rationality test in order to detect transactions that may be unusual or not, supported by a rational economic explanation from the transaction related parties (Axelrod, 2017). There is a fundamental assumption that any financial transaction or activity that deviates from the expected customer transaction behavioural pattern is considered suspicious (Raza & Haider, 2011). Transaction monitoring is the first key component required to detect this behavioural deviation in an expected pattern, herein referred to as suspicious or unusual (Gordon, 2011). Here the documents gathered through the CDD provide a basis for establishing transactions rationality. For example, a transaction may not appear suspicious on the surface, but a review of additional contextual factors may create suspicion. On the other hand, a transaction's context, which may have seemed odd or suspicious at first, might turn out to be legitimate after additional CDD measure analysis. Essentially, a suitable CDD documentation review can provide justification that may allow

banks to apply for exemptions from the reporting requirement or give reasonable ground to suspect a transaction (Hall, 1995).

The FATF has developed various observable methodological guidance for detecting suspicious transactions based on collaboration with organizations committed to implementing anti-money laundering policies and initiatives (examples include the Asia/Pacific Group on Money Laundering (APG) and world bank; FATF, 2013-2017). The methods are summed under the following four thematic phases: (i) detecting and identifying suspicious transactions; (ii) evaluating the facts and context surrounding the suspicious transaction; (iii) connecting money laundering indicators to the assessment of the facts and context; (iv) and making the suspicious judgment, where the expert explains how the facts, context, and money laundering risk indicators allowed to reach a grounds for suspicion (FINTRAC, 2020). These measures typically aid a bank to form a suspicious judgment, and it is crucial to understand their dimensions and when they are especially likely to be a problem. Therefore, the next section of this thesis examines each of these measures.

3.2.4 Screening for and identifying suspicious transactions

The act of screening for and identifying suspicious transactions traditionally relies on human judgment (Hopkins & Shelton, 2019), but the use of automated systems followed by judgmental validation by financial professionals has become increasingly common (Demetis, 2010). For some banking activities, where numerous large-scale transactions take place frequently, this approach appears appropriate. Hence automated systems may be the only representational realistic method that helps financial institutions track customer transactions instantly for suspicious activities (FATF, 2014). Most banks' regulators mandate the use of monitoring system solution by banks for AML transaction screening. Banks essentially use behavioural/transaction monitoring solutions to flag up transactions for further review by an analyst (JMLSG, 2020b). These automated screening solutions may exploit customers risk rating, location risk rating, transaction channels risk rating or any other risk rating factors approved by the bank AML policies to identify money laundering typologies and indicators in their processed transactions (Esoimeme, 2018). These automated solutions are models driven by fixed rules that are subject to calibrated limits (Rocha-Salazar, Segovia-Vargas, & Camacho-Miñano, 2021) used for transaction outlier

detection. A model can be any system or procedure that imitate a predefined rule to reduces the initial complexity of monitoring large transaction sets for easy inference (Demetis, 2010). Raza and Haider (2011) noted that a transaction that does not conform to the expected behaviour of a customer is suspicious because it is an outlier. According to Hawkins (1980, p.1), *"the intuitive definition of an outlier would be an observation which deviates so much from other observations so as to arouse suspicions that it was generated by a different mechanism".* Screening solutions detect for outliner in transactions through two criteria (Zhu, 2006). First, it compares customer occurring transaction record against account historical transactions patterns, which are considered consistent with customers set CDD parameters. Second, it compares customers transaction pattern against similar peer group to determine if the behaviour is unusual. For example, it will be suspicious if the income generated by a local petrol station looks exceptional high compared to other petrol service outlet in the same locality.

The FATF (2014) recommends that the intensity of the extent and depth of transaction screening solution should be a function of the risk-based approach. It is implied that in situations with higher perceived risk, more intensive monitoring should be required, while in situations with lower perceived risk, banks may choose to reduce the frequency and intensity of monitoring. The use of automated systems during the screening of suspicious transactions requires a highly prescriptive approach to the risk assessment, based on specified money laundering indicators checklists. Each money-laundering indicator is assigned values (Merrell & Van Horn, 2010), leading to an overall weighted value used for the risk prediction (e.g., high risk, medium risk, and low risk- Michie and Cooke, 2007). Then, a general behaviour is a model as normality behaviour across for all customers profiled under the same segmented risk-rating classification, for screening solution to detect an abnormality. Thus, customer individual unique circumstances per situation outcome are not adjudged during model screening functionality (Demetis, 2010).

The definition of (ab)normality is the trigger component for screening solution to decide what to look for (Amicelle & Iafolla, 2018). That is, if there is a breach of the normality constructed, the system generates an alert. Hence, the alert systems depend on the combination settings of the screening parameter of risk and (ab)normality. There is a substantial amount of anomaly screening techniques suggested in the literature to detect

suspicious financial transactions. Some examples include clustering frequent pattern analyser (Gao & Xu, 2009), social networks analyser for social behaviour (Colladon & Remondi, 2017), and clustering frequent pattern visualization (Umadevi & Divya, 2012). Yet, despite the increasing advancement in AML screening technology, the limitation to independently validate each transaction authenticity as suspicious remains an imaginative evolution yet to be a witness. Consequently, the task of monitoring money laundering risk by system remains a core aspect of AML researchers and practitioners in practice.

Automated systems driven by robust information technology have always been critical parts of the process for financial institution screening for and identifying suspicious transactions. But the resulting high volume of false-positive alerts generated by these systems continues to be a major challenge encountered during usage (Sven, 2020). As such, only a trivial percentage of these generated reports result in actual suspicious activity report (SAR) filings. Furthermore, money launderers pay special attention to ensure their transactions remains normal as possible to avoid detections as outliers (Raza & Haider, 2011). For instance, the majority, if not all, computer programs used to detect suspicious transactions generate a large number of "false positives.". Usually between 95 and 98 percent of results are false positives. These false positives must be verified by human investigation to determine whether they are perceived to be linked to proceed from crimes, which must be reported (Lannoo & Parlour, 2021). Conversely, financial institutions have continued to invest in people to acquire the required skills, since suspicious activity reporting relies on the investigation of alerts as problems that shed light on situations that disturb a set of expectations about normality (Amicelle & Iafolla, 2018). To arrive at a judgment if a suspicious transaction flagged is linked to illicit activities requires further assessment of the facts and contextual elements involved in the transaction (FINTRAC, 2020). Consequently, the section next examines facts and context, which are factors considered to create a picture that supports the AML practitioner in forming a suspicious belief.

3.2.5 Facts and context

Facts and the context surrounding a transaction provides pathways to arrive at a suspicious judgment (FINTRAC, 2020). Richardt (2021) defined facts as something that has happened or things that exists and can get confirmed by different, independent sources. Facts regarding a transaction, for instance, might include the day, hour, place, sum, or category of bank

service product. Additionally, information about a suspicious transaction may include the financial history of an account, business lines, customer account information, or personal contact information for a customer or corporate entity. According to Gordon (2011), suspicion is the conclusion arrived after consideration of relevant facts surrounding a transaction that point towards evidence of money laundering. Here, the transaction context plays a significant role in determining suspicious transactions. Context is the information that clarifies the suspicious facts in a transaction to aid judgment relating to suspicious transactions (FINTRAC, 2020). The context is essentially required to differentiate between what may make a fact in a transaction appear suspicious or not, in each scenario. For instance, a person making deposits to a personal account might have an income or job that is inconsistent with the amounts of the deposits (fact) and may also keep changing the justification for their deposits without being able or willing to do so.

The strength of the evidence pertaining to money laundering is highly transaction-specific and context-sensitive. For some transactions, the evidence that indicates that a transaction source of funds may originate from illicit activities may be obvious, but others require proper interpretation of suspicious behaviour hidden between lines. Consequently, the significance of the evidence varies according to the complexity of the money laundering techniques employed by launderers. Facts relevance and context are crucial to decision making (Rubinson, 2010). The relevance of facts and context enable experts to distinguish between what might be suspicious and what might not make sense in a particular situation. The AML practitioner in a bank is an expert who produces specific facts relating to money laundering crimes. These facts include data about the customers' identity, transaction types, transaction pattern and other data relating to each customer that should aid an understanding of the context data when put together to decide that each transaction traceable to an individual customer is economic rational or not. Typically, facts within this circumstance may originate through either analysis theory-laden, or mediation approach (Rubinson, 2010). These analyses differ on some dimensions, but the degree to which the risk gradation is subjectively or objectively based is the principal deviation. On one end of this ambit, the theory-laden approach hold that facts observe or perceive during risk prediction is influenced by and interpreted through the professional's own existing beliefs, values, assumptions, and expectations (Tan, 2016). In this instance, facts only become

relevant given the law deems relevant (Rubinson, 2010). On the other end of the ambit, mediation approach filter for facts with no established and binding rules, but rather apply norms in the light of the complexity of the circumstances (Rubinson, 2010). The advantage of this approach is that it moves from facts evident, with laws, to the degree they can be viewed as laws at all, arising from context. This approach, it has been argued, is more appropriate when analysing for facts under conditions of uncertainty, most especially in circumstances where the information available is limited and of poor quality. The dominance of interpretive statement over cold facts alters the quality control of suspicious activity reporting into an argumentative battle between the State controlled regulatory institutions and AML obligated entities (Amicelle & Iafolla, 2018). Further, the vague definition of what constituent suspicion and the absence of an exhaustive guidance as to what constituent reasonable suspicion is expected to increase the difficulties encountered by reporting entities to structure transaction appropriately to avoid overreporting (Loh, 2020; Sinha, 2014; Takáts, 2011).

The challenge during risk assessment of suspicious transactions is that, in the absence of a potent burden of proof needed to establish truly suspicious transaction and confronted with potentially devastating consequences of missing an actual case of money laundering transaction, the existing risk assessment framework prioritises the use of indicators to support judgment. These approaches to facts and the presented context analysis may form the basis for a common understanding for a transaction to be suspicion, and thus further facilitates the linking of the observed transaction to known typologies and risk indicators of money laundering.

3.2.6 Linking money laundering indicators to your assessment of the facts and context

In addition to difficulties establishing the facts and context surrounding a suspicious transaction, another strain for those completing risk assessment for suspicious activity reporting is the ambiguous evidence to identify particular acts of illicit funding (Bergström et al., 2011). In the light of the lack of a substantial evidence base, the option of depending on indicators as signals for money laundering activities becomes absolute. This approach is particularly relevant to reduce the degrees of uncertainty in decision making during circumstances of incomplete information to validate the authenticity of facts and contexts in a given instance (Brockett, Derrig, Golden, Levine, & Alpert, 2002).

The FATF, law enforcement agencies and other competent authorities involved with AML programs typically investigates various money laundering crimes typologies to formulate indicators (Gordon, 2011; Plaksiy, Nikiforov, & Miloslavskaya, 2018). Money laundering risk is represented by various parameters unique to money laundering activities, such as large cash payments (Demetis, 2010). Such parameters can then act as proxies for modelling money-laundering behaviour. Money laundering indicators typically originate from various facts, unusual patterns, behaviours, or order irregularities recognised in customers transactions trends. This system also draws on the review of high-quality suspicious transaction reports submitted by AML regulated entities to update the list of available indicators in the public domain (FINTRAC, 2020). It is equally important to note that, the regular updating of the indicators list help increases the numbers of scenario available for practitioners to link cases during decision making. These risk indicators are specifically delineated to enhance the ability for easy identification of suspicious activities linked with the various forms of money laundering techniques (FATF–EgmontGroup, 2020). Regularly, AML Practitioners are encouraged to consider the significance of the risk posed in each set of financial transactions based on similarity with established indicators of money laundering crimes. In this way, money laundering indicators serves as red flags of suspicious activity that suggest an unusual act. The presence of an indicator alone, might not provide a justification to conclude a suspicious transaction judgment, the evidence should prompt further detailed analysis of the transaction.

Gordon (2011) maintained that linking transaction patterns to existing money laundering indicators helps guide practitioners in knowing transactions with a higher likelihood of money laundering crimes. He noted further that the detection of money laundering activities would be challenging for financial institutions without money laundering indicators. However, Savona and Riccardi (2017) suggest that the lack of quality data for the formation of money laundering risk proxies is a principal challenge encountered during the development of money laundering risk indicators. Similarly, some money laundering indicators are difficult to quantify. For example, the recent work of Maskus, Peri, and Rubinchik (2021) on the theory and identification of business-based money laundering identify variation in commodity prices as an indicator of money laundering risk. In addition, the FATF noted that any form of anonymity in a financial transaction is a red flag indicator

(Pocher & Veneris, 2021). Bearing these circumstances, then there cannot be a final list of money laundering indicators (FATF–EgmontGroup, 2020). Therefore, bearing the uncertainty surrounding some money laundering construct, it will be logical to suggest that there cannot be an exhaustive wrapped up list for all existing money laundering indicators. Hence some level of uncertainty in decision making when professionals encounter transactions without familiar money laundering indicators.

Moreover, adopting money laundering indicators as a yard stick for judgment making might lead to bias in the unconscious acceptance of transactions with any indicator's element as suspicious (Demetis, 2010). Hence resulting in the number of false-positive reports. For example, if a trading entity is registered or has offices in a jurisdiction with weak AML/CFT compliance, all transactions consummated by the trading entity are tagged suspicious. Indicator's absolute may not provide a clear indication of suspicious money laundering activities but can inform the decision for prompt confirmation of the facts and contextual elements surrounding transactions or behaviour flag by each specific indicator (FATF–EgmontGroup, 2020; FINTRAC, 2020). As new categories of money laundering risks emerge through the latest money laundering scandals or accumulated through AML reporting pathways, attempts to capture them through an ever-expanding list of risk categories evolve (Bearpark & Demetis, 2021). However, Gelemerova (2009) concludes that money laundering risk is ambiguous and without clear indicators to gauge decision-makers to know precisely when transactions are genuinely suspicious. Human judgment remains crucial during the evaluation of collected money laundering related data, especially in a circumstance whereby data required for accurate decision are uninformative, unavailable, incomplete, or conflicting (Hanea & Nane, 2019). Hence the need for human judgment in establishing which transactions flags by these indicators facts is accurate statements of suspicious activities (Longworth, 2018). Thus, prompting for the review of how professional make the judgment to arrive at reasonable grounds to suspect next.

3.2.7 Making judgment on reasonable grounds to suspect

Suspicious transactions occur regularly, and there is currently no quantitative model that can independently confirm transactions funds with specific illicit activities origin. It takes a lot of work for staff members to manually examine flagged transactions (from systems) to determine whether they are suspicious or not (Demetis, 2010). Suspicion is a subjective

concept that falls short of proof based on substantial evidence, and a human concept that is very difficult to replicate in monitoring software solutions (Lannoo & Parlour, 2021). Suspicion is more subjective than speculation because it is grounded in fact. A suspicious transaction is "a degree of satisfaction and not necessarily amounting to belief but at least extending beyond speculation as to whether an event has occurred or not" (sinha, 2014, p. 78). Hence human logic is depended upon during the judgment process of discerning suspicious transactions (Simwayi & Guohua, 2011). Scholars studying facts as a disposition often focus on the relationship between factual truths and the interpretation of available evidential traits. Money laundering risk assessment is about the detection of factual truth.

Evidence of money laundering risks in a financial transaction may present an interpretation concept, which occasionally influences the outcome of the judgment process. Interpretation gives rise to an inference process that requires the contribution of both direct and circumstantial evidence. On one hand, circumstantial evidence allows inference from the context surrounding a transaction. On the other hand, direct evidence is an inference that comes from within the risk assessor actual knowledge (Greenstein, 2008). Importantly, all forms of evidence must go through some form of inferential process to reflect validity for purpose. However, it is crucial to consider the suspicious pieces of evidence with cognizant of the customer KYC information during decision making.

Money launderers are considered rational actors within the AML context (Simonova, 2011). They may occasionally create a false representation of their KYC documentation to access financial services. Yet, banks rely on these documents for intelligence gathering to predict transactions suspiciousness, despite not having the complete mechanism required for the independent verification of all the information collected during CDD (Viritha, Mariappan, & Venkatachalapathy, 2015). For example, in the absence of public registries with beneficial owners data, financial institutions have to depend on processes that determine the truthfulness of statements presented by their customers (Simonova, 2011). The facts composite in the context and money laundering indicators make up the essential elements to consider with the customer KYC information. Together, they must demonstrate and articulate an expert suspicion of money laundering in such a way that irrespective of whoever is interpreting the same element with comparable experience, background, or training would likely reach the same judgment (FINTRAC, 2020). Remarkably, financial

institutions may not verify the evidence found in the context nor money laundering indicators presence in a transaction that led to the suspicion. Neither are they required to prove that a money laundering offence has occurred, but the decision must be free from bias and prejudice. Law enforcement rely to some extent on the result of the risk assessment for intelligence and investigation. Furthermore, the bank AML practitioners cannot provide a definitive opinion because of the many variables associated with establishing a transaction with funds of illicit origin.

There is always the challenge of information insufficiency to ascertain a definite degree of suspicious level in a transaction due to a varying range of information, whose awareness might alter the initial decision. The lack of certainty as to the information sufficiency and, by extension, the dependent on KYC for further justification of identified unusual transactions create some uncertainty inherent in the production of the suspicious activity report. Thus, bank AML practitioner's opinion is expressed most qualified in probability, a metric commonly used for uncertainty (Kaplan & Garrick, 1981). Probability allows practitioners to adjust and deal with the uncertainty integrated with the absence of additional information that would support or confirm their aroused suspicion. Likelihood and consequences are the most appropriate probabilistic approach in money laundering risk assessment. Likelihood refers to the probability of an adverse event occurring (FATF, 2014). For example, what are the money laundering likelihood that the subject is laundering the proceeds of criminal activity? Consequences refer to the severity of the effects of the adverse event. For example, what are the consequences of the subject successfully laundering these proceeds? According to FATF (2014), banks should analyse information obtained to understand the likelihood of the risk of money laundering occurring and the impact that these would have. However, banks are not necessarily required to perform probability calculations, which may not be meaningful. With the reliability of the practitioner opinion ideally being validated and calibrated through a plot of the likelihood and consequences on a matrix, the likelihood and consequences approach encourages a robust logical evaluation of probability value while limiting the possibility of over or underestimating the strength of the evidence presented. (Williams & Maskell, 2021).

The state of expectations in AML risk assessment does not only depend on the assigned risk probability of the underlying assumption, but also a function on the degree of confidence

used to determine the assigned probability (Freitas, 2021). Pulling this fundamental principle together may suggest that AML experts estimate the probabilities and consequences using various judgmental data correlation analyses on an array of indicators. It is often sufficient to use a variety of expert opinions that are synthesised by the professional environment to gain an objective understanding of the causes and factors underlying the spread of money laundering. The element of chance is dependent on the nature of money laundering (Korystin et al., 2020). However, the decision regarding the risk level is subjective to some degree. Different persons can have different views on the very same financial transactions. The lack of consensus and certainty regarding the amount of information and, consequently, suspicion required to act appropriately is a common worry in the broader field of controlling, from street stops to counterterrorism procedures (Alpert et al., 2005; Fagan and Geller, 2015; Stalcup, 2015). This position from the decision-maker perspective entails blurred boundaries of accountability (Helgesson & Mörth, 2016), and thus the concept of suspicion as a subjective reality (Sinha, 2014). Human judgment is required to determine the validity of facts in the presented context through sensitivity to the purpose and intents with which the facts stand (Longworth, 2018). A basic assumption of many social sciences is that facts are not a function of determining it, but it is a matter of cognition because the human brain has to screen what is essential from the bulk of information during decision making (Rubinson, 2010).

According to Longworth (2018), having the facts under consideration can leave scope for human judgment in arbitrating their accurate description, constitution, or classification. Especially in circumstances where the same facts may present themselves in different contexts but may appear identical to an observer because the practices, ideas, and material conditions of the context in which the facts present themselves yield the interpretation (Stephens, Markus, & Townsend, 2007). There is evidence that suggests that people depend on heuristics principles to make judgments under uncertainty (Kahneman et al., 1982). An evolved system called heuristics are commonly used in judgment and decision-making to lessen cognitive load and minimize error (Kahneman et al., 1982; Scheiter et al., 2020). Such heuristics help diminish the complex tasks of assessing probabilities. They further noted that, although these heuristics are highly efficacious, except they can lead to systematic and predictable errors (Tversky & Kahneman, 1974). As a means of reducing cognitive load and

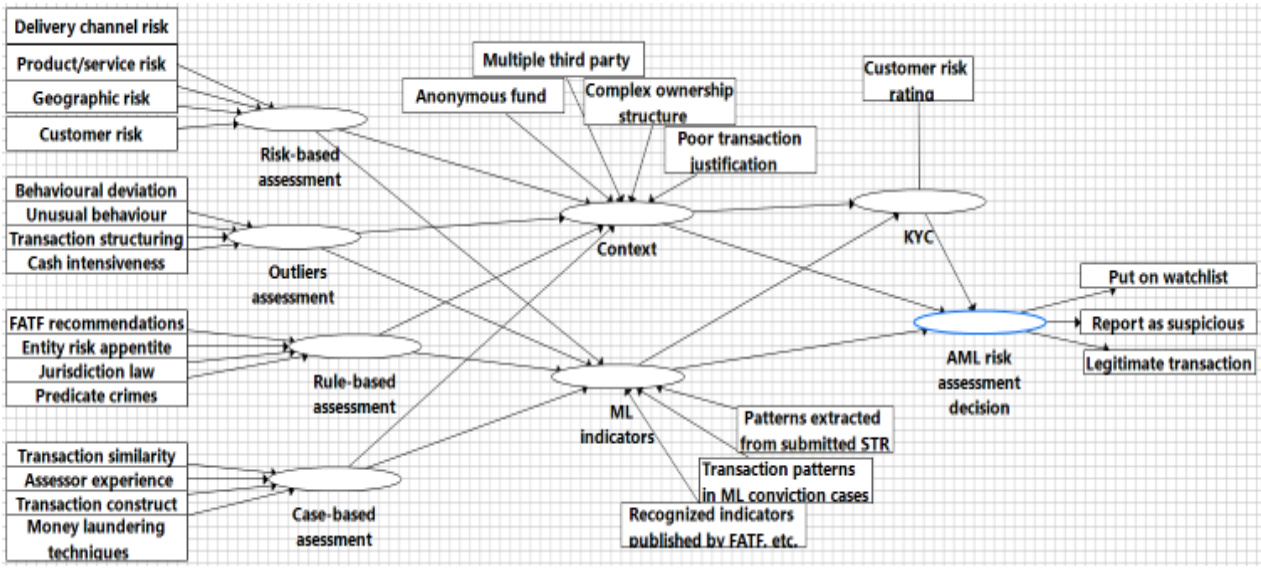
minimising error, heuristics and causal attributions are utilized in judgment and decision-making. This method may be biased in favour of direct evidence due to the understandable, albeit false, notion that some observational forms are superior because they don't require context interpretation, as opposed to other observational forms that do (Greenstein, 2008). For example, transactions involving enormous amounts of direct cash payments may generally raise a relatively high level of suspicion than transactions involving insignificant transaction amount. In fact, there are significant elements of speculation faced by the AML expert during decision- making on SAR, and there is also a clear link between the effectiveness of AML risk assessment and human judgment quality in this context (Canhoto, 2008). In the light of a physical indicator to determine what is suspicious, the process of detection has to be based on a subjective, impressionistic assessment of the risk observer (Sinha, 2014).

This circumstance is one contemporary emanate that AML practitioners must confront during decision making. The model in Figure 1 describes the various means to establish evidence required to justify a suspicion threshold judgment enumerated by the risk assessment approaches identified in prior research work. In the model, the process of making suspicion judgment is postulated as a deduction related construct, comprising direct-evidence components (money laundering indicators) and circumstantial-evidence components (suspicious context).

3.2.8 Toward an integrative view of the complexity of AML risk assessment

I draw on the suspicious transaction literature review on suspicious transactions (FINTRAC, 2020), money laundering indicators (FATF-EgmontGroup, 2020; FINTRAC, 2020; Pocher & Veneris, 2021), risk assessment approach (Ross & Hannan, 2007), outliers' assessment (Demetis, 2010; Hawkins, 1980; Raza & Haider, 2011; Zhu, 2006), and context (FINTRAC, 2020) to develop an integrative view (see Figure 3) of the AML risk assessment decision model. The validity of this Figure 3 decision model was revalidated in Chapter 5 during the semi-structured interview with AML experts conducted (see section 5.4.2). The Figure 3 model was also specifically developed to describe the complexity of assessing AML risks and as part of building this thesis's theoretical framework (further discussed in Section 4.1 and 4.3.1 of Chapter 4).

FIGURE 3. AN INTEGRATIVE VIEW OF THE AML RISK ASSESSMENT DECISION MODEL



Source: Present author.

3.3 Core challenges for AML risk assessment of STRs

3.3.1 Risk categorization

The FATF recommendations set out the risk-based approach as the international standard for implementing measures to combat money laundering. The risk-based as such becomes the foundational guideline for implementation of the AML regime to adequately addresses identified higher-risk customers (FATF, 2012-2020a). However, in practice, the actual formality of the risk-based model leads to variance in the AML risk effectiveness across institutions. For example, AML stakeholders within the various financial institutions may interpret risk differently due to their reliance on different models, techniques, and practical tools (Savona & Riccardi, 2017). Furthermore, there are no specific established criteria for financial institutions to adopt for the segregation of customers into risk categorization in order to channel monitoring resources commensurate with each customer's perceived risk profile (Grosu & Mihalciuc, 2021). Hence, risk categorization has a direct implication on a host of the AML scheme administration processes, which may include mechanisms to coordinate actions to assess risk, cost, ongoing monitoring, risk mitigation plan, and the act of suspicious transaction reporting.

Another concerning issue with risk categorization is the objective for AML stakeholders to set criteria and parameters used for customer risk categorization. With this objective, money laundering risks are categorized into low, medium, and high-risk categorizations

under the assumption that risk can be better managed when structured into constituent components. Surprisingly, this belief is just a characteristic of a reductionist approach (Demetis, 2010), which operates contrary to the fact that risk is not a physical substance that may have different constituents but a concept that is intuitive in notion (Holton, 2004). As such, the operationalism of risk in the form of categorization is seen as a function of the aspect of perceived risk imposed by the observer. Since the process of risk categorization is an act that enables the observers to determine the process of breaking up risk into labels imposed by the observer risk perceptions (Savona & Riccardi, 2017). Furthermore, even when AML stakeholders are able to successfully designate the various money laundering risk into various categories, every profile in each designated categories does not default the totally of the risk categorised, for example low - risk customers (Demetis, 2010). Demetis further noted this as the foundational mistake of the risk- based approach. Consequentially, AML risk assessment and the related actions of filing STR/SARs accordingly becomes an act that depends on individual perceptions and consequentially leads to inconsistent approach response to responding to potential suspicious activities (Zavoli & King, 2021).

On another level, one may need to look out how risk categorization help increases risk prediction across a host of other field. To date, it will appear that risk categorization remains one of the main instruments used in risk assessment to inform judgment on risk prediction. However, the effectiveness of risk categorization in the risk management domain has come under criticism across different professional applications in the last few decades. For example, in the field of clinical science, Large, Ryan, Singh, Paton, and Nielssen (2011) examined the predictive value of risk categorization as applied in a schizophrenia-related range of harms and observed risk categorization resulted in a large proportion of false-positive risk ratings. Their study noted that categorization is a flawed way of deciding isolated events risk, despite the growing acceptance rate of categorization in risk management strategies. While Augustyn and Ward (2015) work on the evaluations of procedural justice suggests a higher likelihood of offending among individuals with low evaluations of procedural justice doctrine. Similarly, in the banking industry, Zhou, Qi, Xiao, and Wang (2021) suggested that the supervised multi-label risk classification models are suboptimal due to the lack of labelled data and diverse combinations of risk types. In sum, the application of subjective and arbitrary risk categorization techniques may impede

financial institutions aspiration of detecting every money laundering related transaction (Bender & Panz, 2020).

3.3.2 Regulatory distortion of the risk assessment process

Anti-money laundering regulations are policies, laws, or legislation for combating money laundering and defines offences that constitute money laundering crimes. Despite their importance and advantages, AML provisions issued as guidance to financial institutions must be promoted not to unduly hinder the objectives of AML during the attempt to enforce compliance. Though, the high money laundering vulnerabilities of the financial sector as a result of the several numbers of essential services carried out by the banks is considered sufficient to justify some public intervention and control. The operationalization and meaning of the most appropriate level of anti-money laundering regulations nevertheless remain unclear and not specify in great detail (Bergström et al., 2011). The recent shift from the rule-based to risk-based regulation has called for further discretion for banks to decide what is a suspicious case, in light of the rigid, formalistic, bureaucratic, and entailed high administrative burden inflicted by the rule-based approach (Unger & Van Waarden, 2013). Significant disagreement nonetheless persists regarding the scope of regulatory intervention required. For example, Menz (2020) work suggests that risk management efforts in banks have adjusted in response to the risk-based approach, from the financial crime risk analysis to a document-collection exercise. This shift was necessary to mitigate regulatory risk. Because the financial regulators equally adjusted in response to the significant changes brought about by the risk-based approach. They formulated AML prevention or mitigation measures intending to target activities with higher money laundering risk vulnerabilities. These have specifically involved the risk segregation and classification of many activities as low, medium, and high, with possible combinations between the different categories, dependent on expert judgment, breakdown of the distinctions between high and low-risk jurisdiction, simplified and enhance due diligence. Gelemerova et al. (2018) note that because of the regulatory focus on national risks rather than case-specific ones, banks are more likely to categorize partners and clients' risks based on their nationality or country of origin than on their behaviour, which results in an unfavourable bias against a group of potential customers. A more recent regulatory strategy in the AML legislation has called for an extension in bank responsibility from the provision of

electronic and other records for evidence of criminality to a position of being held liable for money laundering activities uncovered (Lannoo & Parlour, 2021). While some other scholars also noted that the KYC approach in the risk-based regime not only had it failed in preventing the abuse of banks for money laundering but is now regarded as a cover papering over the real issue in banks.

A series of new regulatory distortion debates with the AML space has arisen as authorities have attempted to construct a new risk designation era. Attention has focused on risk designation such as country risk instead of championing the need for all-inclusive risk analysis (Gelemerova et al., 2018). The diversion of attention from resolving the main issues is a possible direct consequence, which flows from this subjective nature of risk assessment focused on conduct-specific risk. The AML regulations in the eyes of the regulators have move considerable from precise to vaguer norms with the move from rule to risk-based regulation (Unger & Van Waarden, 2013). A number of other areas have also required specific strategies such as better information sharing; powers, procedures, and tools; understanding the threats and performance metrics; enhanced capabilities, international strategy, risk-based supervision and risk base management; and transparency of ownership.

Recent events in national and international environment have further confirmed that AML regulatory policies cannot be effective in isolation to tackle money laundering related offences. AML regulatory policy and appropriate legal framework must be managed more effectively while the absolute definition of suspicious transaction appear to have been ignored within the updated AML recommendations that have taken place in recent years. Reference has already been made to the importance of public and private strategic partnership in tackling economic crimes. Additional problems include the fact that anti-money laundering policy interventions have less than a 1% impact on criminal finances, compliance costs far outweigh any money that has been recovered from criminal activity, and banks, taxpayers, and regular people are punished more severely than criminal organizations (Pol, 2020). Risk aversion on the part of financial institutions, which seek to shield themselves from excessive scrutiny or penalties by financial regulators, can result in "de risking practices," where banks decide to end business relationships with clients who are deemed to be too risky (Halliday et al., 2019). Then, the box-ticking processes demanded by the legislators might be a hindrance, as these might deflect attention from

the fact that additional or other knowledge was required, giving rise to a false sense of control (Helgesson & Mörth, 2016).

3.3.3 The concept of reasonability and suspiciousness

According to the FATF's (2012-2020) recommendations, financial institutions should be required by law to report their suspicions to the financial intelligence unit (FIU) if they have any reason to believe that funds are the proceeds of criminal activity or are connected to financing for terrorism. In compliance with this recommendation, methodical suspicion, therefore, becomes the pathway for the detection of activities involving the proceeds of crimes (Fedirko, 2021). However, suspicion is a vague concept that requires definitive guidance to implement a reasonable suspicion threshold, which in this case is absent. According to Dion (2012), there are various questions concerning how suspicious acts may be related to AML risk interpretation. First, what does the term suspicious activity mean? Second, is suspicion equivalent to a probability or a possibility to observe an illegal behaviour? Third, how could the act 'reasonable' be interpreted? Fourth, how could organizational members know if their efforts were reasonable or not? These are related to the recommendation presented above, which has blurred the lines to detect the difference between transactions linked to criminal proceeds and genuine financial transactions consummated through various financial institutions platforms. The status requires financial institutions to report activities/transactions they suspect might have linkage to proceeds of crimes. Measuring the success of the SAR may prove difficult because of doubts about the extent of compliance (Hall, 1995).

Furthermore, whether activities could be suspicious or unusual typically depends on the risk observer perception of reality as obtained from the interpretation of available facts (Dion, 2012). Suspicion is a variable and malleable concept that equally depends on different mindsets and subjective judgement (Gelemerova, 2009). Yet, money laundering risks are nebulous and there are currently no publicly available established optimal suspicion threshold to guide the margin of the risks subjective judgment during decision making. In the absence of physical indicators, professionals detect money laundering acts based on their individual subjective and impressionistic assessment (Sinha, 2014). The concept of risk, however, is much more elusive and individualized in AML. It is about a risk judgment to determine whether a counterparty or transaction might be connected to illicit funds

(Gelemerova et al., 2018). As a result, it raises the question of whether the negligence-based reasonable suspicion test is appropriate given the criminal designation attached and the punishment that results from a conviction for failing to detect (Loh, 2020). Many proposals to address the practical issues have cantered on changes to the reasonable suspicion threshold, including suggestions to eliminate the objective "reasonable suspicion" strict liability or to implement a hybrid "reasonable suspicion" test requiring both subjective suspicion and objectively reasonable suspicion (Loh, 2020). There is a chance that the risk-based approach could at any time revert to over-compliance until more clarity is obtained because reporting institutions will want to prevent the feared risk of being reprimanded by the regulatory authorities (Gelemerova, 2009).

3.3.4 Reactive risk assessment strategy and high false-positive incidences

One essential measure of the capabilities of AML solutions is their sensitivity (Bearpark & Demetis, 2021). Sensitivity refers to the ability of a system to accurately identify those transactions with a high likelihood of been involved with proceeds originating from crimes. An optimum performing AML system can form a suspicion on a risk-sensitive basis to screen out transactions with a high or low likelihood of involvement with the money laundering act (FATF, 2014). However, the current challenge in the field is to identify associated links between suspicious transactions linked with crime proceeds (Shaikh et al., 2021). As Forstater (2018) noted, the existing framework operates based on identified suspected threat and the analysis of their nature, sources, likelihood, and consequences. Where threats and vulnerabilities concur in determining the probability of money laundering (Savona & Riccardi, 2017). This system makes the risk judgment formulation a static process that relies on prior typology studies, thematic assessment, expertise and may be confronted with the possible omission of potential complex environments that could occur during actual cases risk assessment (Chia, Keoh, Michala, & Goh, 2021). Another paradox is that KYC tends to be backward looking, which in current perspective cannot provide accurate account of behaviour changes in future. It needs to be noted that people change depending on their circumstances and typologies of money laundering have continuously been changing as a response to dynamics changes in the money laundering landscape (Mugarura, 2014). That is to say, risk assessment strategies were still largely responsive, leaving this left bank vulnerable to two factors: first, failing to recognize risk that was not assessed for; and

second, facing legal challenges as new cases from victims of money laundering crimes appeared in the court systems (Naheem, 2019).

More compounding is the fact that outliers that lead to the correct profile of suspicious condensed few suspected acts of money laundering transactions, but also with a corresponding massive volume of genuine transactions (Demetis, 2018). This has been noted as one of the issues that have made risk assessments of the individual risks resource-intensive, time-consuming (Menz, 2019). The government fines the bank if money laundering is successfully prosecuted, and because the bank failed to report the transaction, the government requires the bank to engage in expensive monitoring and reporting (Takáts, 2011). Even though the quality control of suspicion is both on "false-positives" and "false-negatives" reports, the pressure is primarily on the reported missing (Amicelle & Iafolla, 2018). The main consequence, which flows from this asymmetry in the incentives is the defensive reporting by banks, thus potentially flooding the authorities with information overload (Gara & Pauselli, 2020; Sinha, 2014).

3.4 Examining the AML risk judgment

Similarly, since the early-21st Century, considerable change has taken place in the methodology for money laundering risk assessment from the rule-based to the risk-based, as promoted by the FATF (FATF, 2013). In contrast to the earlier emphasis on the use of rule-based methodology, which involves strictly following state-provided rules for the identification of potential money laundering risks, the risk-based approaches emphasize that AML regulated institutions understand where their risks lie in order to make the risk-based approach effective. Implying, AML regulated entities now take ownership to ensure reasonable steps in the identification and assessment of the money laundering risk within their business. Given such shift, there is uncertainty associated with determining, predicting potential future money laundering risk and there is a reliance on judgmental professional evaluations of relevant risk indicators. Although the implementation of the AML risk-based approach methodology has differed from one organization to another, the establishment of global standard and the establishment of AML regulatory framework has been generally regarded as the natural system for AML coordination without paying attention to the accuracy of judgements made by AML professionals.

Demetis and Angell (2006) have investigated the systemic effect of AML-technology and demonstrates many false assumptions being made. Their analysis shows that the use of technology in partly automating the generation of suspicious report is risk generating. Since there is, however, a limit to what these models can do for regulated entities. Unlike many other components of criminal justice risk assessment, money launderers are proactive and responsive agents that actively seek ways to infiltrate regulatory strategies as well as ways to avoid them (Ross & Michelle, 2007). Therefore, an expert's judgment is necessary for the completeness of an AML risk assessment. The experts utilise the raw transaction data and reconstructs the information encapsulated based on secondary frame distinctions imposed by the organisational, regulation and personal factors to make risk estimations.

Human expertise is an integral part of assessing money laundering risks and has served as a crucial element of the risk management solution in money laundering risk assessment. Given this perspective, one might expect that much research in AML risk assessment would involve comparing experts' judgments accuracy from different institutional backgrounds and across genders. Yet, research has been limited on the role of individual evaluations in identifying and assessing money laundering risks, particularly in the assessment of customer risk. Consequently, there is an urgent need to investigate the quality of human judgment in the context of AML, regarding several underlying accuracy components, including calibrations and resolutions. It is critical to have the appropriate level of judgment and confidence in such a situation as underconfidence can lead to unnecessary delays in assistance, whereas over-confidence can result in excessive trusting and authorising a high-risk offender.

The use of human intelligence and other resources to help distinguish suspicious from nonsuspicious transactions has been a central research problem that has emerged in the wake of high-profile money laundering cases involving financial institutions. Meanwhile, the financial industry faces increased pressure to reduce the proliferation of false positives that thwart genuine transactions. In response to improve money laundering risk assessment accuracy, a risk-based approach, for example, has gained attention. Oriented towards AML risk assessment measures using a risk-sensitive approach, in contrast to the rule-based methodological approach used earlier when the state provided rules for identifying potential money laundering risks. Unfortunately, one person's view of a risk does not

necessarily accord with another's. The shift from an overly prescriptive approach to one that is more risk-based is likely to create more uncertainties, which in turn will call for a greater reliance on professional judgment based on analysis of various relevant risk indicators. This project argues that when experts heavily rely on designated money laundering risk topologies, the cost of systematically calculating risk parameters may not be justified due to their failure to fulfil the intended function.

Although, there are good reasons for AML experts to form risk opinion in line with existing AML risk recognised and incorporated by their organisation or statutory jurisdiction, as judgment of their own estimation. Which is currently a professional practice within the financial industry. The FATF (2012) recommends, for example, that financial institutions apply due diligence measures to business relationships and transactions with individuals and legal entities from high-risk countries. Consequently, all transactions which may be associated with people or businesses from these allegedly high-risk countries are viewed as high risk and signalled as red flags. The term 'red flag' refers to pre-established circumstances that are viewed as unusual in nature or differ from the expected conduct (DiNapoli, 2008). Therefore, risk is represented by various money laundering-related parameters, such as large cash payments (Demetis, 2010). As a result, expert risk estimates take into account not only pre-existing typologies but also the behavioural traits of the already well-known suspect customer base. Nevertheless, how these risk topology features affect the quality of AML risk assessment is a research issue pertinent to the present study.

In addition, while AML experts should follow a risk-based approach during risk assessment, the focus may shift from identifying and assessing money laundering risks to gathering information to mitigate regulatory risks (Menz, 2020). More broadly, this thesis argue that the organisational approach to money laundering risk plays a notable function in the operation of the AML risk assessment. The strength of this argument stern from the fact that AML experts need to consider not only whether their reasonable belief will reflect their organisation framework, but also whether the reasonable belief is in line with the statutory requirement. If not, experts are deterred from choosing the optimal decision, thus distorting optimum decision making.

In AML risk assessment, there are significant reasons for experts to recognise and adopt the customer and transaction risk profile designated by their organisation or statutory

jurisdiction as if they were risk judgments of their own perceived estimates. For instance, the FATF (2012) advises financial institutions to use due diligence procedures when dealing with natural and legal persons from high-risk countries. As a result of this classification, every transaction that may be associated with persons or businesses entities from these allegedly high-risk countries are perceived as high risk and signal as a red flag transaction. A red flag is a set of pre-established circumstances that tend to be viewed as unusual in nature or vary from the expected behaviour (DiNapoli, 2008). Red flags observed in customers transaction triggers further detailed risk assessment, and the refusal to act by AML practitioners or those due to recognise and investigate would tend to undermine risk-based principles, creating uncertainty and increasing sanction costs.

Risk is, hence, a representation by various parameters related to money laundering, such as large cash payments (Demetis, 2010). In other words, there's the threat of AML risk assessment becoming a bureaucratic decision. The implications of this approach on risk judgment are more of a threat to the quality of risk judgment rather than a positive since current processes lead to categorisations. For example, banks must adopt methods that identify money laundering based on relatively perceived riskiness (low or high) of factors such as the location of the customer, the type of bank product used, and the geography of the transaction (Premti, Jafarinejad, & Balani, 2021). When interpretive statements replace cold facts, risk estimates evolve to a predetermined judgment based on consensus estimates about the exact nature, form, and extent of the problem. As a result, the risk terminology masked or legitimized new forms of discrimination and exclusion during risk assessment (Amicelle & Iafolla, 2017). Thus, provides criminals with opportunities for exploitation, which is avoidable if AML risk should instead be assessed on a case-by-case basis. The risk-based principle expressed within the context of AML risk assessment allows for a stylised categorisation of risk, which will help experts determine their estimated risk perceived level (FATF, 2014). There is no doubt that people evolve based on their circumstances, and money laundering topologies are continuously evolving in response to the dynamic changes in the modern market landscape. Against this comparative and the International Standards on Combating Money Laundering backdrop, subsequent profiling of customers perceived risk level then acquires a different character; one that is informed not only by already known typologies but also of behavioural characteristics of a pre-

established suspicious customer base. Hence, this study argue that AML risk assessors' judgment decision are systematically calibrated to the extent of designated risk category produced by their organisation or jurisdiction statutory limit.

Following the thought of Greenstein (2008), this project intends to distinguish between visible suspicion and intuition generated suspicion through the experimental study presented in Chapter 6. An experimental study presented in chapter 6 will identify indicators categorized as high risk by the FATF regulatory framework to identify visible suspicion. Visible suspicion comprises of both the visibly suspicious transactions involving known money laundering topology, negative media coverage, law enforcement inquiries, judicial orders and court documents about a customer or their affiliate. After all, the identification of visible suspicion during the risk assessment processes may influence the assessor's confidence in the accuracy of their judgment. This bias favour visible suspicion against other kinds of intuition-based suspicion that require further in-depth analysis, which is understandable, although mistaken, to think that certain types of observations are "better" than others since they (assessors) will carry out little or no interpretative effort (Greenstein, 2008).

There are costs associated with risk categorisation. It poses problems of false positives, false negatives, and systematically confidence calibration. A systematically confidence calibration may fail to view a high-risk customer as such, just because the transactions satisfied basic procedural norms, and it may allow recognition of normal transaction as high risk, just because it fails to satisfy basic procedural norms (Baumgartner & Whytock, 2022). Money launderers are proactive and responsive agents that actively look for ways to infiltrate regulatory strategies as well as ways to avoid them, in contrast to many other elements of criminal justice risk assessment (Ross & Michelle, 2007). In addition, while AML experts should follow a risk-based approach during risk assessment, the focus may shift from identifying and assessing money laundering risks to gathering information to mitigate regulatory risks (Menz, 2020). More broadly, the position of this study is that the organisational approach to money laundering risk plays a notable function in the operation of the AML risk assessment. The strength of this argument stern from the fact that AML experts need to consider not only whether their reasonable belief will reflect their organisation framework, but also whether the reasonable belief is in line with the statutory

requirement. If not, experts are deterred from choosing the optimal decision, thus distorting their decision confidence level.

According to Lannoo and Parlour's (2021), the dynamic risk assessment may also be based on the following four pillars: Subject matter expertise: Takes into account what is already known about suspicious activities. Finding outliers involves taking into account behaviours that deviate from the typical profile for a given customer segment. Identifying anomalies involves observing abrupt shifts in customers' behavior over time. Network analysis: Displays connections and relationships between various system players. Analysis via each of them will result in a probability of 'suspicious' activity taking place which will be explored in detail in Chapter 5. At the heart of the issue, however, is that suspicion is a human concept, and it is very difficult to teach a computer to be suspicious, as opposed to highlighting unusual transactions in relation to set parameters. Human intelligence must not be left out of any AML assessment system (Lannoo & Parlour, 2021).

Many of the mechanisms by which experts' judgment might influence the outcome of a risk assessment, e.g., organisational accountability, Operating jurisdiction related factors or their personal factors-are yet to fully explained in the academics. However, the risk-based assessment approach provides the basis for the risk-sensitive application of AML measures. In contrast to earlier risk emphasis on the rule-based methodology, in which the State provided rules for the identification of potential money laundering risks, the risk-based approaches emphasize that AML regulated institutions understand where their risks lie to make the risk-based approach effective. As a result of this shift, there is an increased uncertainty associated with predicting potential future money laundering risk, as well as the reliance on judgment derived from professional evaluations of relevant risk indicators. High level of expert dependence on their organisation designated topology may be one indication that the systematically model risk parameters is not accomplishing the intended function and therefore may not justify its potential cost.

For the purposes of this study, it is particularly significant that laws based on FATF standards oblige millions of financial institutions and other businesses to comply with complex compliance requirements, confirm the identities and sources of funds of their clients, keep track of financial transactions, and report certain types of transactions and "suspicious" activities to authorities (Pol, 2020). Even though banking institutions have automated risk

management systems, assessing the risk of money laundering requires manual (human) expertise. The frontline officers' support and the regulatory authority's monitoring efforts are seen as complementary to the support provided by the compliance department, which should have increased the level of compliance in the banking institutions.

There are few studies on the role of the individual in determining the likelihood of money laundering, particularly when it comes to determining the likelihood of customers. Although banking institutions have access to a variety of automated solutions for evaluating money laundering risk, a human factor is still necessary. This study aims to add value to the existing literature on money laundering risk assessment because there is little published research that examines the role of an individual in the fight against money laundering (Isa et al., 2015).

3.5 Concluding remarks

The central idea in this chapter was that AML financial institutions keeps record of every transaction consummated through their platforms by customers or clients who use the platforms as a medium to interact with the environment (Berentsen & Schär, 2018). Record types could include hard copies and digital versions. Importantly, the captured information becomes structured in the form of financial and non-financial transactions that constituent how the institution observes. Prior literature on AML risk assessment suggests that financial entities set up their systems in an organisationally and technologically driven structure to sieve this information for AML risk assessment (Demetis, 2010). In most cases, it appears that these systems include models that incorporate already known typologies and characteristics of pre-established suspect customer bases when performing risk assessments. An important AML design goal is to address the problem of excessive and useless reporting, known as the 'crying wolf effect' (Takats, 2011).

Human expertise is an integral part of assessing money laundering risks and has served as a crucial element of the risk management solution in money laundering risk assessment. Earlier literature suggest AML risk assessment from the human point of view entails a tension between box-ticking and human judgement. In the risk judgment process, there is a heavy focus on checklist rather than the interconnectedness, memory, learning and intelligence that are involved with the risk judgment (Helgesson & Mörth, 2016). AML

experts make a number of decisions, including when to act based on what is viewed as normal and abnormal behavior as well as when to report suspicious client transactions. In light of this, their choices (asset confiscation) may have serious repercussions for matters of moral character and human rights.

With banks becoming more concerned with AML risk assessments, there is increasing debate about the effectiveness of the risk-based approach, which gives businesses discretion over what constitutes suspicious transactions. Human errors seem inevitable in the risk assessment process due to the considerable involvement of humans in monitoring, managing, and making decisions (van Duyne, Harvey, & Gelemerova, 2018). Despite these concerns, there have been relatively few studies on the effectiveness of individual-based roles in assessing money laundering (Isa et al., 2015). Some recent literature on money laundering points to a need for more research to link cognitive factors to the accuracy of AML risk assessments in financial institutions (Jamal et al., 2022).

In fact, there are relatively few research on the ineffectiveness of the risk-based approach in AML. While compliance in AML risk reporting is usually examined based on published reports, what happens inside an organization within compliance reporting communities, that is, within the black box, is often unknown (Pok, Omar & Sathye, 2014). The purpose of this study was to highlight some of these issues. Hence, this research project seeks to examine the quality of AML risk assessments in the contemporary context of the risk-based approach, and also linking this empirical situation into cognitive theoretical context. It seems appropriate to move on to the research questions and specifics of the research methodology in order to fill the gaps in the AML risk assessment described above.

CHAPTER 4 RESEARCH QUESTIONS AND DESIGN

4.1 Aim of the present study

This project aims to provide an exploratory examination of anti-money laundering (AML) risk assessments in the contemporary context of the risk-based approach, in which financial professionals assess the risk to which they are exposed and adopt suitable modification actions in accordance with their levels of perceived risk. In this study, the purpose was to evaluate the quality of expert judgment, as well as analyse factors that influence money laundering risk estimates. From this information the findings would be used to highlight the effectiveness of the risk-based approach in AML risk assessment.

Adopting a risk-based approach to AML, in which customers are risk rated based on elements like geographic risk, customer risk, and product or service risk, which may raise or lower the perceived risk posed by a specific customer or transaction, is problematic (Bello & Harvey, 2017). Money laundering detection, for example, has to be based on a subjective assessment of an assessor, as there are no physical indicators to detect money laundering risk (Sinha, 2014). Standard banking practices involve risk scoring, but the methodology may differ from bank to bank, starting with defining the relative riskiness of professions, industries, financial products, or countries (Amicelle & Iafolla, 2018). The adoption of the risk-based approach to AML is problematic as discussed in the literature. Of this approach, van Duyne et al. (2018, p. 267) states: *''The whole approach to AML has incorporated the human biases and social consensus about the precise nature, form and extent of the problem and has designed a response specific to the assumed nature and level of that 'threat', that suited the political decision makers beforehand''*. This statement provides rationale for the current research.

The main gap identified by the research questions was the need for a framework that would be appropriate for human reliability analysis of suspicious transactions. As discussed in section 1.2 of this thesis (page 15), money laundering crimes are associated with significant financial and human costs, so creating this framework for future research is deemed imperative, particularly in light of the difficulties associated with assessing money laundering risks (see Figure 3 on page 89). The specific aims were to:

- To examine the quality of AML risk assessment

- To provide an understanding of how likelihood judgments are formed within the context of AML risk assessment
- To develop a quantitative methodology for assessing the quality of AML risk assessment

This section describes the design process for the study. It explains the research questions and the methods chosen for answering the questions. In this section, the research question, the research plan is presented, as well as the belief system that influenced the design of the research.

4.2 Research question

Within the context of AML risk assessment, an expert's individual values and conceptions of risk affect how they make risk estimate judgments, and the expert's specific experiences influence this in many ways. Menz (2020) noted that AML risk assessment is a complex process, and the significant level of uncertainty in making accurate decisions may have contributed to a shift in experts' aim to satisfy their regulators instead of focusing on actual risk estimates. Although, the risk-based approach to anti-money laundering is fundamental to the successful application of the FATF Recommendations, which is the international standards for combatting money laundering. In essence, this strategy calls for all participants—regulators, law enforcement, the financial services industry, and other sectors—to focus their efforts on areas where money laundering risks are greatest in order to combat this practice. The way that people perceive the opportunities and desires that are available to them (as influenced by the environment) varies. Humans possess desires, and their perceived opportunities influence the outcomes of their decision (Ortega & Vargas-Hernandes, 2018). These perceived beliefs are not always accurate. As a result, it cannot be certain that an expert will choose the best option or may be unaware of some alternative opportunities.

This thesis indicates that expert risk assessment decisions stem from the broad self-regulatory strategies of their organisation conduct and prevention regulatory focus. In doing so, this research contributes to knowledge about the determinants of the quality of AML risk assessments by examining AML expert opinions on risk assessment judgment indicators in a survey and investigating the accuracy of experts' actual risk probability judgment in money laundering crime-related formulated vignettes. By examining expert opinions and

relating the findings to experts' self-regulatory preferences, this thesis should shed light on the question of what factors influences expert risk assessment quality the most.

This project examines the quality of AML expert probability judgment in terms of performance on various underlying accuracy components such as calibration and resolution. The project employs probability judgment techniques for eliciting and evaluating the overall quality of professional judgment. This study incorporates money laundering crime-related data to produce vignettes that describe actual cases with money laundering and non-money laundering conviction outcomes to utilise the probability judgment technique. Thus, the study uses multiple indicators that correlate with those categorised risk designated profiles and that are generally conducive to suspicious transaction reporting using the risk-based approach.

The project's current exploratory examination of AML risk assessment deduced from the literature and official practices guideline lead to three sets of research questions.

I. Which specific factors significantly influence experts' judgments regarding AML risk?
II. How does the quality of AML probabilistic risk assessments made by experts compare with that of novices?
III. How does the quality of AML probabilistic risk assessments differ across gender?

While there has been a large body of literature published on risk perception and human judgment in general, the quality of human judgment within the context of money laundering risk assessment is less well understood, especially from the risk-based methodology approach for assessing money laundering risk. Available literature which examines the quality of human AML risk judgment in commercial banks is scanty, and there have been growing calls for more research work on AML risk assessment since the introduction of the risk based (Demetis & Angell, 2007; Gise-Sproïe et al., 2020). Furthermore, the continuing popularity of the risk-based approach in practice and the dependence on human estimates for risk suggest that there will be crucial benefits for studying the quality of human judgment.

4.2.1 Research problem

Consequently, the purpose of the study was to understand the actual thoughts of AML professionals when making AML risk assessment decisions, and to connect these findings to

the quality of anti-money laundering risk assessments. The majority of the issues being examined in this research are unique to the commercial banking industry, but the implications of the findings could have an impact on all AML-regulated entities in a broader context and contribute to academic and empirical debate. There were three major challenges facing the research design highlighted as follows.

First the issue of relevance of this topic research in practice. A relevant research paper is one in which the research questions address problems (or possibly finds) that practitioners encounter (or potentially encounter) in practice, and the hypotheses connect those variables within their control to the outcomes they care about, using logic they regard as plausible (Toffel, 2016). Money laundering is one of the biggest obstacles to an effective international financial system (Buchanan, 2004). It is a global phenomenon and international challenge that involves multiple financial institutions across many jurisdictions and a complex series of transactions. As well as being extremely difficult to investigate, money laundering is also very difficult to prosecute. The risk of money laundering is therefore a relevant topic that must be studied. Even though scholars in this field have noted and studied various risk assessment approaches, the studies are found to lack strong theoretical foundations for linking expert cognitive factors to the quality of AML risk assessment in financial institutions (Jamil et al., 2022). This research highlights some of the issues. Hence, this thesis tackles a topic of great relevance in the field of money laundering and the study fills an important gap in the empirical literature on this subject.

Second, the research scope. The scope of the study indicates the parameters under which the study will operate (Simon & Goes, 2013). This scope of this study is human based role in assessing money laundering risk, specifically human reliability during suspicious transaction reporting. This will be examined in terms of performance on various underlying accuracy components, such as calibration and resolution. In carrying out AML risk assessment, a common assessment tool was developed to facilitate the assessment of countries worldwide against the FATF standard (Johnston & Carrington, 2006), hence the focus of this research in term of its applicability is the global AML environment.

Third, this research project seeks to understand a broadly empirical situation involving the quality of AML risk assessment within a commercial banking context and to link this empirical situation academically and theoretically from a cognitive standpoint. Theory

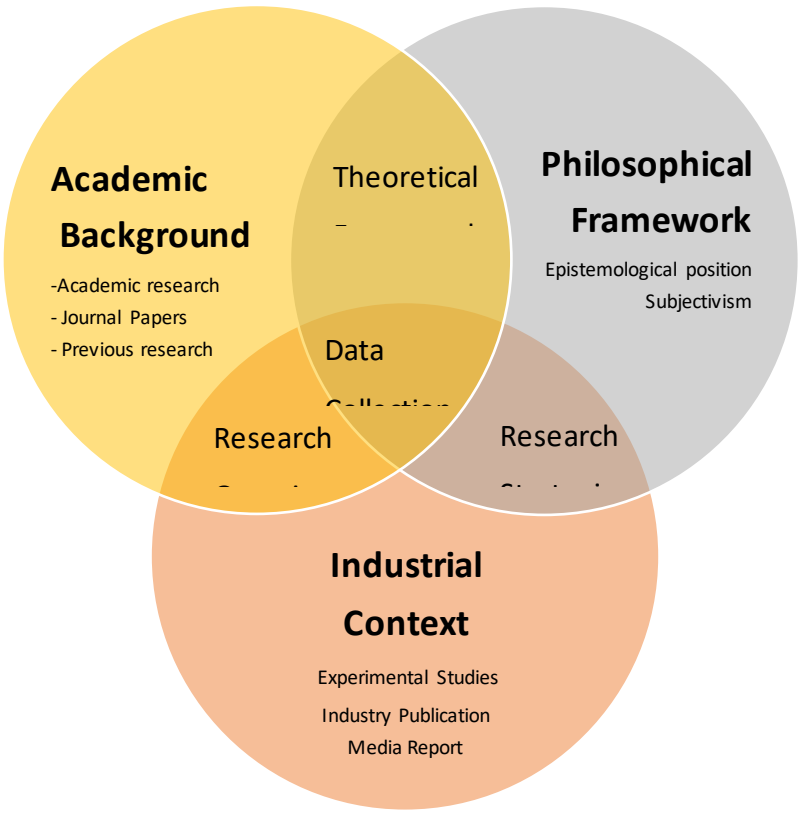
provides explanations for problems, describes unique features of phenomena, and provides predictive information. A theory without research has no basis; similarly, a theory can only be evidenced correct with research. This was done in order to create an appropriate theoretical framework (Udo-Akang, 2012) within which to interpret the results and give a justification for the behaviours observed. A focus was placed on the dissimilar ways in which theories and practices were related in the research framework for this project (Verstegen, 2001). The project has been structured in a manner that should maintain this balance by including both sets of issues in the literature review, the methodology framework, and the data collection and analysis.

4.2.2 Research framework

The framework for the research was largely based on the research onion model developed by Saunders (Figure 4). According to Saunders' model, research is composed of multiple layers that comprise the beliefs and values underneath it (Saunders, Lewis & Thornhill, 2007). At the centre of the onion model, data collection lies so that the methodologies can be developed to suit beliefs. The model details the following six layers.

i. Philosophical stance
ii. Approaches
iii. Strategies
iv. Choices
v. Time Horizons
vi. Techniques and procedures

FIGURE 4. THE RESEARCH ONION



Source Saunders et al. (2007)

In this research project, the onion model has been adapted a bit, and is used more as a guideline than as a rigid framework. Despite this, the underlying principles of the research remain the same, including the purpose of the study, the epistemology stance, the methods of gathering data, and the timeframe.

4.3 Philosophical assumption

The data collection was not attempted to be done with a tabula rasa approach Duschinsky, 2012) as the researcher's own experience in AML, while taking care to avoid bias, was a source of strength in the study. Indeed, heeding Miles and Huberman's advice that not to "lead" with the researcher's conceptual strengths "can be simply self-defeating" (Miles & Huberman, 1994, p.17), the study took advantage of the researcher's experience and knowledge. That helped to gain better access to professional respondent groups as well as to bring out meaningful feedback from respondents starting with vignette design.

4.3.1 Epistemological stance

Epistemological positions describe the researcher's understanding of money laundering risk assessment. It is a statement of underlying values and beliefs that the thesis holds concerning AML risk assessment and how it is been performed in commercial banks. According to the literature review, this position has evolved out of the literature analysis, which is supported by the theoretical framework. In this thesis the underlying belief is that the risk assessment is complex process (see Figure 3 representation), and experts face uncertainty at the call. Individual perceptions and choices are essential to identifying suspicious incidents, and no single approach is universal (Zavoli & King, 2021).

The epistemological understanding of the risk judgment process is important to the research in order to understand whether it can be comprehended and described in an academic context, and to determine if the data collected in the research can be used to examine the quality of human judgment at risk.

4.3.2 Subjectivity stance

The study's context is based on the subjectivity belief that human's perspective or opinion, particular feelings, beliefs, and desires affects decision making during AML risk assessment. By offering a subjectivity perspective, one can explain how risk assessment is carried out on the basis of personal perspective or preference of a subject. According to subjectivism, social reality is determined by the perceptions and actions of social actors (Kuhn, Cheney & Weinstock, 2000). AML experts, like other social actors, may interpret the risk that they assess differently as a result of their unique worldview. Their varying interpretations are probably going to have an impact on their decisions and the type of risk judgment during risk assessment (Savona & Riccardi, 2017). Results of risk assessments are a result of experts interacting with their environment and trying to make sense of it through their interpretation of events and the conclusions they draw from them. In order to make sense of and comprehend the risk assessments of money laundering crimes made by AML experts in a meaningful way, this research bases its approach on the subjectivity assumption.

Bank and other AML regulated institutions are increasingly using risk-based approach as a means to deal with uncertainty in an organised manner, and it has become somewhat of a contemporary standard. The entire AML risk assessment approach has taken into account social consensus and human prejudices regarding the precise nature, form, and scope of money risk, and it has developed a response tailored to the presumptive nature and level of that "threat" that suited the political decision-makers beforehand (van Duyne et al., 2018). This thesis takes the stance that the entire risk assessment process will always be based on the assessor's impressionistic, subjective assessment because there are no physical indicators for money laundering risk (Sinha, 2014). The following subsections highlight some of the additional complexities in the AML risk assessment process.

4.3.3 The risk-base approach

The introduction of the risk-based approach has undoubtedly been an interesting regulatory step, but the practical side of its implementation is still in its basic form (Demetis, 2010). Banks and other AML-regulated entities are encouraged to develop their risk assessment system rather than relying on definitive lists. They must work within their specific perimeters, including country risk, client risk, business risk, and other factors pertinent to the region in which they operate (Naheem, 2017). However, there are issues with risk conceptualization in the risk-based approach, and the definition of money laundering risk remains unclear (Bello & Harvey, 2017), so most AML-obliged countries and entities replicate the FATF guidance definitions without following any more objective criteria (Ferwerda & Reuter, 2022). Therefore, rather than what they (regulated entities) deem risky, risks are defined based on what regulators perceive to be risks (Ross and Hannan, 2007).

4.3.4 AML risk assessments are inconclusive

Despite official guidelines, reports of suspicious financial transactions are often made even when there are no reasonable grounds to suspect that crimes like money laundering have been committed or attempted (Amicelle and Iafolla, 2017). A well-known problem in the literature is distinguishing between suspicious and non-suspicious behaviours (Bello & Harvey, 2017). Data collection for the purpose of making a decision needs to be conducted with a level of due diligence, which allows experts in this field to make reasonably certainty that they have taken reasonable care and taken reasonable ethical steps (Maurer, 2005).

Due diligence is casuistic in that it eschews definitive conclusions but is provisional, probabilistic, and the outcomes are never really known in advance.

4.3.5 The problem of risk categorisation

Risk categorisation is crucial in the risk-based approach for allocating monitoring resources in accordance with the perceived riskiness of customers (Amicelle & Iafolla, 2017). In order to determine customers risk category, the bank must first take into account all pertinent inherent risk factors, including customers, products and services, distribution channels, and geographic areas (Klimova, Zhampeiis, and Grigoryan, 2020). Low-risk rated customers, such as those located in low-risk locations, having a low-risk account type, and working in a low-risk profession but with intentions to engage in money laundering crimes may continue to operate their business under the predefined low-risk category without being monitored heavily.

The epistemological understanding is important to the research when considering how to develop the instrument used in the experiment. Therefore, the research takes a Normativity approach setting of commercial banking and has tried to maintain a rearch framework, both empirically and theoritically that acknowledges the reality of actual AML risk assessment.

'' A normative theory includes description of the expectations that structure a speech event, a range of ways in which individuals may respond to these expectations, and the normative principles against which performances may be judged to be better or worse'' (Goldsmith (2001, p. 518).

It is assumed that "normative judgment are belief states that are either about the judge's psychology, or they are about content that is fixed by the judge's attitude (Bedke, 2019).

4.4 Research-Theoretical framework

In this research project the theoretical framework is based upon decision theory and has been used to explain the overall quality of professional judgment in an AML context. In particular the framework was used to identify professional specific cognitive strategies in terms of overall accuracy and some underlying accuracy components, such as calibration and resolution. The framework was specifically applied to a risk assessment context, with

the expectation that the findings could then be unilaterally applied across all AML regulated entities.

4.4.1 Framework

Money laundering has been studied using various theoretical frameworks within academic work. However, most of these research work are based on economic frameworks, particularly those that are used when predicting money laundering growth or managing money laundering data. The focus of this research, however, is not purely economic; it examines the cognitive aspects of expert responses to money laundering risk, and therefore a broader theoretical framework is required.

This research framework is multi-theoretical. Decision Theory has been used as a base, but some of the specific system theories associated with the risk-based approach have been merged into this, which focuses on the construction of models rather than individual case analysis. Models are constructed based on a variety of risk factors, then a different character emerges for profiling suspicious customers. One informed not only by existing typologies, but also by behavioural characteristics of a pre-established suspicious customer base. The latter point was included because of the research's premise that, for AML risk assessments to be effective, AML experts need to have an understanding of money laundering contextual and the typology of money laundering-related transactions.

In this research, one challenge was ensuring that the theoretical framework was appropriate and relevant to this study and ensuring that there was no influence from the author bias regarding the framework format.

4.4.2 Decision Theory and AML risk assessment

A rational approach to decision making is provided by decision theory. It allows one to make rational decisions in the face of uncertain consequences (North, 1968). Decision theory involves determining what course of action to take when faced with uncertain data that inconclusively support or discredit various hypotheses about the real but unknowable world (Kaplan, 1967). Decision makers may gain or lose by acting upon these uncertain data. Obviously, a genuine application of this decision theory involves a great deal of complexity and quite advanced computation techniques. However, one can get a sense of its functioning by examining a simplified example-the case of an AML expert who decides

whether or not to report a suspicious money laundering transaction. To make this decision, the expert has to consider the likelihood of the risk of money laundering occurring, the impact if the transaction is actually a case of money laundering, the possible consequence of failing to report a truly suspicious transaction, the impact of reporting this transaction on the existing relationship between the institution and the client, and many other variables. Experts have three options, regardless of how complex the problem is. They can report the transaction as being suspicious, not report the transaction as suspicious, or spend more time and seek further advise that will further facilitate a final decision.

Considering that the decision-making environment is uncertain, expectations are dependent not only on the probability of an assumption, but also on the level of confidence that the assumption is made. It is the state of confidence that determines the weight agents attribute to a future assumption (Freitas, 2021). This research highlights some specific cognitive strategies utilise by experts during AML risk assessment. The fundamental knowledge gap address by the current work lies in the field of money laundering risk judgment, which is recognised as a new development in the perspectives of judgment and decision-making as explained by Jamil et al. (2022).

4.5 Data analysis framework

The aim of this study is to evaluate the quality of expert judgment and identify factors that influence money laundering risk. In order to pursue these goals, three exploratory methods will be employed. To begin with, opinion polls will be conducted on 1497 individuals who are directly or indirectly responsible for making AML risk assessments in the real world. These polls will contain questions relevant to the research, such as the contexts and information that will be most useful for experts to form a reasonable belief that transactions are potential instances of money laundering and the factors that are most likely to influence the quality of risk assessment decisions in this domain.

Following that, semi-structured interviews will be conducted with nine AML experts based on four themes: the effectiveness of risk assessments, risk assessment process, key influencing factors, and perceived opportunities for process improvement. The interview responses will then be subjected to a thematic analysis.

Finally, an experimental study using vignettes will be conducted on 169 participants to investigate the quality of probability judgment in this context. In this thesis, a statistical technique based on an extension of Yate's (1981) model will be developed to measure the overall accuracy of AML risk assessments as well as performance in various important aspects of judgment across level of expertise (experts vs. novices) and gender.

There are several important factors that influence a money laundering risk estimate. Some of the most significant factors include experience, commitment to organisation values, regulatory requirements, and individual differences. The eager strategy stemming from organisation focus naturally elicits a tendency towards a course of action that is satisfactory or good enough (Hernandez et al. 2019), and the vigilant strategy stemming from a regulatory focus naturally elicits a tendency towards safe choices (Hamstra, Bolderdijk, & Veldstra, 2011). Conversely, cognitive biases have an impact on people by making them over-rely on or give more weight to expected observations and prior knowledge, while dismissing information or observations that are perceived as uncertain, without taking the bigger picture into account (Dietrich, 2010). These three focus strategies and outcome sensitivities may have very important implications for AML risk assessment. Hence, the first research question is to assess the influence of these three factors on the likelihood of AML risk assessment judgment. The first research question will investigate the most significant of these three factors to an AML expert, during the estimation of money laundering risk judgment. As part of understanding the risk assessment process, this research will seek to understand how these factors interact in their influence across a host of risk assessment processes. Besides AML professionals working in commercial banking, this study will also seek opinions from AML specialists at other financial institutions and non-financial firms regulated on AML issues. The research utilises expert opinion polls to respond to question 1. The opinion polls explore a five-dimensional analysis of how experts form their risk opinion threshold during AML risk assessment.

The five aspects that will be considered in the opinion polls include.

1. Threshold for the forming of suspicion,
2. Decision accuracy indicator,
3. Causes of decision disparity.
4. Decision outcome

5. Customer identity verification regarding the threshold for KYC

Money laundering risk assessment is one of the many fields where experts occasionally make vague estimates when assessing the potential risk of money laundering. This practice has always been controversial and often justified because making a likelihood assessment too precise could bias analysts or decision-makers. Yet these claims have rarely been submitted to rigorous testing. Even though scholars have noted and studied the importance of a risk-based approach in money laundering risk assessment, the studies are found to generally lack strong theoretical foundations for linking professional cognitive factors to the quality of AML risk assessment in financial institutions. One critical missing element from academic research on money laundering risk assessment is the lack of consideration of the accuracy of expert judgment in this context.

As stated above, one of the main aims of this project is to provide an exploratory investigation of the effectiveness of professional AML risk assessments. Accordingly, the overall quality of professional probability judgment in an AML context will be examined in question 2. In order to identify specific cognitive strategies, professional and novice judgment will be compared in terms of overall accuracy and in terms of the underlying dimensions of accuracy components, such as calibration and resolution. Furthermore, potential gender differences will be examined in research question 3. Outlined in Table 5 are the research questions and the intended primary and secondary data sources.

TABLE 5. SUMMARY OF RESEARCH QUESTIONS AND DATA

Summary of research questions and primary and secondary data sources		
Research Question	Data Source Empirical Primary	Secondary Data
1) Which specific factors significantly influence experts' judgments regarding AML risk?	Opinion poll survey Unstructured interview	Journal article analysis FATF Guidelines FSA Reports
2) How does the quality of AML probabilistic risk assessments made by professionals compare to that of novices?	Vignettes experiments	Journal article analysis FATF Guidelines FSA Reports Case study reports
3) How does the quality of AML probabilistic risk assessments differ across gender?	Vignettes experiments	Journal article analysis FATF Guidelines FSA Reports Case study reports

Two studies will be conducted to explore these research questions. Study 1 presented in Chapter 5 will seek to respond to research question 1. Since this research question is specifically about the expert perspective, a study will be conducted with business professionals who perform AML risk assessments as part of their regular job duties. The most effective methodology for this investigation appeared to be qualitatively oriented. As a result, a field survey and unstructured interviews with practitioners will be conducted as part of the study 1.

The remaining two research questions will be explored in study 2 and presented in Chapter 6 of this thesis. The accuracy of professional AML probabilistic risk assessments will be the subject of these queries. Studying personal values and beliefs requires unobtrusive approaches since they are sensitive subjects (Poulou, 2001). The vignette method allows respondents to express their perspectives on topics they are familiar with, while remaining detached from them and protected from personal threat. This approach has the advantage of removing the need for respondents to be biased and give socially acceptable answers since they do not fear that honest responses might devalue their reputations (Alexander & Becker, 1978). As Kerlinger (1966) argued, vignettes combine a variety of expressive and objective ideas with projective methods, making them ideal for psychological and educational research. Hence study 2 used a vignette-based field experiment where varying versions of vignettes will be used to depict the context and information about the risk-based approach (i.e., customer business lines, financial products and services, and domicile location) to human subjects.

4.5.1 Definitions of expert and novice

Knowledge and skills in a particular field are essential to the concept of expertise (Herling, 2000). Experts are defined as those with many years of experience, whereas novices are defined as those without much experience (Scheiter, Ackerman, & Hoogerheide, 2020). Researchers have used this conceptualization in several judgment and decision-making studies involving novice participants who were untrained in forensic examination tasks as well as expert analysts who regularly engaged in such examinations (e.g., Marcon, Quigley-McBride, & Meissner, 2022). This study adopts a measure of more than two (2) years of experience in AML related tasks as the measure of expertise, and zero (0) length of

experience for novices. By conceptualising expertise as highly task-related, it is possible to predict that expertise will enhance performance on tasks (Kruger and Dunning, 1999).

4.6 Ethical considerations

In the course of the research, primary data was collected from a variety of individuals working in commercial banks and other AML regulated industries. Collaborations with other academics and experts across the field were also a part of the research. It was essential during this research to maintain independent, honesty, openness, fairness, and accountability. Further, ethical approval was obtained during the last quarter of 2020 using the Northumbria University's Ethics online approval system and adhering closely to its regulations. Below is a discussion of some of the other crucial factors taken into account during the ethical evaluation of research.

4.6.1 Voluntary Consent

In addition to signing an explicit consent form, all participants have been deemed to have consented to participate in the research by actively participating in the surveys or agreeing to participate in the interviews. The research objectives were provided to all potential experts via an email invitation, so that they could prepare and fully brief themselves before accepting the invitation to participate. All of the participants were AML professional working with AML regulated institution.

4.6.2 Confidentiality

Money laundering related topics are often very sensitive and difficult to recruit participants from financial institutions. All participants will have the right to highlight information that cannot be published even if it is shared with the researcher and all information throughout the study were made available only to the researcher undertaking the study and the study supervisor. In addition to containing guidelines on authorship, confidentiality rules, and data sharing policies, the ethics code outlines the procedures for responsible data management and sharing.

4.6.3 Anonymity

Anonymity is ensured during case description, particularly during the description of specific jurisdictions and identifying individual participants. The document also attempts to present

a balanced global perspective on AML, rather than only highlighting examples of bad practices in one jurisdiction while ignoring positive cases in other jurisdictions. The project also presented AML risk assessment from a balanced global perspective, as the report highlights opinion from participants in various jurisdictions.

Although all interview responses are reported anonymously, they are broken down by represented industry. With a codification system in place for referencing between researcher and supervisor, interview data and identity are known to the researcher and supervisor to ensure validity and authenticity of data.

4.6.4 Right to withdraw

Interview participants were adequately informed through the signed consent form and throughout the process of their right to withdraw at any time and without giving a reason. If this occurs, the interviewer may wish to ask the participant if the data collected up to the point of withdrawal can still be used, but the participant retains the right to decide whether it can be used.

4.6.5 Data collection period and Research timeline

The collection period for the primary data used during this research work was conducted over an 18-month period. The overall time span for conducting the research project was three years.

4.7 Vignette instrument

The use of vignettes, which are systematic descriptions of a concrete situation, is supported as a method of producing more reliable measures of respondents' opinions than the more abstract questions found in most opinion surveys (Alexander, 1978). There has been an increasing recognition that questionnaires are inadequate for studying attitude, perception, beliefs, and norms; this has led to the growing popularity of vignettes (Gould, 1996). For over 30 years, clinical vignettes have been used to compare physicians' approaches to diagnosing and treating patients with similar health problems **(**Veloski, Tai, Evans, & Nash, 2005). Researchers commonly use vignettes to prompt interview responses as part of their research (Hughes & Huby, 2002), although their use in AML risk assessment research is less developed.

There have been methodological debates comparing vignettes with observational techniques. As opposed to observational studies, vignettes are more cost-effective and more rapid (Gould, 1996). Researchers can use vignettes without compromising ethical integrity when there is difficulty accessing participant groups and ethical problems are paramount (Hughes & Huby, 2002). Due to the sensitivity of this research topic and the challenge of obtaining quality data for analysis, the vignette instrument proves to be a very valuable tool, especially for collecting quality data in financial institutions. Importantly, it is important to consider the appropriateness of vignettes content for intended participant groups when designing it.

4.7.1 Vignette design

Real-life money laundering crime data was used to develop 12 sets of 10- to 12-lines financial transaction scenarios. In these cases, both money laundering and non-money laundering convictions have been obtained. From the literature review, six (: Bulk Cash Smuggling, Structuring, Virtual/Crypto Assets, Shell Companies, Complicit Professionals, and Trade-based money laundering) money laundering schemes discussed in Chapter 2 were chosen to be used in the scenario created for this study. Two cases were assigned to each scheme, one involving a money laundering conviction and the other involving non-money laundering convictions. A thorough account of the customer due diligence process was incorporated into each scenario, and the type and quantity of information contained in the narratives were carefully crafted to resemble the kind of information that financial professionals typically utilize to make assessments about the company. In addition to these comments, three independent financial professionals were consulted-two of whom worked for banks and the last, a lawyer specializing in AML legal practitioners, for content validation. Furthermore, the following strategy was used as an approach to improve the validity of the vignettes (familiarity, effectiveness, relevance, reliability, completeness, intelligibility).

i. All information that could bias the participant towards a specific action point were removed from each vignette.
ii. The author carried out the first preliminary review of the vignette content based on his background experience as an AML expert who previous work in a commercial bank prior to joining the PhD program.

iii. The vignettes were further presented to AML experts for review and the feedback provided was adopted to enhance the vignettes
iv. Also, the vignettes were also an integral part of the first-year annual progress report and improved upon based on the comments received from the annual progression panel member.
v. The vignettes were again presented to another set of AML experts for review before the final version of the vignettes was run through a pilot test.
vi. A feedback column was also created to seek the opinion from the participants on the generalisability and vignettes realistic after completion of the experiment

After a successful pilot test, the vignettes were uploaded to the JISC online survey platform for participants to access. However, actual details of associated bank statements were not provided but only relevant financial figures were included as part of the narrative. Future research should consider this limitation and the findings relating to vignettes questions should be read with this in mind.

4.8 Concluding remarks

Only primary data sources were utilized in order to ensure an accurate representation of the opinions and discussion surrounding the subject. The decision theory framework for this study has always been planned to take into account a variety of perspectives from experts in a wide range of fields who are involved in assessing AML risk. This variety included both different individuals working for the same jurisdiction and various jurisdictions involved in AML risk assessment. In order to paint the clearest picture possible of the overall AML compliance system currently in operation within the general banking sector, a number of data collection methods have been used to evaluate the similarities across these various social constructs.

The research involved primary data collection from individuals and as such obtained university research ethics approval. The research was designed to be completed either electronically or by teams skype meetings. Also, to some extent the researcher is independent to any practitioner role within a banking context, due to the nature of separation between academic institutions and global banking institutions.

CHAPTER 5 FACTORS INFLUENCING AML RISK ASSESSMENT: AN EXPLANATORY INVESTIGATION

5.1 Introduction

The literature analysis of the risk-based approach to money laundering assessment suggests the following three consistent findings. First, uncertainty is an inherent feature of AML risk assessment decision making. Decision making often must be determined based on incomplete or inaccurate information and can be amplified by ambiguity, concealment, inconsistencies, ill-defined problems, and obscure boundaries affecting the number of checks. Second, despite the several publicly available risk assessment guidance documents, the operationalization of the various risk-assessment methodology models lacks complete details but is left for the obligated entities interpretation during necessary procedure setting. Thus, increasing the ambiguity faced by AML practitioners during the decision-making process. Third, banks AML risk assessment system creates high numbers of false positives reports generated, which is a major challenge faced by the banking industry and are explicitly creating significant customer friction. In fact, the banking industry is under pressure to drive down the number of false positives stopping genuine transactions in their tracks.

This study identified three factors: organisational, personal, and regulatory, as important determinant factors that influence expert AML risk assessment decisions from the literature. Hence, there was the need to know which of these three factors significantly inform decision outcome during risk assessment. That is what particular factors influence expert's risk estimates the most during risk assessment.

5.2 Methodology and Design

According to Kangas and Leskinen (2005), one of the most common methods to explain expert decision accuracy is to use judgmental probability forecasting and to assess the degree of uncertainty associated with predicting the effects of alternative decisions. For example, an expert judgment about uncertainty may be expressed as verbal probability expressions, graphical illustrations, numerical probabilities, odds, and fuzzy sets. In this work, the project specifies behavioural concerns about the quality of probability judgment accuracy, which is examined through a vignette experiment.

Preliminary work such as literature reviews and interviews influence the research question and poll design. For the current study, both are used. The literature review aimed to provide insight into how financial professionals can discern suspicious behaviour within complex financial transactions using procedural risk assessment frameworks. Academic journals from different fields were reviewed, such as criminology, law, auditing, financial crime, money laundering, economics. In addition, the reviewed included some AML risk guidance documents and reports, such as those published by the FATF, Financial Intelligence Units in different jurisdictions, etc. A key objective of the data collection section of the research was to examine how banks implement anti-money laundering measures to assist governments in limiting the facilitation of proceeds from crimes. The results and underlying trends identified in the review were then scrutinised across five short poll questions with AML experts in September 2021. The contribution of these preliminary exercise was to probe how AML professionals make risk assessment decisions. That is, what particular factor significantly influences their decision. Based on opinion results, this project examines the significance of how organisations, regulations, and personal factors impact AML risk judgment. By using opinion mining or sentiment analysis, one can learn what a large group of experts think or feel (Chauhan, Sharma, & Sikka, 2021). Some disciplines, particularly in the AML risk management domain (Savona & Riccardi, 2017, for example), acknowledge that in many complex risk estimations, the best data is expert opinion when measured data and formal theories are inadequate, inconsistent, or unavailable. Furthermore, expert opinion is used in cases where there aren't any empirically based models, and when it's necessary to combine information from different sources with incommensurable units of measurement (Kangas & Leskinen, 2005). Against this background, the preliminary instrument for the first part of the research was an expert opinion survey involving five different polls of 1 question each relating to an aspect of the AML risk assessment phases.

5.3 AML regulated entities survey-Professional opinion

To understand expert judgment regarding factors that influence their risk assessment judgment, we hosted five short polls with a question each. The short polls data are used to investigate the focus factors (organisation, regulatory and human) that influence expert money laundering risk estimates the most. The polls focus on the threshold for the forming of suspicion, decision accuracy indicator, causes of decision disparity and decision outcome.

The survey also explored international dimensions of customer identity verification regarding the threshold for KYC. Each of the questions offered the opportunity for respondents to pick an option from construct indicators for organisational, operating jurisdiction and personal factors and the opportunity to provide supplementary options as appropriate.

To implement the survey, the author of this project hosted the online opinion survey in 23 AML professional's related LinkedIn groups (see Appendix 2 for the list of AML LinkedIn group), with global membership representation. The survey was available to all members of the group who visited the group LinkedIn webpage between the open period of the surveys, and no allowance was made for multiple responses by a single member. The LinkedIn is a social network that focuses on professional networking and offer professionals the opportunities to describe their job roles in their respective profiles; hence, this provided the opportunity to validate the role and experience of the respondents to this study opinion poll questions. Furthermore, there were no incentives offered in return for all participants who completed the surveys. The polls were stripped of all identifying information to avoid potential surveyor effects, and the surveys were presented in written English. This study is one of the few studies that have attempted to investigate AML professionals' attitudes regarding the impact of organisation, regulatory and human factors on AML risk assessment, and it provides an important baseline for further systematic investigation.

With these caveats in mind, there are important reasons to examine the belief and perceptions of AML experts. As discussed earlier, the main issue regarding the ability of AML experts to assess money laundering risk is on how competent they are, given their existing knowledge and skills as well as the influence of external factors such as regulatory requirements and their internal organisational factors such as internal control systems and compliance (Isa et al., 2015). Thus, it is important to examine the attitudes of this all subset of AML professionals because FATF and other AML regulators care deeply about shaping human expertise in assessing money laundering risk.

The opinion poll consisted of 5 questions that focused on five broad areas of AML risk assessment within any AML regulated entities and which were of interest to the research questions. The areas are listed below.

1. What context is most useful to form a reasonable belief that your customer transactions are potential instances of money laundering (ML)?
2. What context is most effective to form a reasonable belief that your perceived risk of a transaction is consistent with absolute risk level?
3. What factor is the most dominant cause for differences in reasonable belief among AML practitioners to submit a SAR?
4. The quality of your risk assessment decision is most influenced by what context?
5. What information is the most useful to form a reasonable belief that you know your customer?

5.3.1 Background overview of AML Professionals respondents

TABLE 6. THE RESPONSE RATE FOR EACH OF THE 5 SHORT POLL QUESTIONS.

Surveys	Factors (R1 =Regulation, O2=Organisation, H3= Personal)	measurement	Response rate (Participants)
Poll 1. What context is most useful to form a reasonable belief that your customer transactions are potential instances of money laundering (ML)?	Cash intensiveness (R1) Recognition of ML indicators (O2) Similarity with past ML crimes (H-3) Negative press report - (4)	The threshold for the forming of suspicion	490
Poll 2. What context is most effective to form a reasonable belief that your perceived risk of a transaction is consistent with absolute risk level?	Regulatory compliance (R1) Internal policy compliance (O2) Previous decisions (H3) Something else-(4)	Decision accuracy indicator	477
Poll 3. What factor is the most dominant cause for differences in reasonable belief among AML practitioners to submit a SAR?	Statutory interpretation(R1) Organizational factors(O2) Personal factors (H3) Something else-(4)	Cause of decision disparity	250
Poll 4. The quality of your risk assessment decision is most influenced by what context?	Legislative factors(R1) Organizational policy (O2) Personal factors(H3) Something else-(4)	Key factor that influences decision outcome	344
Poll 5. What information is the most useful to form a reasonable belief that you know your customer?	Current valid passport Tax ID number Physical address Something else-	The threshold for knowing your customer	576

TABLE 7 SHOWING INDICATORS FOR MEASURING FACTORS THAT INFLUENCING RISK JUDGMENT

SN	Indicators	Measure	Academic literature
R1	Cash intensiveness, Regulatory compliance, Statutory interpretation, Legislative factors	Regulation Factor	Hamstra et al. (2011); Demetis (2010); Demetis & Angel (2007)
O2	Recognition of ML indicators, Internal policy compliance, Organizational policy	Organisation Factor	Van Dooren (2005); Andriopoulos (2001); Hernandez et al. (2019)
H3	Similarity with past ML crimes, Previous decisions, Personal factors	Personal Factor	Busse et al. (2015); Sinha (2014); Thomas, (2018)

Further analysis of the distribution of participants across the polls indicated 1497 (Table 8) distinct participants responded to the poll questions, with some taking part in more than one poll question.

TABLE 8 SHOWING OPINION POLL FREQUENCY PARTICIPANTS

SURVEY PARTICIPATED	NUMBER OF PROFESSIONAL
All 5 poll questions	11
Only 4 out of the 5 poll questions	74
Only 3 out of the 5 poll questions	89
Only 2 out of the 5 poll questions	196
Only 1 out of the 5 poll questions	1127
Total	1497

The thesis was interested in getting opinions from AML professionals across the global AML regulated entities. Since AML compliance is a global response, this study needs to get a representative picture from as many countries as possible. In total, participants from 109 countries participated in the survey. See Figure 5 for the geographical spread of participants across the globe. As a continent, Asia had the most participants at nearly 37% followed by Europe (35%), Americas (20%), Africa (6%) and Oceania (2%). Figure 4 for actual numbers of participants according to the regional locations across each continent.

FIGURE 5. GEOGRAPHIC LOCATION OF OPINION POLLS PARTICIPANTS.

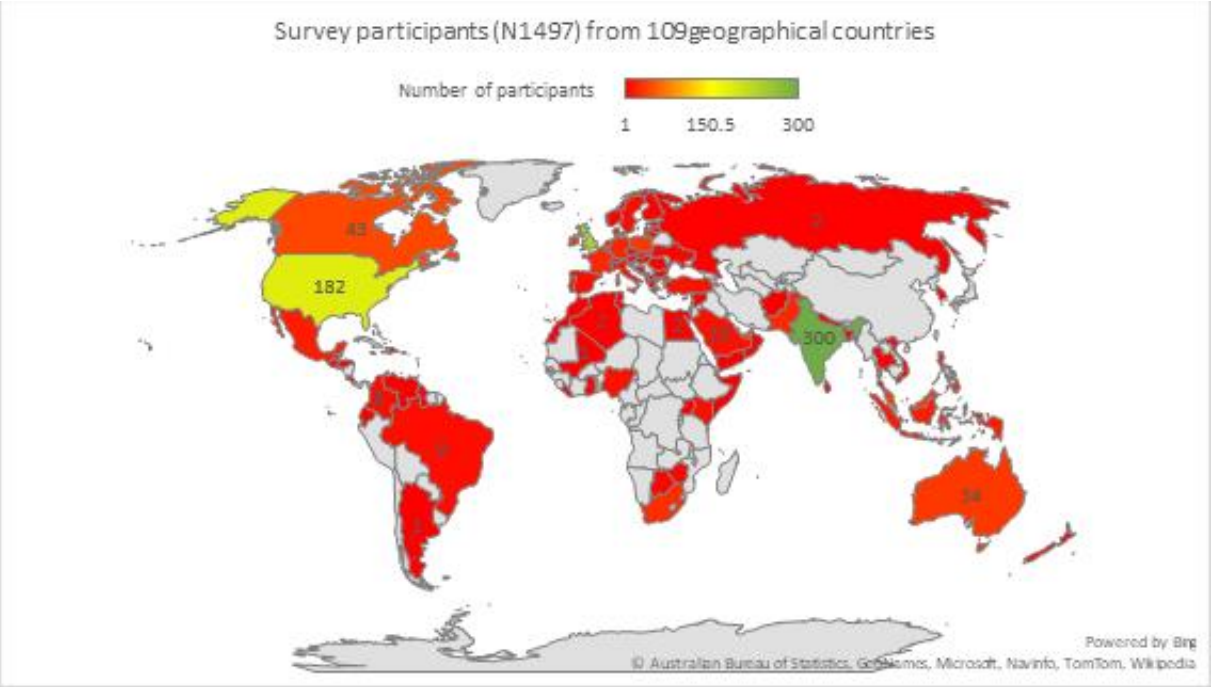
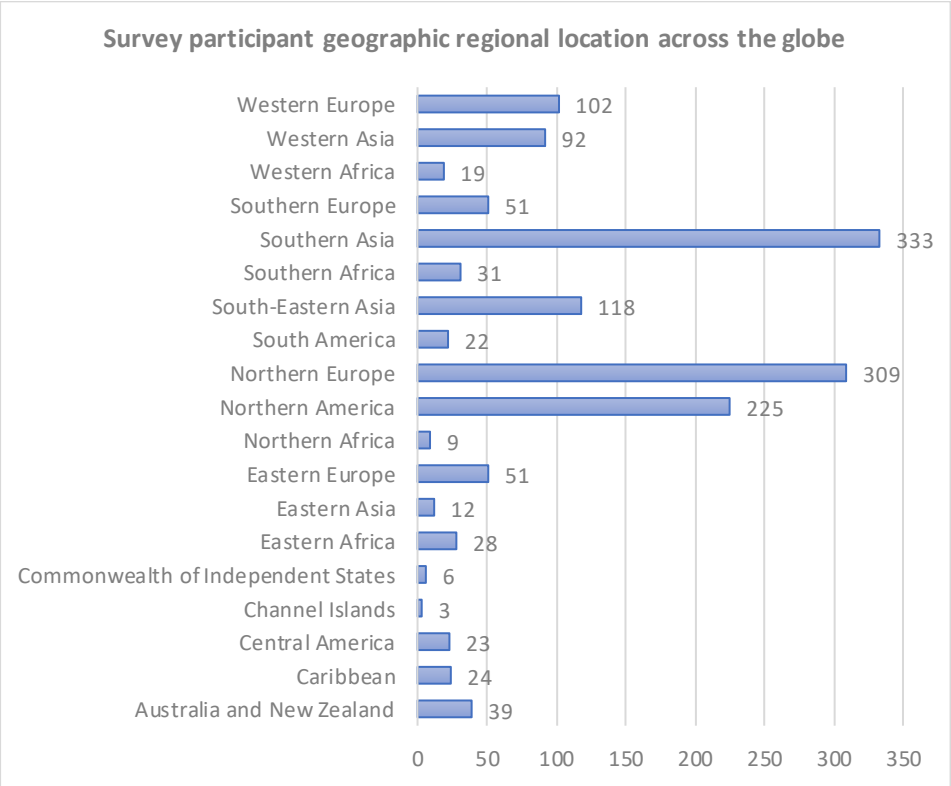


FIGURE 6. PARTICIPANT BY REGIONAL BREAKDOWN



The research also acknowledged that some countries have more accomplished AML compliance than others. For example, the United Kingdom and the United States have significantly advanced AML compliance and monitoring over the years. A strong representation of responses from both countries (15.5% and 12.2%, respectively) enriches the survey response data.

Further, a good industry-wide coverage including a wide range of the AML regulated business sector was achieved. The data collected from the AML professionals were representative of most of the main divisions of the AML regulatory sector, including regulators and law enforcement agents. In total, 48.8% were directly from commercial banks, 19.8% from other financial institutions (such as micro-finance banks, institutional banks, credit institutions etc), 29.1% from non-financial institutions and the remaining 2.3% from AML regulators. See Figure 7 for the actual survey respondents counts per represented AML regulated sectors

Figure 7. Participates employment sector

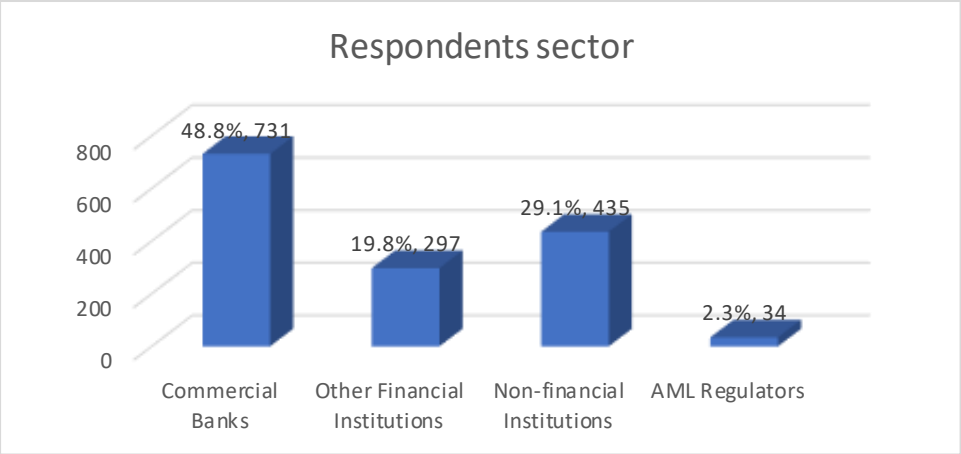


Table 9 shows the distribution of the participants with respect to their job role in their organization. represented based on their AML-related job roles. To get first-hand insight into what influences their risk estimates during AML risk assessment.

TABLE 9. BREAKDOWN OF PARTICIPANTS BY JOB ROLE

S/N	Job Role	Frequency	Percent (%)	Directly or indirectly responsible for AML risk assessment task?
1	Compliance administrator	586	39.1	Directly responsible
2	Operations	246	16.4	Directly responsible
3	Investigation	168	11.2	Directly responsible
4	Client on-boarding	167	11.2	Directly responsible
5	Risk and Regulatory Compliance	113	7.5	Directly responsible
6	Audit	36	2.4	Directly responsible
7	Internal Control	32	2.1	Directly responsible
8	Business Compliance	21	1.4	Directly responsible
9	MLRO	15	1	Directly responsible
10	AML policy advisory analysis	8	0.5	Directly responsible
11	Surveillance-Regulators	4	0.3	Directly responsible
12	System/IT analyst	62	4.1	Directly responsible
13	AML Training Consultant	21	1.4	Indirectly responsible
14	Project manager	17	1.1	Indirectly responsible
15	Physical assets control	1	0.1	Indirectly responsible
	Total	1497	100	

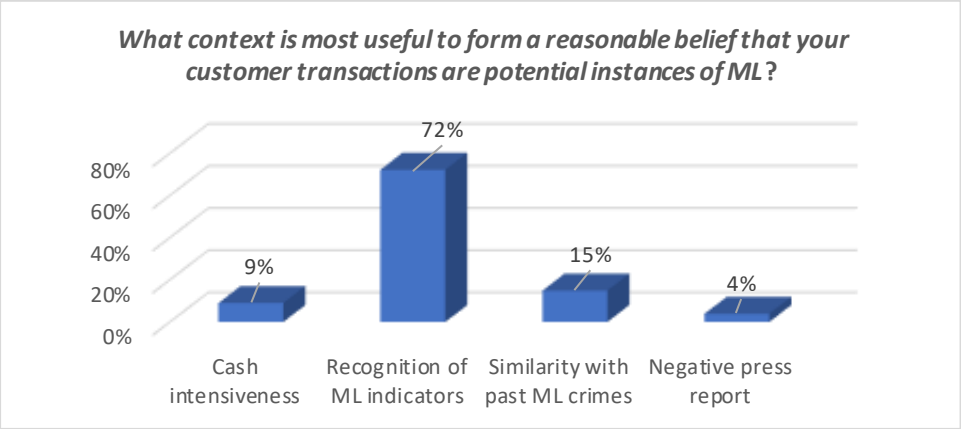
The analysis of Table 8 revealed that the 93.1% of the total number of the respondent were currently engaged in roles with direct responsibility for making AML risk assessment decision. Indicative that the respondents reflected a representative of the intended targeted audience for this study and their opinion suitable for gaining good insight into actual AML risk assessment practices in regulated entities.

5.3.2 The threshold for the forming of suspicion.

I prepared a one-page questionnaire to gather opinion data on expert most preferred options to gauge their threshold for the forming of suspicion. The participants were asked ***'what context is most useful to form a reasonable belief that your customer transactions are potential instances of money laundering (ML)'*** and offered the opportunity for respondents to pick a preferred option from '*Cash intensiveness*', '*Recognition of ML indicators*', '*Similarity with past ML crimes*', and '*Negative press report*'.

A total number 490 participants responded to this poll question, and it is interesting to note that 72.2% (see figure 5 below for the response rate) of the participants indicated that the recognition of ML indicators was the most useful context to form a reasonable belief that customer transactions are potential instances of money laundering.

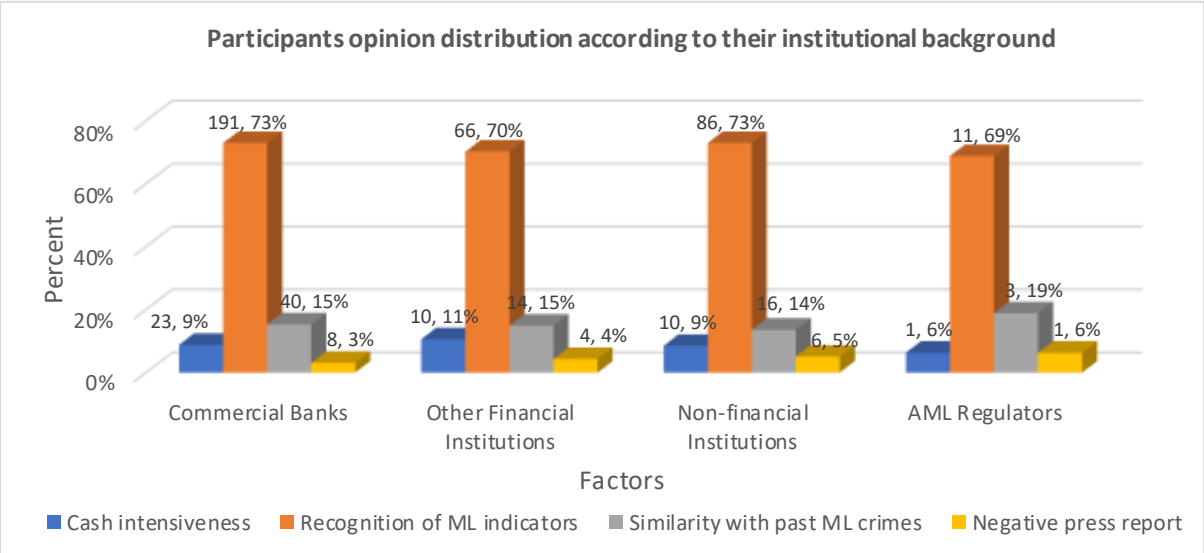
FIGURE 8. THRESHOLD FOR THE FORMING OF SUSPICION POLL RESULT



Further analysis of the results across the institutional background of the respondent (depicted in Figure 8) shows that more than 70% of the opinion poll participants in each segmented job sector indicated that the recognition of ML indicators is the most significant factor that influences their suspicious belief. Similarly, the downward trend exhibited the same downward ranking for all the other indicators across all job segments. That is,

'similarity with past ML crimes was ranked second, 'cash intensiveness' was ranked third, and 'negative press report' was ranked least.

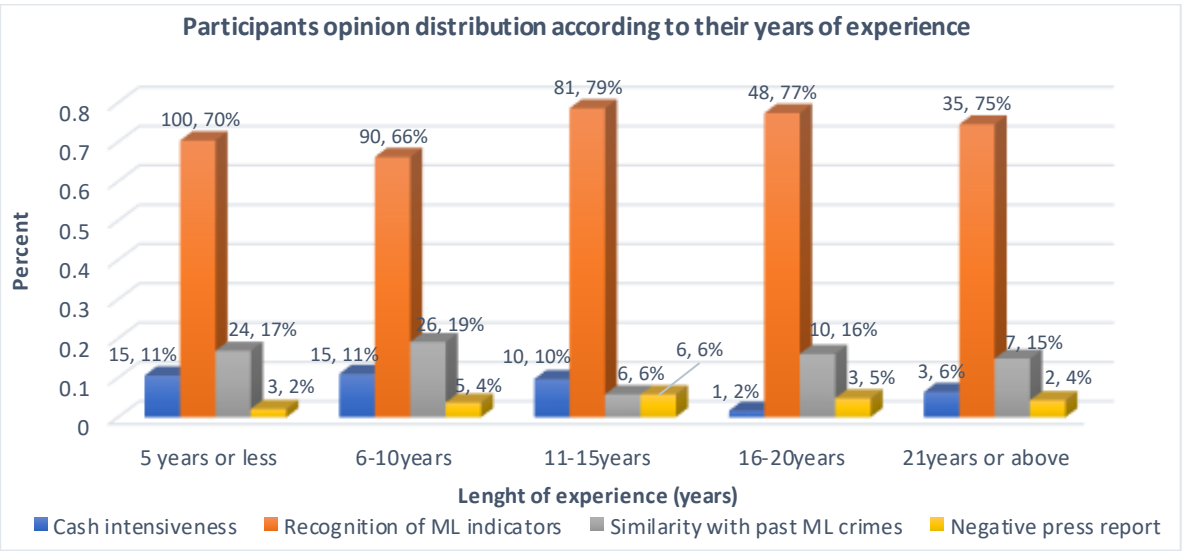
FIGURE 9. THRESHOLD FOR THE FORMING OF SUSPICION POLL RESULT DISTRIBUTION BY INSTITUTIONAL BACKGROUND



Similarly, the analysis of participants' opinions according to their years of experience (depicted in Figure 10) indicate the 'recognition of ML indicators' as the most significant factor that influences their suspicious belief across all lengths of experience.

This shows that more than 70% of the opinion poll participants in each segmented job sector indicated that the recognition of ML indicators is the most significant factor that influences their suspicious belief.

FIGURE 10. THRESHOLD FOR THE FORMING OF SUSPICION POLL RESULT DISTRIBUTION BY YEARS OF EXPERIENCE



Overall, these results suggest that recognition of ML indicators are considered the most constructive context to form a reasonable belief among AML practitioners irrespective of their institutional background and length of years of experience. This apparent direct association between ML indicators and threshold for the forming of suspicion among AML practitioners have some practical and significant implication on the quality of risk judgment. Gordon (2011) earlier noted that FATF, FATF-style regional bodies, and national competent authorities (especially financial intelligence units) have studied known examples of money laundering to identify patterns or indicators of possible money laundering, and this information has been made available to financial institutions as money laundering typologies. Hence, the result of this study suggests that established indicators may have a substantial impact on the AML experts' judgement accuracy. The use of indicators in decision-making may be particularly relevant when there is incomplete information available for practitioners to validate the accuracy of facts and contexts, Brockett et al., (2002) note.

It may be recalled from the methodology section that there were five main category's themes for the short poll questions: the threshold for the forming of suspicion, decision accuracy indicator, cause of decision disparity, key factor that influences decision outcome and the KYC threshold. Therefore, a comprehensive analysis on the remaining four themes will be presented in the next four sections.

5.3.3 Decision accuracy indicator

One line of thinking is that suspicious activity reports (SAR) which form the cornerstone of money laundering reporting hang on the loose scales of 'suspiciousness'. What seems like a straightforward decision is a complicated scheme, customarily performed by state institutions such as prosecutors and courts, now trust onto financial institutions (Sinha, 2014; Wilkes, 2020). Even though, AML experts lack sufficient evidence to completely justify the accuracy of their risk judgment, they must explain the level of their assigned risk estimates. It is difficult to quantify money laundering risk (Amicelle & Iafolla, 2018). Risk estimates require sufficient warrant within professional communities, which ultimately relies on experts evaluating the quality of evidence, credibility, and honesty on the scale from personal selected risk indicators, statutory interpretation, and organisational

perspective. Hence, it may be useful to ask the participants, ***'What context is most effective to form a reasonable belief that your perceived risk of a transaction is consistent with absolute risk level?*** Respondents were given a list of responses which were a construct of regulatory, organisation, human factors, and a final "something else" option.

A total number 477 participants responded to this poll question, and it is interesting to note that 47% (see figure 8 below for the response rate) of the participants indicated that

regulatory compliance is the most important context to know when their perceived risk is consistent with the absolute risk level during AML risk assessment. While 40% noted that their organisation's internal policy compliance was the most effective context to know when their perceived risk is consistent with absolute risk level during AML risk assessment.

Furthermore, 12% of respondents indicated 'previous decisions' as the most important context to consider with their perceived risk of a transaction in knowing if it is consistent with the absolute risk level. While the remaining 2% of the respondents stated 'something else' other than the three given factors.

FIGURE 11. DECISION ACCURACY INDICATOR POLL RESULT

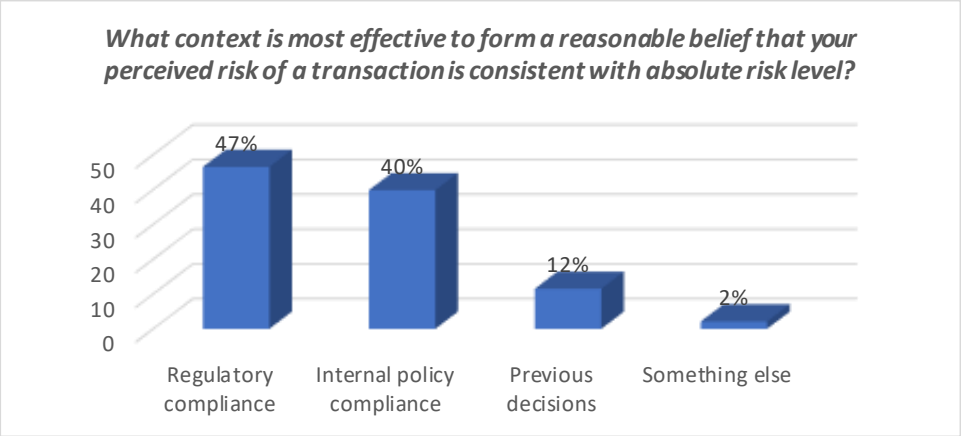
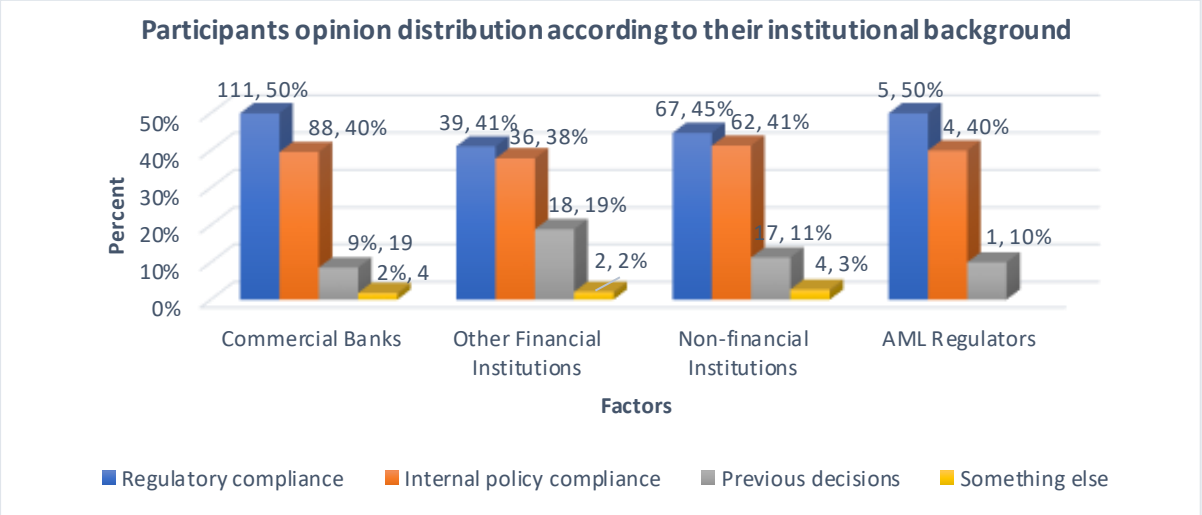


Figure 9 illustrates that in respective of institutional background, regulatory compliance was indicated as the most important factor in determining the accuracy of AML risk assessment. More than 40% of the survey participants in each segmented job sector indicated regulatory compliance as the most significant factor in determining the accuracy of their perceived risk of money laundering. This suggest that AML experts are regulatory focused. Hence, regulatory focus theory may provide useful insight on how and why AML experts make risk assessment decisions from a prevention focused perspective. The regulatory focus literature

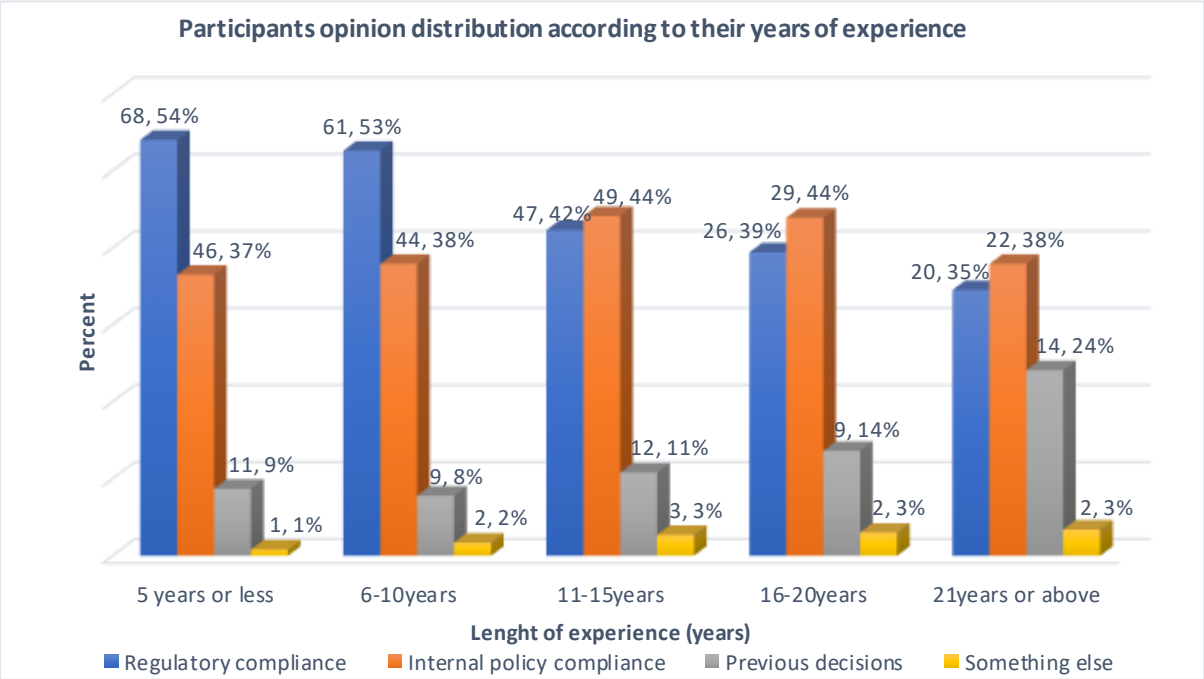
has shown that individuals who are prevention focused exhibit risk-averse traits and make decisions that are focused on the pursuit of minimal goals (Cantor, Blackhurst & Cortes, 2014). The downward trend was ranked the same across all institution's segments. That is, 'internal policy compliance' was ranked second, 'previous decisions' was ranked third, and 'something else' was ranked last.

FIGURE 12. DECISION ACCURACY INDICATOR POLL RESULT DISTRIBUTION BY INSTITUTIONAL BACKGROUND



However, the analysis of the opinions of experts according to their years of experience group (summarised in Figure 10) shows that the most important factor that experts regard as most useful in determining the accuracy of their risk judgment varies across groups of participants. The majority of participants from experience groups of 0-5years (50%) and 6-10 years (41%) considered regulatory compliance as the most important factor for determining the accuracy of their AML risk assessment. Whereas majority of participants from within experience group exceeding 10 years (11-15years-44%, 16-20years-44%, and above 20years-38%) considered their company internal policy compliance as the most important factor for determining their AML risk assessment. There was a statistically significant positive correlation at $p < .001$ between length of experience and decision accuracy indicator ($r = 0.175$, $p = 0.000127$). This suggest that as the experts' experience increases in the industry, they tend to align their decision accuracy from a regulatory perspective to an organisational perspective.

FIGURE 13. DECISION ACCURACY INDICATOR POLL RESULT DISTRIBUTION BY YEARS OF EXPERIENCE

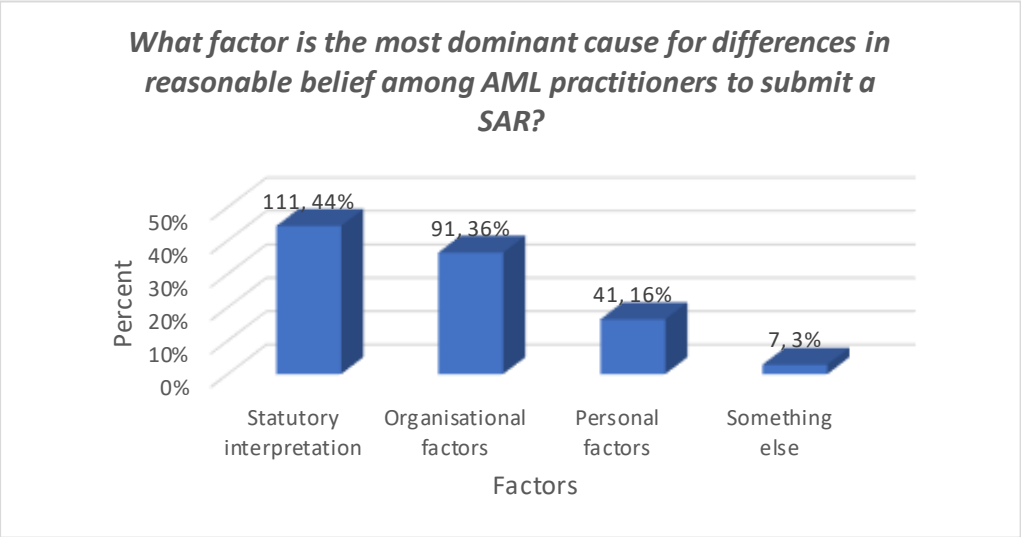


5.3.4 Most significant causes of decision disparity among AML professionals

AML experts are increasingly seeking ways to improve the standardisation of risk assessment judgments among the profession, and it may be important to ask the participants, '***what factor is the most dominant cause for differences in reasonable belief among AML practitioners to submit a SAR***?' Respondents were given a list of responses which were constructs of regulatory, organisation, personal factors, and a final 'something else' option.

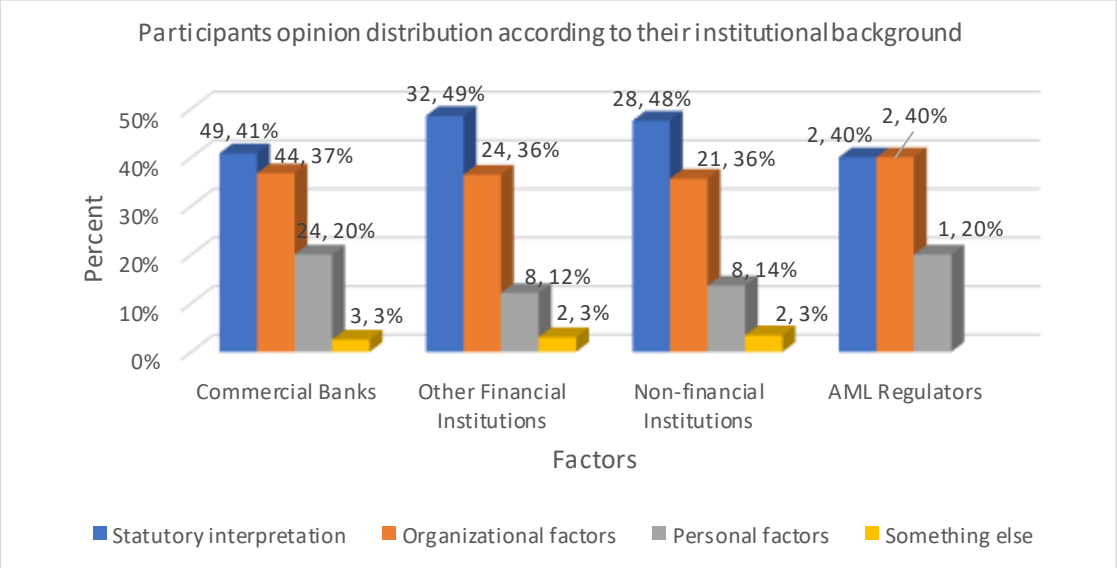
The bar chart in Figure 11 represents experts' opinions on the most dominant cause for the difference in reasonable belief by 250 AML experts. Accordingly, the most frequent cause of differences in reasonable belief between experts during the rendition of SARS was statutory interpretation (44%). Organizational factors also appear to have significant relevance in this regard as they rank second with 36%, followed by personal factors with 16%. The remaining 3% indicated something else.

FIGURE 14. MOST SIGNIFICANT CAUSES OF DECISION DISPARITY AMONG AML PROFESSIONALS POLL RESULT



When institutional background is taken into consideration, as demonstrated in Figure 12, statutory interpretation is determined to be the dominant cause for differences in reasonable belief among AML practitioners from commercial banks (41%), other financial institutions (49%), and non-financial institutions (48%). While the regulators had the exact same proportion of 40% for both statutory interpretation and organisation factors. In terms of experts' response to suspicious activity reporting, the results suggest that they (AML experts) are the regulatory focus.

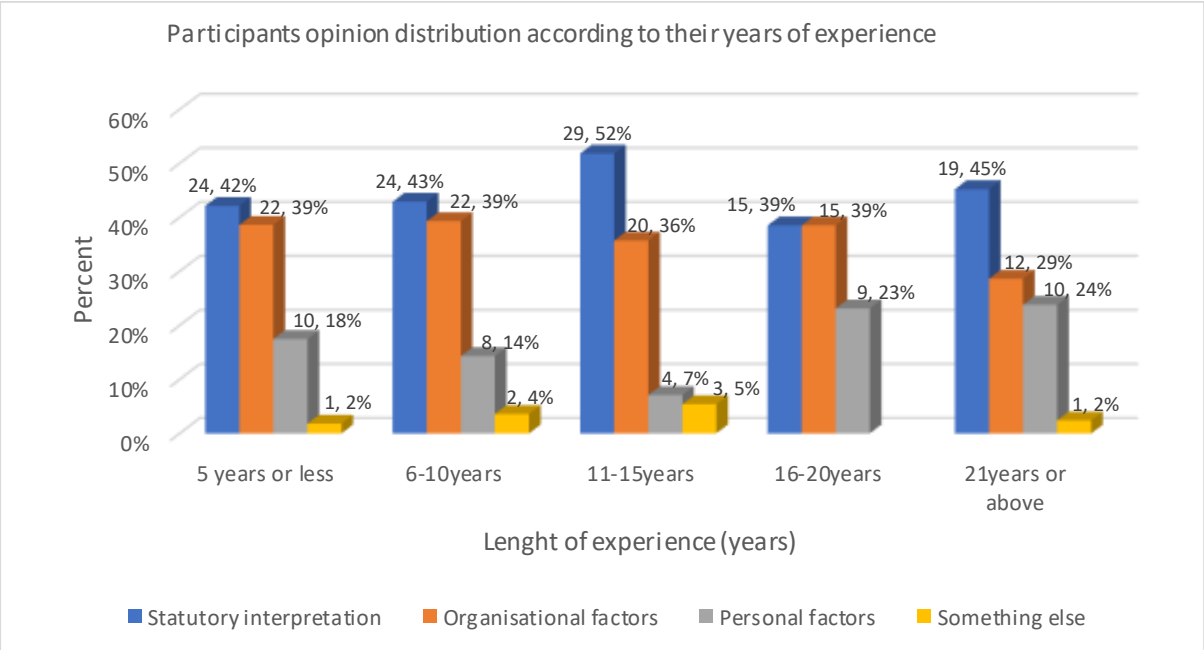
FIGURE 15. MOST SIGNIFICANT CAUSES OF DECISION DISPARITY AMONG AML PROFESSIONALS POLL RESULT DISTRIBUTION BY INSTITUTIONAL BACKGROUND



Similarly, the analysis of the opinions of experts according to their years of experience group (summarised in Figure 10) shows that statutory interpretation had the highest frequency as the most important factor that experts regarded as the dominant cause for differences in reasonable belief among AML experts across all experience group, except for the group in years of experience 16-20 years which had the proportion of 39% for both statutory interpretation and organisational factors. This result suggests that experts across all experience groups identified factors related to statutory interpretation as a dominant cause for bias in their judgments when submitting suspicion reports.

A possible reason for this conclusion may be the absence of adequate definitions of suspicion and risk (Gelemerova, 2009). Further demonstrating the unclear nature of suspicion is the JMSLG handbook, which explains that the UK courts have defined suspicion as a condition that is beyond pure speculation, albeit based on some reasoning. The defensive reporting culture or the box-ticking exercise is a direct consequence that flows out of this subjective and ill-defined notion of suspicion (Sinha, 2014).

FIGURE 16. MOST SIGNIFICANT CAUSES OF DECISION DISPARITY AMONG AML PROFESSIONALS POLL RESULT BY YEARS OF EXPERIENCE

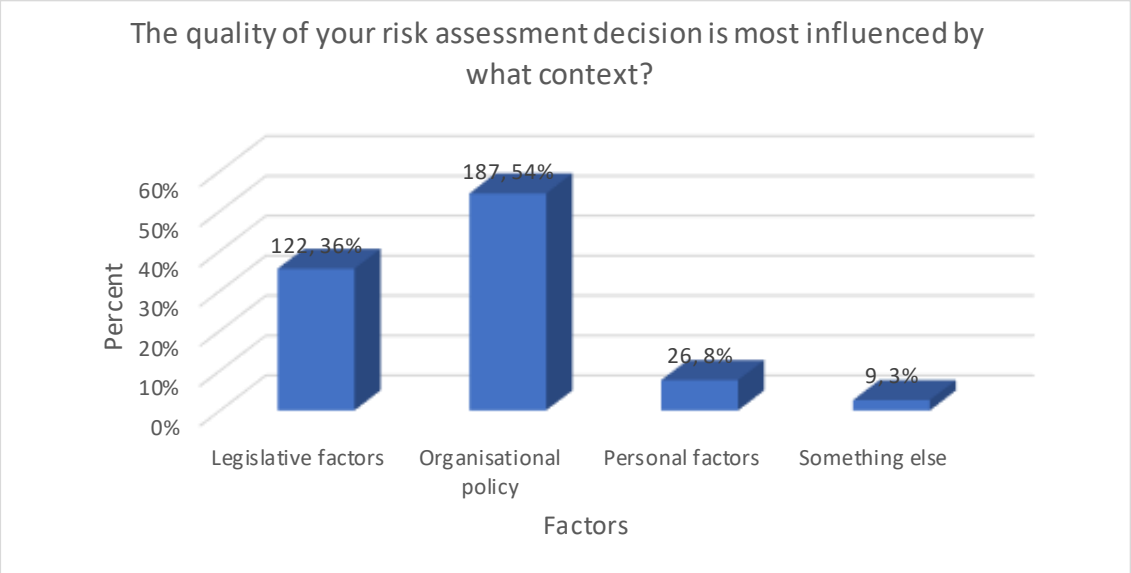


5.3.5 Key factor that influences decision outcome

Understanding how AML risk judgment in cases of alleged money laundering are influenced by regulatory, organisation and personal context is an important step in efforts to improve AML risk assessment. Hence, it was useful to ask the participants, ***'The quality of your risk assessment decision is most influenced by what context?'*** Respondents were given a list of responses which were a construct of regulatory, organisation, personal factors, and a final 'something else' option.

The bar chart in Figure 13 represents 344 AML experts' opinions on which factor influences their risk assessment outcome. The percentage range in participant opinion is 51%, with 'something else' receiving the least at 3%, and organisational policy receiving the most at 54%. While 36% noted legislative factors and 8% attributed it to personal factors.

FIGURE 17. KEY FACTOR THAT INFLUENCES DECISION OUTCOME POLL RESULT



In Figure 14, participants from commercial banks (58%), other financial institutions (48%), non-financial institutions (54%) indicated organisational policy as the most significant factor that influences the out outcome of AML risk assessment decisions. However, the regulators had a percentage proportion of 44% for both Legislative factors and organisational policy.

FIGURE 18. KEY FACTOR THAT INFLUENCES DECISION OUTCOME POLL RESULT DISTRIBUTION BY INSTITUTIONAL BACKGROUND

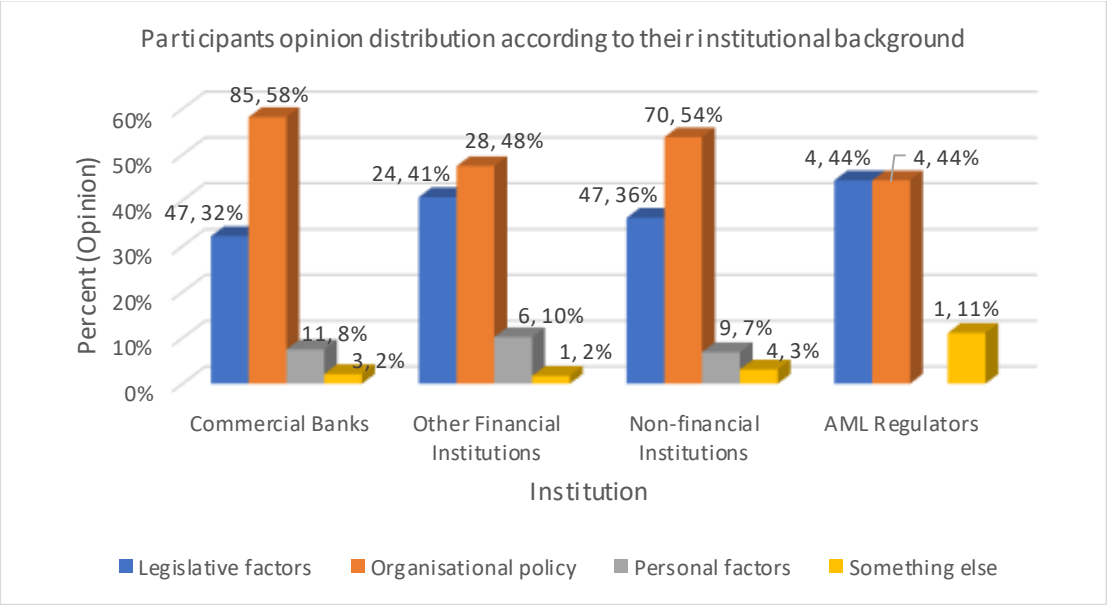
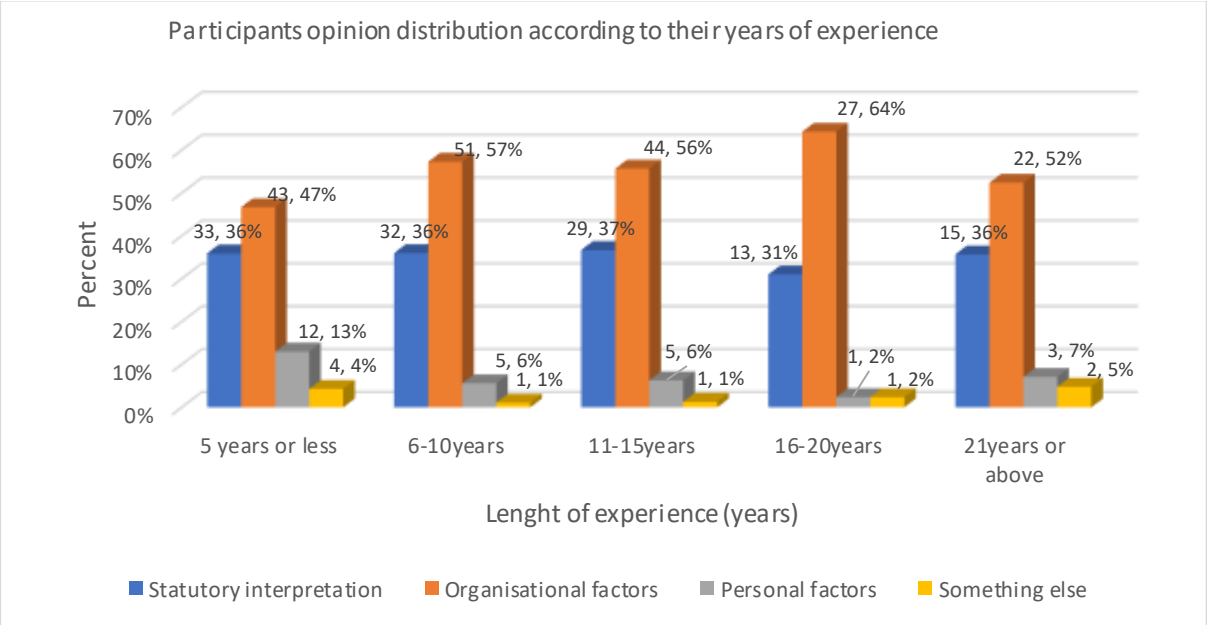


Figure 14 represents the AML experts' opinions according to their length of experience in the industry on the quality of their risk assessment decision. The expert employment of their organisational policy as a guide toward the actual outcome of their risk assessment seems to be independent of their institutional background or length of experience in the industry. It may be the case that these results reflect the regulated entity's response to FATF recommendations that it is the responsibility of entities to take appropriate steps in identifying and assessing the risk of money laundering (FATF, 2012). Hence every outcome of a risk assessment process is guided by the document process put in place by the organisation. Nonetheless, in order to establish an optimal suspicion, organizations have developed basic prescribed standards and automated knowledge-based systems, or artificial intelligence networks, in a bid to minimize the margin of subjective judgement (Gelemerova, 2009). But as long as there are no clear indicators of how to act to minimize the risks of wrong decisions and the repercussions thereof, money laundering risk remains highly nebulous.

FIGURE 19. KEY FACTOR THAT INFLUENCES DECISION OUTCOME POLL RESULT DISTRIBUTION BY YEARS OF EXPERIENCE

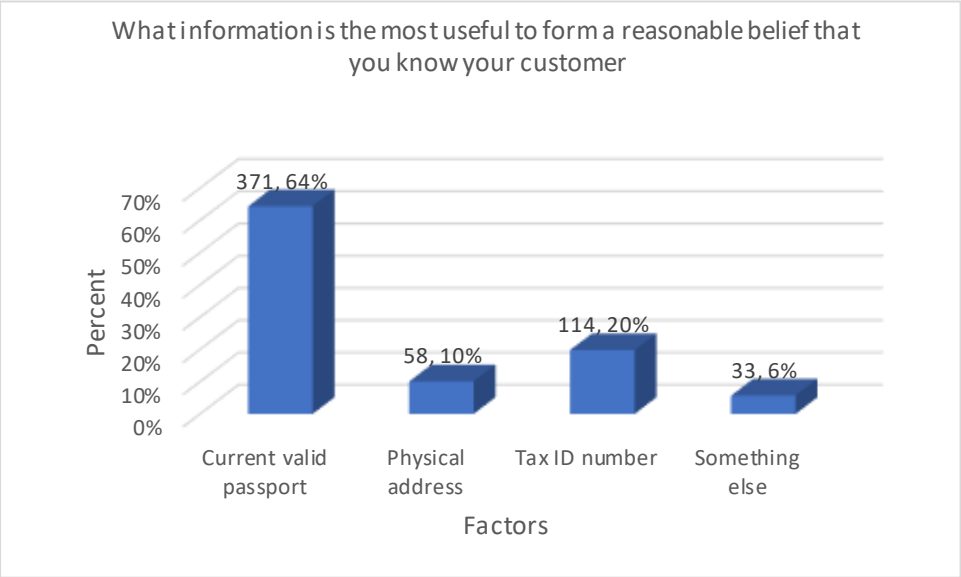


5.3.6 The threshold for knowing your customer

Recently, 'Know Your Customer' (KYC) has become an industry standard for making sure that people are who they say they are. While the scope of KYC is constantly expanding, customer identity verification is still a crucial first step in KYC processes (Van-hoai, Duong & Hoang, 2021). Hence, it was useful to ask the participants, ***'What information is the most useful to form a reasonable belief that you know your customer?'*** Respondents were given a list of current valid passport, tax ID number, physical address, something else.

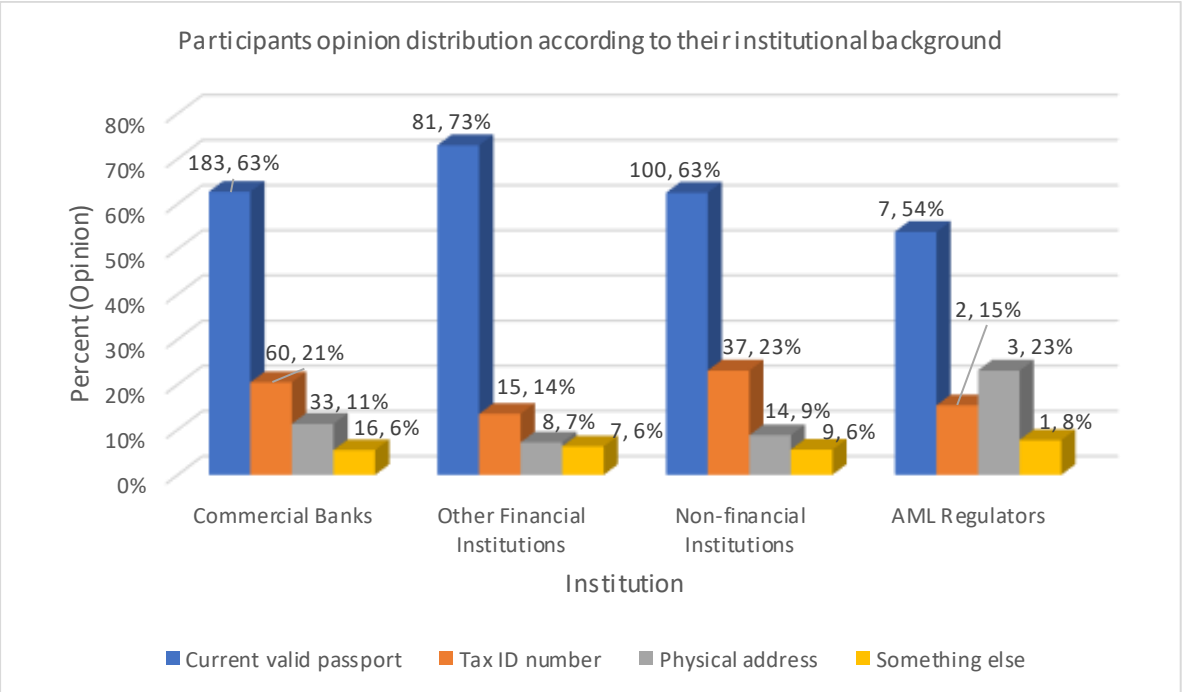
The bar chart in Figure 16 represents 574 AML experts' opinions on what information is the most useful to form a reasonable belief that they know their customer. The know your customer study found that 64% of responding AML experts considered current valid passport as the most useful document to know their customer. A further 20% of the response noted Tax ID number, and another 10% attributed it to a physical address. Finally, the remaining 6% indicated something else.

FIGURE 20. THE THRESHOLD FOR KNOWING YOUR CUSTOMER POLL RESULT



In Figure 17, participants from all sectors picked 'current valid passport' as the most useful evidence to form a reasonable belief that they know their customers. Commercial banks (64%), other financial institutions (73%), non-financial institutions (63%) and AML regulators (54%).

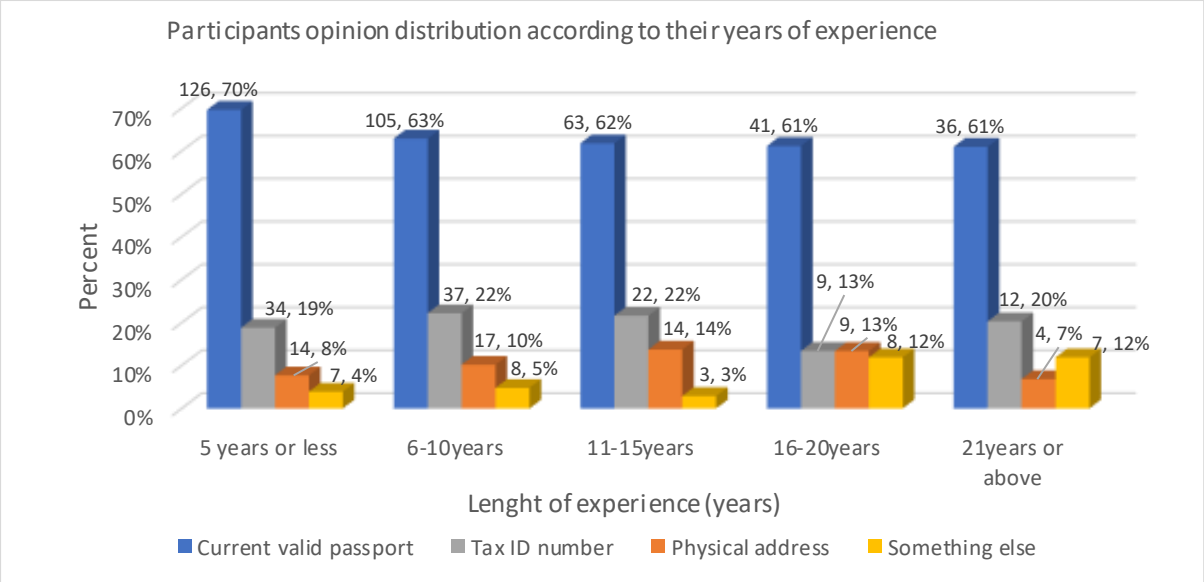
FIGURE 21. THE THRESHOLD FOR KNOWING YOUR CUSTOMER POLL RESULT DISTRIBUTION BY INSTITUTIONAL BACKGROUND



In Figure 18, a current valid passport is indicated as the most useful evidence for KYC by majority of participants within all years of experience groups and across all institutional background.

Apart from the intention of a valid passport to verify that a person stated on the document is indeed the one they claim to be, it's not apparent why experts believe they know an individual best based on a current, valid passport. Many factors may be involved, which vary from case to case. The AML experts can use it to ensure that customers are legitimate and credible, while adhering to the regulatory requirements in the country in question. This is especially likely to occur if an agency overseeing AML promotes a valid passport as KYC documentation. This is in contrast to the expectation of this study, which considers KYC documents to be targeted in contexts that provide direct income/wealth assessment, as tax-related information. According to the findings of this survey, the choice of the entity regulator may significantly influence experts' judgments. Thus, suggest that AML professionals do not deviate from practice guideline. The contribution of this knowledge help validated importance of regulatory framework in risk assessment decision making. Also, the merit of this poll question was used in designing vignettes instrument.

FIGURE 22. THE THRESHOLD FOR KNOWING YOUR CUSTOMER POLL RESULT DISTRIBUTION BY YEARS OF EXPERIENCE



5.3.7 Short poll concluding remark

The initial analysis of the results polls on participants' opinion accuracy gauge (see Figure 1) so far suggests two consistent findings. First, organizational response strategies (such as formulated policies, procedures) serve as the most common choices for AML practitioners to gauge their risk assessment judgment accuracy. Second, despite the much-promoted risk-based approach in which financial professionals assess the risk to which they are exposed and adopt suitable modification actions following their levels of perceived risk, professionals most often depended either on their organization processes or domicile statutory requirement to build their judgment during AML risk assessment.

5.4 Interview Analysis

In part 2 of the data collection, the survey themes were expanded into four interview themes, which covered the main topics raised in the online survey and the vignettes study. During the interviews, we explored the most important arguments discussed in my thesis on AML risk assessment as well as what the professionals actually think when making AML risk assessment decisions; what specific factors influence their decision-making process.

Interviews were conducted in a structured manner for this purpose (Frankfort-Nachmias and Nachmias, 1996). In total, nine AML experts with residences in six different countries, all of whom had experience assessing AML risks within their financial institutions, were interviewed. Considering the time, we had and the conditions we were in, the interview questions were asked in the same order and in the same manner. Each interview lasted approximately 50 minutes and conducted through Microsoft Teams video call. Following participant consent, interviews were also audiotaped. These were the four themes of the interview questions:

a) Overview of risk assessments and their effectiveness.
b) The Risk assessments process
c) Main factors that influence risk judgment
d) Process improvement opportunities

The questions were worded as follows.

i. How effective is the current AML risk assessment framework?
ii. FATF is promoting the risk based as a major approach for carrying out the risk assessment. What do you say about the effectiveness of this approach?
iii. How long have you been in the industry and are there specific academic/ certification qualifications required for your current role?

iv. Do you go with your bank framework risk appetite or your individual risk appetite during review?
v. What can you describe as effective customer due diligence?
vi. How do you measure success in carrying out customer due diligence?
vii. Do you think geographical risk is a key risk? And why?
viii. Does customer due diligence help you spot suspicious activities? And how?
ix. Aside from CDD measures, are there other factors that help to build suspicion?
x. What is a reasonable ground to suspect?
xi. Unusual transaction and suspicious transaction. Do both terms mean the same thing or they're different?
xii. What context is most useful to form a reasonable ground that your customer transactions are potential instances of money laundering (ML)?
xiii. Where do you get information to form a reasonable ground to suspect?
xiv. What are the triggers that initiate the information gathering process to form a reasonable belief of suspicion?
xv. Which specific sources do you go to for guidance to arrive at a reasonable belief that your customer transactions are potential instances of money laundering (ML)?
xvi. Are there instances or requirement when you need the directors or a senior management approval before reporting certain suspicious transaction?
xvii. During operational AML risk analysis of customer transaction to form a reasonable ground to suspect, on which aspect of the decision-making process do you spend most of your time? And why?
xviii. Do you usually get all the information required to know if a transaction is linked to proceeds from crimes?
xix. What are the current limitations facing the current AML risk assessment system?
xx. What can you advise fellow practitioners like you to help them improve accuracy in risk judgment during AML risk assessment?
xxi. Where would you like to see more education/training?
xxii. What changes overall would you like to see in the AML risk assessment framework?

5.4.1 Thematic analysis of the interviews

The interview data was analysed using NVivo, a software used for qualitative and mixed-methods research. NVivo assists in the management and synthesis of ideas. It is widely used for analysing unstructured text, audio, video, and image data, including but not limited to interviews, focus groups, surveys, social media, and journal articles, because the tool allows you to develop new understandings of the data and test hypotheses about the data (Azeem, 2012). It can also be utilised to conceptualize, code, and manage a complete research project. The analysis was conducted using a thematic approach, with codes assigned as they were identified. The software enabled easy coding and report generation. So, after completing the interview data analysis, it was easy to generate reports of all comments under each coded theme.

In total, 21 different codes were identified through the analysis process before any amalgamation or linking occurred. These are listed as follows:

1. Risk assessment process
2. Customer due diligence
3. Decision benchmark
4. Sources of risk rating
5. Information technology tools capability
6. Beneficial owner
7. Effectiveness of the risk-based approach
8. Limitation of the risk-based approach
9. Organisational influence
10. Personal belief
11. Public policies
12. Societal risk perception
13. Risk indicators
14. Geographical risk
15. Reasonable ground to suspect
16. Suspicion
17. Operational challenge
18. Cryptocurrency
19. Training needs
20. Time management
21. Management involvement

The 21 themes were then grouped into lager clusters according to their relevance and relationship to the research. The final areas of reporting were under 4 broad themes.

i. Risk assessment process (customer due diligence, transaction monitoring and suspicious transaction reporting)
ii. Risk analysis
iii. Operational challenge
iv. Bias identification
v. Future direction

Referencing respondents who raised the issue within the following section supports the topics discussed. For the individual identification of the contributing participants, each respondent was coded as 'R' plus a unique generated serial number by NVivo. Although it does not reveal who made the comments, it does show that different people raised the same points and illustrate where several people made the same type of remarks.

5.4.2 Risk Assessment framework

An important component of AML risk framework is the risk assessment process. It is used to identify, investigate, and respond to suspicious behaviour. This theme received the most

coding segments in this study. All respondents described the risk assessment framework as a system that requires adherence to guidelines and procedures during decision-making. The FATF recommendations set out the foundational criteria for assessing AML risks at all respondents' institutions, along with applicable AML legislations embedded in their risk assessment manuals. Most of the respondents (R1, R3, R4, R5, R6, R8, R9) asserted that banks are very rigid with their risk assessment procedures, and that everyone needs to follow the process. For example, R4 noted that "*There are laydown processes that everybody goes through for their risk assessment*".

This finding is consistent with prior literature. For example, Cindori (2013) described the AML risk assessment system as a system based on rules that require the responsibility from all stakeholders involved to apply explicit and rigid rules in accordance with legal requirements. Hood (2011) explained that the rigidity rule protocol within AML systems entails a tension between box-ticking and independent human judgment during risk assessment. An explanation of this judgment approach from decision science can be likened to the rule-based response, which occurs when an individual's actions are governed by a set of well-known rules, which the assessor follows. One difference between skill-based and rule-based behaviour is in the degree of the practice of rules. Since the rules need checking, this approach in making judgment is prone to errors or bias.

5.4.3 Customer due diligence

The respondents generally agreed that AML risk assessment begins with an effective customer due diligence during the onboarding an account. The objective is to determine the initial risk level of customers by determining the inherent risks associated with the customers' economic activity and their geographic location. In R3's words,

"*You need to consider risk totality, you need to look at the customer, customer type, product type, geographical location. You also need to look at the channel […], you need to understand the source of funds, you need to understand the purpose, for corporate entities you need to understand the ultimate beneficial owners. So, without KYC, customer due diligence, we won't be able to identify any suspicious transaction. Because through customer due diligence, you know the customer, you know what the customer can do, the customer transaction thresholds already''*.

In carrying out customer due diligence, most of the respondents specifically highlighted the need to establish identification through official documents or any other suitable means and there is a great deal of reliance on government departments and agencies documents. Normally there are procedures or policy statement that govern CDD activities (R8, R9). For example, banks typically use a CDD checklist to harmonize screening of customers during the account onboarding stage (R4, R5). The CDD checklist is a document that helps them identify and assess the risk associated with their clients. This document guides them to make a harmonized decision regarding proper risk profiling of their customers in knowing which should be considered high or low risk.

To profile customers appropriately, respondent R2 noted *"we do ask question and we use some weights to put more weight on an answer instead of another".* The respondent R6 explained that most banks usually have an interactive tool that calculates the risk based on some parameters such as the customer geography, product, and service offer, as well as whether the client is a PEP (politically exposed person). Respondent R7 noted that each collected customer data is validated and as an analysis you must ensure to tick all the boxes to ensure completion of the laydown process. According to Respondent R7, personal identifiable data collected from customers must be verify through some internal mechanism and this process is essential for the CDD process to be seen as been successful carried out. In fact, according to respondent R7, *"we need to tick all the boxes before we onboard a customer".* In respondent R8 own words effective customer due diligence can be describe as "*when you have ticked all the boxes, and you have dotted your i's and crossed your t's, and all of those things put together to a great extent, you will be satisfied that, you have done your own due diligence*".

Though, operational difficulties persist with CDD policy and procedures implementation - interpretation, compliance costs, and scope (McLaughlin & Pavelka, 2013). An overview from this section indicates that the alignment of judgments and organizations' laydown processes is a likely factor that influences how experts in this field perceive the accuracy of their review activities. Reporting institutions may, for example, use external criteria and surveys to identify countries with high corruption risk, such as the Transparency International Corruption Perceptions Index or reports by the Economist Intelligence Unit. However, these may not suffice for the purposes for which they are intended (Gelemerova,

2009). There is a possibility that a set of truly suspicious cases goes unreported to the FIU, as well as the possibility that truly legitimate transaction are reported as suspicious. Customer due diligence is one of the main concerns of money laundering legislation (Helgesson, 2016).

5.4.4 Risk assessment model

As part of its general guidance on AML screening, the FATF and other regulatory bodies recommend two main approaches: risk-based analysis and generally rule-based implementation of AML screening. The participants agreed that money laundering crimes are elusive and that the risk-based approach currently represents the only viable strategy that accurately reflects reality. For example, respondent R6 noted that "*you need to understand that you have scarce resources, you have certain number of employees, you have a certain amount of finance to sustain the cost of compliance and you cannot go above that''.* On the other hand, screening on rule-based behaviour is dependent on the understanding of their institutions' internal written procedures and policies.

5.4.5 Risk assessment tools

Several of the respondents noted that banks as reporting entities are supposed to screen clients with software, and also the need to ensure that the software is carrying out the screening as expected (R1, R2, R3, R6, R7). Screening or monitoring solutions, which vary from institution to institution, have systematically redefined efficiency in risk assessment over the last two decades. The use of technology has continuously helped institutions manage suspicious activity by monitoring, reporting, and alerts through predefined custom rules. According to respondent R3, technology is the strategy for identifying suspicious transactions in today's world because it is humanly impossible to monitor all customer's transactions and without a monitoring system to identify suspicious transactions, it may be difficult for the whole enterprise transaction monitoring. Considering the cost implications, R2 pointed out that large institutions may have all the tools necessary to track and really check what is needed to check and to assess the risk of an ongoing operation or transaction; however, for small companies, they might not have all the tools required. Respondent R4, who works in a small financial institution, notes that "*the truth is that when you live in a place like […] where you don't have system or software to help you do those things. What you are going to do is that you are going to base [judgment] on your intuition, or you are*

going to base it on geographical or what you have heard or what you know about the person. Perception now becomes the basis of your judgment".

According to respondent R5, banks have all those predefined rules incorporated into their monitoring system, utilized during transaction screening and at the account onboarding stage. These rules are generated based on triggers provided by the country's central/reserve bank, as well as internally generated rules by the financial institutions (R1). Majority of the respondents emphasised that monitoring systems are configured in a way that if anything outside the customer's risk appetite (unusual transactions) is breached, it will flag it for further manual review by designated officer (R1, R4). All participants agreed that human judgment is required for qualitative analysis of unusual transaction generated by automated systems and for validating unusual transactions picked up by systems. One of the general reasons given by the participants for the need for qualitative screening is to exclude some unusual transactions that may be legitimate transactions from further analysis by law enforcement agencies and, hence, not to incorporate them in the filed suspicious transactions reports (R9).

5.4.6 Screening for suspicious transaction/activity

Customers' transactions must be linked with predetermined risk indicators (R1, R5) so that the institution can demonstrate that the customer is suspicious of anti-money laundering crime (R9). To do this, institutions must have not only an appropriate monitoring solution in place, but also staff with the required skills and knowledge (R3). Respondent R1 narrative specified that, ''*a suspicious transaction comes from the branch from a front customer facing staff. Because they see what's happening there. They complete a form, and they indicate why they think the transaction is suspicious. So, there are sections, boxes to tick and certain triggers to say was this a repeat in and repeat out? is this out of line of the customers declared source of income? was the customer effective in trying to give information? is this deposit in line with the customers? are declared source of income things like that? So, they tick all the applicable sections, then they bring the suspicion to compliance. [...] compliance will check and see how these talks to our current triggers and the triggers for the Arabic set […]. So that's how we decide to say if it [is] a suspicion for money laundering or not''.*

In respondent R3's opinion, a compliance officer level of experience is the most important in determining what is truly suspicious since they have useful tools, which might not be

available to staffs in the branch. Compliance officers can utilise some of the available tools at their disposal to check adverse media reports on any particular customer and perform EDD on customers of concern, for instance. Respondent R3 further explained that there are some guidelines and laydown procedures that will add to your experience to determine whether something is suspicious. In respondent R5 word "*to be honest with you, AML topic like in terms of making decision is subjective. So, it really depends upon the person who is actually making that decision. For example, if there is a scenario, if you give it to me and if you give the same schedule to a person who actually has less experience [compared to] me or maybe to a person who has more experience [than] me, the decision, the style and the approach [will] differ basically".* Respondent R9, however, argued that identifying suspicious transactions or activities is subjective because it depends on the information the assessor has about the customer. Hence, it is always appropriate to reach out to customers through their relationship managers when there are unusual activities to clarify the circumstances. In respondent R8 words "*when you don't get complete information, that is a very high ground for me to think that person and his transactions are suspicious".*

According to participants R6, "*we have some form of intuition […] and then you can say there is a pattern here which does not look good. I should be able to explain why this client is doing that. Does that make sense for a person who is doing a specific job*"? In fact, all participants generally noted that they expect customers to behave financially in line with their existing risk profile assigned during account opening. So, a customer transaction becomes suspicious according respondent R5, "*when you check a customer account, and you see that the inflow is not in sync with the nature of business*". There are some checklists that you can follow during the entire risk assessment of a transaction according to respondent R2. Respondent R2 explained further that "*there are some aspects [red flag] that give you immediately the ground of suspicion, or else sometimes, it is about very-stupid things, like the description of the transaction is not consistent with the transaction, something is written wrongly in the request*''. In addition to sudden changes in customer transaction patterns, geographical risk was mentioned by all respondents as a significant indicator in knowing that a transaction should be considered as suspicious.

5.4.7 Geography risk

While money laundering risk identification strategies slightly differed across all respondents, geography was highlighted by all respondents as a key decision determinant in customer risk assessments. Geographic risk is important because some geographical locations are classified as higher risk jurisdictions due to poor implementation of anti-money laundering measures (R3). According to respondent R4, the normal rules is that they pay more attention to customers and transactions originating from countries designated as high risk by FATF. R4 further illustrated with a typical example that *"an inflow from Afghanistan and you get another one from the US. The kind of question that you will be subjected to when it is Afghanistan is to an extent that it even becomes very personal […] that sometimes you are tempted to believe that no better business can come from Afghanistan. But [transactions from] the US, everything that comes from there to the one receiving or the medium or the ones who are processing is okay. Sometimes if [the customers] are going to [be] ask 10 questions when it is coming from Afghanistan, they can even [be] ask two questions when it is coming from the US".*

In respondent R6'swords, "*I think we are all afraid of our legislation, you know, because this is what the legislation says. As soon as you know this person is born there, he is residing there, he should be high risk. We say that that sometimes, it is a bit sad when we talk about it as a human […], but I would say maybe the rationale behind is because if a person is residing there and since it is high risk, you assume that institutions [in that location] do not have the proper AML safety control, so that is why they are on the list. […] I would say at the end of the day, I would not really have comfort, you know, even after having done a full review, I would not be sufficiently confident about the documents I have received […]. It is a bit difficult to explain because I do have clients from high-risk jurisdictions in […], maybe a client who is of Pakistani citizenship but is residing in the UK could change my way of seeing things because he would be high risk because of his Pakistani citizenship, and he is residing in the UK. Then maybe there could be some form of balance*''.

Respondent R7 noted that the mere hearing of geographical location like Pakistan automatically plays out a case of terrorism financing. In his words, "*the one from Afghanistan, clearly without even checking any documentation stuff is placed on watch already. […] citizens of those countries, even if they are [residing in a low-risk country] and if*

one of them is a director in any of companies in [the residing countries], that accounts is on watch list already". According to respondent R4, there is a growing understanding that transactions from high-risk jurisdictions are subjected to rigorous scrutiny. Consequently, the volume of transactions is slowly shifting from these locations to less visible jurisdictions, so the system should be dynamic as much as possible rather than based solely on geography. This statement has some important policy implications. Having designated some jurisdictions as high risk in order to respond effectively with control, has this strategy reduced the flow of proceeds of crime out of/in those jurisdictions, or has it fuelled the development of more innovative methods to channel these proceeds.

5.4.8 Suspicion, uncertainty, and doubt

According to participant R6, "*we have some form of intuition […], but at times we cannot really pronounce ourselves on that because we don't have the evidence, we don't have the facts and even in normal cases like where you have transactions, […] you cannot just say, this client is doing something wrong. In such instance, you get some influence of ticking the box*''. According to respondent R9, "*if my instincts and from information gathered do not give me 100% assurance that the traction is genuine, I will file STR because the information provided though not directly linked to money laundering, but I am not yet convinced that this transaction is genuine. Then I think it is safer for me to file STR and be on the safer side with the regulators*".

Participants' opinions emphasize the belief that they must report every transaction they do not fully understand, and that in some cases they still report an unusual transaction even when the customer provides satisfactory evidence. For example, respondent 1 explained in her word "*I will send to the regulator, if I still think it is a suspicion because it is the responsibility for the regulator to complete the investigation"*. In fact, participant R2 noted *"when I decide not to report, I am sure 100% that the transaction is not linked to any [activities of money laundering]. I might be wrong sometimes, off course. But when I don't report, I always attach to the [unusual] transaction in the client account, a document showing all the process, all the [checks] that I have done on the transaction and why I am sure that the transaction is consistent with the [customer] activity [and] is legitimate"*.

A retrospective description of suspicion investigations may make it appear that they are linear and conclusive, but this is not always the case (Fedirko, 2020). The respondent in this study generally tend to prioritize filing an STR report over exercising their judgement case by case. In this approach, caution was the driving force, but it is in opposition to the risk-based approach. This further result suggests that financial institutions may simply be filing STR/SARS for safety reasons. Moreover, as a cognitive bias, the participants showed a tendency to place more weight on the written procedures and policies, even if the provided context of a case were highly reliable.

In performing a qualitative screening for suspicious transactions, the procedure can be summarized briefly as follows:

1. Upon receiving an alert of an unusual behaviour/transaction, the customer documented account records are opened and examined with the flagged transactions. The deviations are then examined to see if predicted customer transaction dynamics have been exceeded. An independent AML experts verify the unusual transaction
2. Further documentation or information is typically sought from the customer for justification of unusual behaviour.
3. The obtained document documents and/or customer response further examined from an economic rationally explained point of view to decide if suspicious or normal.

5.4.9 Weaknesses in the current AML risk assessment framework

There is a heavy reliance on risk-based methodology in the current risk assessment framework, which appears very academic, statistical, and difficult to apply in practice (R2). Employees of financial institutions rarely understand the underlying assumptions be hind the risk-based approach since it is a framework laid out in statutory legislations (R4). The bottom line is that each and every company in the industry needs to develop a written process for applying the risk-based approach to its business process, and not all companies have the adequate resources and departments necessary to follow the process required to implement the guidance recommendations (R2).

Most of the respondents noted that the current risk-based approach is not adequate in filtering some of the emerging risk like cybercrimes and human trafficking for examples. These areas do not really come out when carrying out money laundering risk assessment, despite being quite thematic (R1). According to respondent R6, there are few guidelines available for understanding risk emerging from technological advance methods for money laundering by criminals, and that somehow, the industry is not sufficiently prepared for this type of risk assessment. Respondent R6 further iterated "*we will have to go according to this new item because we cannot go against that, it is the new trend now*''. In respondent R8's word, "*The framework for money laundering as of now, I don't think it is very effective because there's still loopholes whereby money launderers bringing in their proceeds of crimes and all of these things and we are still not able to find controls around these things or identify because these guys (criminals) are usually a step ahead of the institutions and the bodies that are fighting this so-called money laundering. […] I think we need more work*".

All respondents agreed that the risk-based model sometimes biased decision-making towards existing risk classification templates during risk judgment (all respondents). For example, respondent R3 noted, ''*in our jurisdiction, we have what they call a three tier KYC. In line with regulation, Tier one and Tier 2 customers are supposed to be classified as low risk. However, what they have found out over time is that since the tier 1 customer account have minimal KYC requirements the banks are not required to get certain information type and required minimum verification to open an account. We have witness instances whereby criminals exploited these categories low risk account to commit money laundering crimes despite the controlled transaction threshold in place for these tier 1 accounts*''. Most people claim specific line of business as their source of income, but it is not what they do; there is a lot of cover up to conceal the actual sources of wealth (R8). A customer with huge transactions volume considered to be riskier because the decision is statistically based (an approach promoted by the risk base methodology), but the main issues are what is the real activities behind every transaction? What is the customer really doing? However, these declaration by customer is relied upon to carry out risk assessment (R2). A lot of times it is very difficult to identify a whole lot is happening at the backend just by feeling from within the four walls of a financial institution (R8).

The qualitative screening step consider the likelihood that unusual transaction/activities is an instance of money laundering and the consequences if it is actually a case of money laundering. However, it was gathered from the participants that this process is subjective to some degree. Different persons can have different views on the very same unusual transaction, and the qualitative screening may still be impractical and beyond the capabilities and resources available to the analyst.

It is also difficult to get all the information at once because it may come from different departments and people, some of it may come from the front desk staff, some might come from the branch, such as from the accounting department (R1). The respondent R7 pointed out that the uncooperative attitude of business managers hinders access to basic information, as they often appear to be on the side of the customer due to revenue-generating benefits. As observed by respondent R7, there are situations where these managers often instruct customers on how to mitigate the controls put in place to filter suspicious transactions.

5.4.10 Future Priorities

There is no doubt that risk assessment will remain a fundamental component of the global aim at uncovering efforts to disguise illicit funds as legitimate income. Respondent R8 indicated the need for more access to customer data outside their declared main business, outside the statutory required information. More open exchange of information among banks. Financial institutions sharing information about customers in a dual two-way flow among financial institutions, instead of only sharing information between them and the regulators (R2). By doing so, they (experts) will be able to get more accurate information to confirm truly suspicious transactions and activities. It is also important for countries to reconcile what global supervisory bodies recommend with what is happening locally, given that both local and international regulations must be complied with (R1). It is very important for it to be tailor made across jurisdiction and customer specifications because of the issues of dissimilarity among customers. So, it is not putting documentation requirement in place for compliance, which on itself is okay, but there is need for behaviour assessment of customer (R4).

In respondent R5's own words, "*I feel it should be more of a technology into risk assessment, not only like the kind of check-the-box approach. So, if I say technology, basically the use of*

artificial intelligence, which will have the inputs from what is happening around basically not typologies but also the key defining requirements".

5.5 Discussion

The promoted risk-based approach regime gives those involved with carrying out risk assessment the ability to makeover, appraise, and to use their best judgment. AML risk assessment involves experts weighing the impact and likelihood of money laundering occurring while making decisions. Thus, a money laundering risk assessment should be based on a risk-based approach, focusing more on high-risk products, services, clients, entities, and locations. With this objective, money laundering risks are categorized into low, medium, and high-risk categorizations under the assumption that risk can be better managed when structured into constituent components. Indeed, evidence from the semi-structured interviews conducted in this study suggest that AML experts are able to differentiate among specific threats when forming risk perceptions on the basis of predefined risk categorisation. That is experts are more likely to use the risk-based principles in money laundering risk estimates, rendering their judgment less susceptible to their individual risk perception and decision-making, and less likely to incorporate irrelevant information not related to labels imposed by regulators and organisational framework during risk judgment. But money laundering related transactions are most often entirely indistinguishable from other legitimate financial transactions, so they do not come with convenient red flags. As such, the operationalism of risk in the form of categorization is seen as a function of the aspect of perceived risk imposed by the observer (Savona & Riccardi, 2017). The risk-based approach, for example, automatically identifies customers as high risks if they are politically exposed, such as senior political appointees, top government officials or relatives of those officials (FATF, 2014). Although factors like being a politically exposed person arguably provided some relevant information about actual susceptibility to money laundering risk, but a direct consequence of such approach to decision making is box ticking exercise on the part of banks (Sinha, 2014).

This perspective suggests that opinions made by experts influences organizational/countries responses to AML risk assessment. Direct analysis of the interview helped shed light into the actual thoughts of AML professionals when they make risk assessment decisions. The result from the interview data analysis suggests organizational response strategies such as

formulated policies, procedures serve as the most common choices for AML practitioners to gauge their risk assessment judgment accuracy. This was consistent with finding obtained from the short poll earlier presented in this work. The AML risk assessment framework is a system that requires adherence to guidelines and procedures during decision-making, there are laydown processes that everybody goes through for their risk assessment. This finding is also consistent with prior literature. For example, Cindori (2013) described the AML risk assessment system as a system based on rules that require the responsibility from all stakeholders involved to apply explicit and rigid rules in accordance with legal requirements. Hood (2011) explained that the rigidity rule protocol within AML systems entails a tension between box-ticking and independent human judgment during risk assessment. An explanation of this judgment approach from decision science can be likened to the rule-based response, which occurs when an individual's actions are governed by a set of well-known rules, which the assessor follows. One difference between skill-based and rule-based behaviour is in the degree of the practice of rules. Since the rules need checking, this approach in making judgment is prone to errors or bias.

Despite the much-promoted risk-based approach, in which financial professionals assess the risk to which they are exposed and adopt suitable modification actions following their levels of perceived risk, professionals most often depended either on their organization processes or domicile statutory requirement to build their reasonable judgment during AML risk assessment. The interviewed respondent in this study generally tend to prioritize filing an STR report over exercising their judgement case by case. In this approach, caution was the driving force, but it is in opposition to the risk-based approach. This result suggests that financial institutions may simply be filing STR/SARS for safety reasons. Moreover, as a cognitive bias, the participants showed a tendency to place more weight on the written procedures and policies, even if the provided context of a case were highly reliable. For most of the practitioners, the fear of the consequence for failing to adverse risk in their judgment compel the ticking the box approach during risk assessment.

CHAPTER 6 AML RISK ASSESSMENT: AN EXPERIMENTAL INVESTIGATION

6.1 Introduction

Following the first part of the research, the second part involved an experimental study and two analyses to answer research questions two and three. In the first analysis, the quality of expert AML probabilistic risk assessments was compared with novice assessments in terms of various underlying accuracy components. In the second analysis, this study examines whether there is a potential difference in the quality of probabilistic risk assessment across genders.

6.1.1 Background to study

Professionals dealing with AML risk assessments face challenges such as incomplete or inaccurate information, ambiguity, concealment, inconsistencies, or ill-defined problems that impact the quality of AML assessments they conduct. They are often required to make judgments under such circumstances with varying levels of uncertainty. For example, under the Proceeds of Crime (Money Laundering Act) and associated regulations, all reporting entities and their employees must report suspicious transactions (FINTRAC, 2020). Their suspicion of money laundering originates from assessments of multiple elements (transactions, facts, context, and any other relevant information that may or may not indicate money). Hence imperative that AML experts have good judgment in detecting suspicious incidents related to money laundering risk, so the STR can be of high quality to the appropriate authority (Jamil et al., 2022). AML guidelines are equally accessible for regulated sectors, alongside the experts' skill sets.

The AML expert is also governed by guidelines designed to assist them, in their decision-making and ensure they are compliant with money laundering regulations during risk assessment. However, there is significant variation among professional practices, and the AML system generates a large volume of low-quality SAR reports annually (Gelemerova, 2009). The situation is alarming since most professionals in the anti-money laundering field rely heavily on, or even exclusively on, money laundering risk indicators published by international organisations such as the FATF and Egmont Groups, as evidence from study one (short poll analysis and interview analysis). These money laundering risk indicators generally serves as potential red flags that can help draw experts' attention to particular

instances of suspicious transactions. Demetis (2010), in his study of technology and anti-money laundering, illustrates how risk is represented by various parameters related to money laundering, such as large cash payments. While such parameters may be viewed as proxies for modelling money-laundering behaviour, they are likely to lead AML experts to accept as a matter of course that all large cash payments are suspicious, leading to an increase in false positives. The comparison is awkward and limited, yet revealing, as suspicion operates in money laundering risk assessment, suggests stereotyping.

In the same vein as customer risk profiling of suspicious transaction then takes on a different character; one that is informed not just by known typologies, but also by the behavioural characteristics of a specific financial institution's pre-established suspicious customer base. Hence, the heavy reliance on these developed ML indicators may increase the likelihood of false positives and false negatives in AML experts' judgment. For the staff, the most challenging aspect is developing criteria to identify suspicious behaviour or transactions (Sinha, 2014). Without quality considerations in bank AML programs, criminals might be able to evade detection. The consequences of such failures have left major financial institutions with penalties and costs in the hundreds of millions (Nyreröd et al., 2022). A common theme in the risk assessment literature is the emphasis on box-ticking, which results in a high false positive rate that undermines the AML system's efficacy, bank's reputation (dalla Pellegrina et al., 2022), and raises operating costs for law enforcement agencies that rely to some extent on these reports for intelligence (Amicelle & Iafolla, 2018; Takats, 2011). False positives occur when a legitimate financial transaction is flagged as suspicious, resulting in the transaction termination and may also lead to the transaction account being frozen. On the other hand, false negatives are when fraudulent behaviour is happening but not causing a trigger. In fact, false positives alone cost the American e-commerce industry $2 billion in costs, according to Kount (a digital fraud prevention company) report (Menz, 2020). Further, this raises concerns about the attribution of a 'grey' identity to law-abiding customers (Bergström, Svedberg Helgesson, & Mörth, 2011).

Another important area of concern is the risk-based approach as a global strategy during AML risk assessment, and it gives financial professionals the ability to assess the risk they face and take appropriate actions based on their perceived risk level (Michel Dion-2012). It seeks to identify transactions that represent an unacceptable risk. AML experts may have to

perform a deeper analysis if there is a high-risk factor such as political exposure or wealth originating from jurisdictions perceived as high-risk. However, within the money laundering risk context, the concept of risk is far more elusive and subjective (Demetis, 2010). Specifically, it is a judgment about risk, which is that a counterparty or transaction may be associated with criminal funds (van Duyne, Harvey, & Gelemerova, 2016). How, the adoption of the risk-based approach to AML is problematic (Bello & Harvey, 2017; Demetis, 2010; Naheem, 2019;). Yet, there are relatively few research on the effectiveness of the risk-based approach in AML. This research highlight some of the issues.

In Walker's (1999) view, banking institution staff are still incompetent at identifying money laundering risks. In a similar vein, van Duyne et al. (2016) suggested that the vulnerability of any risk-based model is its human interface. In their view, humans should act rationally when assessing AML risk and make accurate judgments throughout the process. However, humans are often far from rationality in their decision-making. Yet, limited studies have been found on the individual-based role in assessing money laundering risk (Isa, Sanusi, Haniff, & Barnes, 2015). In fact, money laundering risk judgment is a new development of the research on judgment and decision-making, and there remains a significant literature gap regarding its review in that area (Jamil et al., 2022).

This section of the research focuses on the quality of anti-money laundering risk assessment for several reasons. First, by examining the decision involving money laundering risk, we can examine broader theoretical claims about expert risk perception and decision making. Second, appropriate judgment and confidence levels are vital in this context and yet the quality of expert's risk judgment in this area is yet to be systematically explain.

6.1.2 Probability judgment

It is common to make important decisions based on incomplete information in today's complex world, ranging from everyday uncertainties such as weather forecasts, medical treatments, and knowing when a company may unwittingly engage in money laundering. It is now possible to quantify uncertainty for use as part of decision appraisal and in the effective representation of outcomes to users (Joslyn & LeClerc, 2012; Murphy & Winkler, 1984). In fact, there are several different techniques available for use in research and organisational settings to express expert likelihood judgments (Carbone & Armstrong, 1982). Probability judgments are only one of the severally commonly used forms of

likelihood judgment (Yates et al., 1989). Most authors have noted that the precision of probability judgment helps to simplify the study of likelihood judgment, since a probability is an expression of a purely internal state (Lichtenstein, Fischhoff, & Phillips, 1977). Hence, the decision made using probabilities provides detailed information about the assessor uncertainty in quantifiable data. This can further be used as a tool to communicate the assessor's uncertainty to intended decision users, who may then be able to interpret the projections of the assessor in an optimal manner (Murphy & Winkler, 1984). Typically, there is no right or wrong probability residing somewhere in reality against which one can measure it, but it may be possible to verify whether the proposition to which a probability judgment is attached is true or false. It is also interesting to examine how good such probabilistic judgments are in very specific ways, beyond how well they operate in general terms. Probability score (PS) decompositions become particularly useful in this context (Siegert, 2017; Yates, 1982). In the study of basic judgment processes, decompositions of PS have the potential to be valuable tools. Specifically, the foundations of variations in the various aspects of judgment performance indexed by decomposition components, e.g., calibration.

Several studies have demonstrated that calibration in probability judgment is adversely affected by overconfidence (McKenzie et al., 2008). Calibration is the measure used to describe the degree of consistency between allocated probabilities and actual occurrences (Lichtenstein et al., 1977; Hathout, Vuillet, Carvajal, Peyras & Diab, 2019). Existing experimental research work suggests confidence plays a critical role in the cognitive control of probability judgments' formulation. The evidence presented thus far supports the idea that the degree of confidence in one's choices correlates with the level of knowledge of errors one has made. Borracci and Arribalzaga (2018) note that confidence could be considered an essential ingredient of success in task accuracy. There has been evidence for these patterns in a variety of tasks, including probability judgments (Trejos, van Deemen, Rodríguez, & Gomez, 2019), forensic assessments (Mattijssen, Witteman, Berger, Brand, & Stoel, 2020), currency forecasting (Wilkie-Thomson, 1998), and news judgments (Lyons, Montgomery, Guess, Nyhan, & Reifler, 2021). Confidence can be defined as a subjective likelihood of its correctness and is one of several forms of uncertainty human brains encode (Fleming & Daw, 2017; Merkle & Van Zandt, 2006). Most attempts to document the relation

between judgment confidence and judgment accuracy have either lacked statistically significant results or arrived at mixed results. For example, Miller et al. (2015) study, synthesized 40 years of research from 36 studies and assessed clinicians' confidence ratings with mental health or psychological issues based on the accuracy of their judgments. They demonstrated that confidence is better calibrated of judgment accuracy using a random-effects model, with a small but statistically significant effect (r=.15; CI=.06, .24). While, in Luna and Martín-Luengo (2012) study with students making judgments about cued recall versus general knowledge in response to a viewed video of a bank robbery, the study found that confidence could be a good marker for accuracy with cued recall. However, Luna and Martín-Luengo suggested the need for further studies using ecological tests and robust data analysis methods to confirm the validity of their work. In contrast, Carlin and Hewitt (1990) found no significant relationship between confidence and accuracy among clinical psychologists.

Probability judgments are well-calibrated to the extent that the probability judgment attached to various events match the relative frequencies with which those events occur. Those who are not well calibrated may either be underconfident or overconfident. In the underconfident assessment, the percentage of propositions that are true exceeds the assigned probability. With overconfidence, too few propositions are true. For example, a money laundering reporting officer (MLRO) is well calibrated across all the many occasion that the MLRO assign a probability of .85, if in the long run, 85% of the suspicious transaction report sent to the relevant authorities turn out to be actual cases of money laundering crimes. However, if only 60% result in absolute money laundering crimes, the MLRO is not well calibrated but overconfident. Similarly, if 90% of the suspicious transaction reports resulted in tactual cases of money laundering crimes, then the MLRO is underconfident. An assessor is well-calibrated, if over the long run, for all propositions assigned a given probability, the correct proportion is equal to the probability assigned (Kull et al., 2019; Kumar et al., 2019; Lichtenstein et al., 1977). Confidence calibration is an aspect of probability judgment accuracy that has received significant attention (Card, & Smith 2018; Lichtenstein et al., 1977). It is one of the prominent prescribed approaches to determine probability judgment validity (Bol & Hacker, 2012; Tomassini et al., 1982; Zhong et al., 2021).

Being well-calibrated is critical for optimal decisions. However, it is common for humans to overestimate or underestimate probabilities, frequencies, and proportions they encounter, which result in poor calibration (Khaw, Stevens, & Woodford, 2021). The most recognised cause of poor calibration is overconfidence or overreaction (e.g., Lichtenstein, Fischhoff & Phillips, 1982; Wallsten & Budescu, 1983; Wilkie-Thomson, 1998). The pattern of overconfidence and underconfidence observed in studies of intuitive judgment is explained by the hypothesis that people focus on the strength or extremeness of the available evidence (e.g., the warmth of a letter or the size of an effect) with insufficient regard for its weight or credence (e.g., the credibility of the writer or the size of the sample). This mode of judgment yields overconfidence when strength is high and weight is low, and under-confidence when strength is low, and weight is high (Griffin & Tversky, 1992).

6.1.3 **Probability judgment and task difficulties**

Most experimental work on the insight of confidence as a measure of accuracy utilises the administration of general-knowledge questions to subjects (Merkle & Van Zandt, 2006; Yates et al., 1989). These forms of alteration differ across tasks and context, and the findings from these studies suggest a positive correlation between confidence and judgement accuracy. The literature also noted that people tend to exhibit overconfidence about what they know (Paese & Feuer, 1991; Santos-Pinto, & de la Rosa, 2020). However, what is striking in this finding is the phenomenal increase of overconfidence in onerous judgment settings, with a very low likelihood of correct judgement/responses (Bol & Hacker, 2012; Allwood & Montgomery, 1987). Similarly, people tend to perform worse in their confidence (underconfidence) in less onerous tasks (Lichtenstein & Fischhoff, 1977; Moore & Cain, 2007). But most authors maintain that the extent of calibration observed during an experiment reflects the experimental-subject capability, and not the structure of the event or events upon which the experiment is conducted (Hathout et al., 2019; Keren, 1991). For example, Afflerbach et al. (2021) measures the impact of individual uncertainty on performance. According to their study, an expert's ideal uncertainty increases as he or she becomes less knowledgeable

6.1.4 Common method for estimation of human probability judgment

A growing concern for the public and regulators is the assessment of human error in industry. It is therefore imperative to quantify human error, despite the challenge involved.

In order to make the process of determining human error probability's objective requires a scientifically rigorous measurement method (Amyotte, 2007). Various statistics for examining probability judgment accuracy have been proposed in the literature. For example, an event tree analysis is a well-known technique for assessing the probability (in a probabilistic context) of an accident. Event tree methods are extensively used to explore the probability of consequences arising from initiating events. According to Ferdous et al. (2009) Event tree analysis (ETA) is characterised by a logic combination of several events that may arise because of an initiating event (e.g., an accident event). To propagate the event consequence in different branches of the tree, the initiating event uses dichotomous conditions (true/false or yes/no). By developing an event-consequence model for each path, the various branches ultimately identify the possible outcome events. An event tree traditionally assumes that the input events' data is precisely known and the independence of the input events (Deacon, 2013). In reality, these assumptions often fail to meet the purpose of risk analysis, leading to erroneous conclusions (Ferdous et al., 2009).

The Bayesian approach to reasoning has been proposed by a variety of researchers in recent years (Costello &Watts, 2014). Bayesian reasoning adheres to the probability theory for drawing conclusions based on observed data. Bayesian Networks (BNs), for example, express causal relationships between events using graphical inference and can be used both for predicting the probability of unknown variables or updating the probability of known variables based on evidence (Kabir & Papadopoulos, 2019). In a comprehensive review, Musharraf et al. (2013) evaluated the use of BNs to assess human error probabilities engineering setting. They demonstrate that the BNs approach adequately assesses human error likelihood based on their comparative study. Similarly, the application of Bayesian networks in system safety, reliability, and risk assessment, was recently presented by Kabir and Papadopoulos (2019). Though BNs have gained popularity in risk assessment applications due to the model's flexible structure, there have been criticisms of Bayesian models' estimation of likelihood functions and priors (Endress, 2013; Marcus & Davis, 2013). The Bayesian theory permits too many arbitrary alterations to likelihoods and priors. Bowers and Davis (2012) explain that this flexibility of the Bayesian theorem-based model could allow the usage of the model for explaining almost any behaviour as optimal.

The Mean Probability Scores (MPS) is another frequently used approach for studying likelihood judgment (Yates & Curley, 1985). The MPS is linked to Brier (1950) and is often referred to as the 'Brier Score'. It measures the difference between the assigned probabilities and whether or not the events transpired. The MPS statistic is a wide gauge of overall accuracy that can be broken down to reveal important underlying aspects of performance, such as calibration and resolution (Lichtenstein et al., 1982; Murphy, 1972a, 1972b; Yates, 1982). This study will adopt an approach based on Yates (1982), since the required estimation is simple probabilities, such as the probability of an event P(A) and does not involve any conditional probabilities of any form related to the Bayes' theorem. The approach and the relating statistics will be described in detail in the methodology section. However, in the meantime, research that has utilised probability judgment accuracy approaches to examine the quality of professional judgment is reviewed next.

6.1.5 The effect of expertise in probability judgment accuracy

Burson, Larrick, and Klayman (2006) found that the extent of calibration seems to depend on the assessor's skills. This study revealed that a significant number of errors in judging relative performance originate from the poor performers' tendency for assessors to overestimate their abilities, which is a function of weaker metacognitive capability. In support of this finding, it has been evident in expert related studies that absolute error for experts was lower than novices. For instance, on average, Martire, Growns, and Navarro (2018) demonstrated that the expert judges were more-accurate (average error 21% on any given trial) than the novices, who produced errors of 26% on average in the correctness of their answers to a series of task that estimated the frequency of occurrence for handwriting features. They noted that this number is considerably lower than expected by chance (25%) if people possessed no relevant knowledge and responded with .5 on every trial. The overall error rate even for experts is large enough to raise questions about whether their estimates can be sufficiently trustworthy for presentation in courts. Likewise, Mattijssen, Witteman, Berger, and Stoel (2020) tested the assumption that the experience of fingerprint examiners enables them to judge the frequencies of general fingerprint patterns and found that experts judgments did not perform better on the task than novices. They further noted that fingerprint experts seem to possess relative knowledge about the rarity of general patterns but had difficulty expressing this knowledge quantitatively.

Amos Tversky and Daniel Kahneman's work suggests that human often rely on a limited number of heuristic principles when assessing probability and predicting values, as these reduce the complex task to a simpler judgmental process. It takes a great deal of expertise to know which detail to ignore when assessing a customer transaction level of the threshold for suspicion to submit an STR (e.g., simple suspicion, reasonable grounds to suspect, or reasonable ground to believe, for review see FINTRAC). Money laundering risk assessment relies heavily on a precise interpretation and classification of transaction trails linking wealth sources to illicit activities. But AML risk assessment guidelines that focus on practical issues of money laundering detection and reporting, such as the risk-based guideline, are influenced by the practice of discriminating vague categories of risk and mapping them to distinct levels. Consequently, we anticipate that AML experts will set their risk assessment based on just a few key risk categories (such as designated customer risk, geographic risk, and transaction risk), as opposed to the many details that non-AML professionals will add. Earlier studies suggest that with increasing knowledge and experience on a task, information processing becomes gist-based (Reyna & Lloyd, 2006). Essentially, they tend to categorise and process information as simply, qualitatively, and quickly as possible given the constraints of the task. The use of categorise risk has many benefits for human performance, including ensuring that reasoning depends on relatively stable and flexible memory representations. The question remains, however, whether this developmental prediction holds up when comparing novices with experts in AML risk judgments. A decision has to be made eventually, and the main objective of this paper is to gain a deeper understanding of what cognitive processes are involved in making these decisions.

6.2 Statistical methodology for examining the quality of AML risk assessment

6.2.1 The participant's probability assessments

The participants made probability assessments on each of the 12 cases using two components. First, they stated whether they believed there was suspicious activity of money laundering with a simple yes/no answer. A yes answer was given a value of unity and a no answer a value of zero. Second, they stated how confident they were on their above answer by providing a probability, expressed as a percentage figure, between 50% and 100%. The analysis converted these values to probability terms between 0.5 and 1.

This is termed the half range method of obtaining probability assessments. More formally, the half range method requires the subject to make probability assessments involving two stages. In the first stage, the subject specifies whether they think the event is likely to occur. This can be denoted $d_{i,j}$ for event 'i' by assessor 'j', where $d_{i,j}$=1 when the event is likely to occur and $d_{i,j}$=0 when the event is not likely to occur. In the second stage, the subject specifies a probability between 0.5 and unity relating to the likelihood of the event occurring or not occurring that the subject had specified in the first stage. This assessment can be denoted $r_{i,j}$ for event 'i' by assessor 'j'.

In the evaluation of a participant's probability assessment, it is necessary to have ex-post outcomes. Regarding the Money Laundering data set, as there exists no precise data that

could be used to generate the outcome data (the guilt or innocence of the defendant in the cases is not known with complete certainty), the obvious choice is the dichotomous trial outcome probabilities (0 for not guilty and 1 for guilty). In the context of the Money Laundering data, N=12, and trial result values, can be denoted e_i, (for the 12 cases the values in ascending order are 0,1,0,1,1,0,0,1,1, 0,0,1, where e_i, for i = 1,…,12, equals zero for an actual not guilty verdict zero and unity for an actual guilty verdict. In the case of half range probabilities, when $d_{i,j}$=e_i (with e_i measured on a dichotomous scale), the outcome index is equal to unity, $c_{i,j}$=1. When $d_{i,j}$≠e_i, the outcome index is equal to zero, $c_{i,j}$=0. Accuracy analysis involves comparing $r_{i,j}$ with $c_{i,j}$ for event i for assessor j.

An alternative method of obtaining probability assessments is the full range method. In this situation the participant would be simply required to make probability assessments that an event will occur on a scale range from zero (the event will certainly not occur) to unity (the event is certain to occur). This assessment can be denoted $p_{i,j}$ for event i by assessor j.

It is often considered that the half range method is easier for participants to deal with who have not had specific training in probability assessment (e.g., Yates, 1982). Accordingly, the participants in the present study were give the half range method in the present study but this was converted by the current author to the full range method to aid statistical analyses.

Note that it is relatively easy to convert half range probability assessments to full range probability assessments. Given half range probabilities $r_{i,j}$ with $d_{i,j}$, then if $d_{i,j}=1$, $p_{i,j}=r_{i,j}$, but if $d_{i,j} = 0$, $p_{i,j}=1-r_{i,j}$. To convert full range probabilities assessments to half range probability assessments, given full range probabilities, $p_{i,j}$, if $p_{i,j}<0.5$, then $d_{i,j}=0$ and $r_{r,j}=1-p_{i,j}$, and if $p_{i,j}\geq 0.5$, then $d_{i,j}=1$ and $r_{r,j}=p_{i,j}$.

6.2.2 The Mean Squared Probability Score (MSPS) and the Mean Outcome Index

The mean outcome index, $M(c_j)$, is a simple measure of overall accuracy for an assessor, j, used with the half range method. For dichotomous probability outcomes, it is simply the proportion of correct assessments. It can be defined as equation.

$$Mean(c_j) = \frac{1}{N}\sum_{i=1}^{N} c_{i,j} \qquad (1)$$

The value to be better than change should be above 0.5 with the best possible value unity. Values below 0.5 are poorer than chance.

The Mean Squared Probability Score (MSPS) is a quadratic loss function used to evaluate the performance or accuracy of a set of probability assessments. It is often referred to as the Brier Score using ex-post dichotomous outcomes. Therefore, it is necessary to have ex-post outcomes. The MSPS is analogous to the Mean Squared Error, and like the MSE, it can be decomposed into components involving bias and variation that can be used to consider specific aspects of performance or accuracy.

The overall probability performance of a set of assessments for assessor *j*, can be measured by the MSPS, which is the average of the squared assessment errors, where in the case of the half range method is the assessment error, measured as the assessment probability value minus the outcome index value. The $MSPS_j$ is defined in equation (2):

$$MSPS_j = \frac{1}{N}\sum_{i=1}^{N}(r_{i,j} - c_{i,j})^2 \qquad (2)$$

A value of zero would imply that assessment probability values are identical to the outcome index values (indicating perfect accuracy, that is, all probability assessments equal unity and have the correct outcome); hence, the higher the value of the *MSPS* the poorer the performance.

6.2.3 Specific Aspects of Accuracy or Performance, the Statistical Decomposition of the MSPS

As discussed previously, the MSPS is an overall performance measure which can be decomposed to identify specific components that reflect the multidimensional aspects of accuracy. Expanding equation (2) gives equation (3):

$$MSPS_j = Var(r_j) - 2Cov(r_j,c_j) + Var(c_j) + [Mean(r_j) - Mean(c_j)]^2 \quad (3)$$

where,

$$Mean(r_j) = \frac{1}{N}\sum_{i=1}^{N} r_{i,j}$$

$$Var(r_j) = (\frac{1}{N}\sum_{j=1}^{N} r_{i,j}^2) - M(r_j)^2$$

$$Var(c_j) = (\frac{1}{N}\sum_{j=1}^{N} c_{i,j}^2) - M(c_j)^2$$

$$Cov(r_j,c_j) = (\frac{1}{N}\sum_{j=1}^{N} c_{i,j}\, c_{i,j}) - Mean(r_j) * Mean(c_j)$$

Given the bivariate linear regression equation of $r_{i,j}$ on $c_{i,j}$ of form:

$$r_{i,j} = K_j + (SL_j * c_{i,j}) + u_{i,j}$$

where,

K_j is a constant coefficient

SL_j is slope coefficient which can be considered a measure of resolution,

$SL_j = Cov(r_j,c_j)/Var(c_j)$

$u_{i,j}$ is an error term

Taking the variances gives:

$$Var(r_j) = [SL_j^2 * Var(c_j)] + Var(u_j) \quad (4)$$

Substituting equation (4) into equation (3) gives equation (5):

$$MSPS_j = [SL_j^2 * Var(c_j)] + Var(u_j) - 2Cov(r_j,c_j) + Var(c_j) + [Mean(r_j) - Mean(c_j)]^2 \quad (5)$$

where

$SL_j^2 * Var(c_j)$ is the minimum variance of r (Yates)

$Var(u_j)$ is scatter (Yates) or error variation

$Var(u_j) = Var(r_j) - [SL^2 * Var(c_j)]$

$[Mean(r_j) - Mean(c_j)]^2$ is bias squared

Equation (5) is essentially, the decomposition of the MSPS used by Yates.

Given

$$2Cov(r_j,c_j) = 2 * SL_j * Var(c_j)$$

Results in the MSPS decomposition used in equation (6):

$$MSPS_j = [Mean(r_j) - Mean(c_j)]^2 + [(1-SL_j)^2 * Var(c_j)] + Var(u_j) \quad (6)$$

This decomposition presented in equation (6) can be presented as follows:

$$MSPS_j = Bias\ Squared_j + Resolution\ Variation_j + Error\ Variation_j$$

6.2.4 The Interpretation of the Components of the MSPS Decomposition

The decomposition discussed involves *bias squared* (*BS*), *resolution variation* (*RV*) and *error variation* (*EV*), using he *MSPS* decompositions presented in equation (6). That is for assessor j:

$MSPS_j = BS_j + RV_j + EV_j$

These three components are discussed next in the context of the half range method using a dichotomous outcome index.

When analysing judgement, it is appropriate to compare a participant's performance with that of a hypothetical random assessor and perfect assessor. The random assessor assigns all probabilities as 0.5 with an arbitrary choice. Thus, the value of Mean(c) for the random assessor is 0.5. Therefore, Mean(c_j) for assessor j, should be above 0.5 with the maximum being unity. The perfect assessor makes correct probability assessments of unity. The Mean Response {Mean(r)} is the mean of the $r_{i,j}$'s, viz. $\Sigma r_{i,j}/N$, where $r_{i,j}$ (which is between 0.5 and 1) is the probability response for case i, ignoring whether or not the prediction is in the correct direction. Mean(r) has, of course, a value of 0.5 for the random assessor and unity for the perfect assessor.

Bias (B) is the difference between the mean response and the mean outcome index {B_j=Mean(r_j)−Mean(c_j)} and measures the degree of overconfidence (if positive) or underconfidence (if negative) in the assignment of probabilities and directional responses. This measure has a theoretical value of zero for the random assessor. Bias Squared (BS) is simply the square of the bias term and is a component of the MSPS. The best value is zero, which would be the case for the random and perfect assessor.

Slope (SL) or resolution is a very important aspect of performance that measures the degree to which higher probabilities are assigned for correctly assessed values. SL is the slope coefficient of the fitted simple linear regression of the responses ($r_{i,j}$) on the outcome index values ($c_{i,j}$). For the perfect assessor, $r_{i,j} = c_{i,j}$ for all assessors, so the closer SL_j is to unity the better the performance. It has value zero for the random assessor. SL is probably the most difficult measure on which to obtain good performance and is a component, in practice, that can often negative, depending on the difficulty of the task. The related

resolution component (RV) of the MSPS relates the slope or resolution component to the variance of the outcome index. The best value on this measure is zero.

Scatter (SC) or error variation (EV) relates to the degree of variation in the responses that are not explained by variation in the outcome index. It is essentially the residual sum of squares in the simple linear regression of the responses ($r_{i,j}$) on the outcome index values ($c_{i,j}$). This measure has a value of zero for both the random assessor and the perfect assessor.

6.2.5 Further Comments and Extensions

The above explanation using equations (1 to 6) is relevant to situations when a dichotomous outcome index is used and more generally when non-dichotomous weighted outcome indices are used (which would involve modifying the $c_{i,j}$ variable, which is not considered here). Yates (1982) undertook a similar decomposition of the MSPS (although he used the term Mean Probability Score, MPS). Yates used alternative formula specifications, but the results are the same in the case of a dichotomous outcome index. The form used in equations (1 to 6) is easier to apply in Excel, which was utilised for the present study.

The above can also be applied to full range probability forecasts by replacing $r_{i,j}$ with $p_{i,j}$ and $c_{i,j}$ with e_i in the equations for dichotomous and non-dichotomous empirical probabilities (e_i). This could provide an additional method to analyse the results. It can also be useful when analysing composite forecasts or the coherence (consistency) of probability assessments between participants.

6.3 An application of probabilistic framework to AML risk assessment

This project investigates the cognitive processes underlying AML risk assessment. More specifically, since probability score truly captures specific cognitive strategies, we should be able to measure the quality of professional probability judgment in terms of performance on various underlying accuracy components, such as calibration and resolution. Hence, using 12 vignettes developed from customer financial transactions, the project sought to examine the quality of AML risk assessment.

Every vignette has a determinate and fixed outcome in terms of either "yes for money laundering case" and "no, not an AML case". The project utilised a questionnaire design

implemented in a 2 x 6 mixed group design, two outcomes (actual money laundering conviction and non-money laundering conviction) where the first orthogonal factor (expert vs novice) is between-subject factor and 6 is the money laundering technique - a within-subject factor.

6.3.1 Vignette research

The study of personal values and beliefs is a sensitive matter, and therefore only unobtrusive approaches can serve that aim (Poulou, 2001). With the vignette's method, respondents can easily express their perceptions on topics very familiar to them but remain detached from them and safe from personal threats. The advantage that follows the usage of this technique is that the respondents do not have to bias their response and give socially approved answers since they do not perceive any danger of devaluing their image by giving sincere answers (Alexander and Becker, 1978). Kerlinger (1992) argued that the use of vignettes offers a combination of expressive and objective ideas and projective methods, and further suggested that as such they should be increasingly used in psychological and educational research.

Vignettes studies use short descriptions of situations or persons (vignettes) that are usually shown to respondents within surveys to elicit their judgments about these scenarios (Atzmüller & Steiner, 2010). Experimental vignette methodology (EVM) consists of presenting participants with carefully constructed and realistic scenarios to assess dependent variables including intentions, attitudes, and behaviours (Aguinis & Bradley, 2014). The use of vignettes embedded in surveys is increasing in many disciplines, such as violence risk assessment (Murray, 2010), marketing research, supply chain disruption (Cantor, Blackhurst, & Cortes, 2014). Vignettes serve the purpose of activating respondents' imagination and interest and eliciting their written statements on the Likert-style formats or checklists that follow the vignettes (Poulou, 2001).

6.3.2 The vignettes design

The data used for the risk assessment vignettes were obtained from actual money laundering crime-related data that included both money laundering and non-money laundering convictions outcomes. That is, the financial transactions incorporated into the vignettes were obtained from court proceedings and the UK Financial Intelligence Unit suspicious transactions reports. In this study, the author identified factors of interest based

on literature reviews and practice guidelines published by the FATF, as there were no existing vignettes in AML risk assessment literature that fit this study. During the design process, attention was paid to ensuring that the volume and nature of the information contained within the narratives were similar to what financial professionals typically use to formulate their AML risk assessments (verified by independent financial professionals). A description of the judgmental cues presented in the case source documents were incorporated into the vignettes. Multi-dimensional methods of external validation of the vignettes were employed after the completion of the vignettes. Importantly, the author interviewed seven (7) AML experts within financial and non-financial institutions about their perspectives on the draft vignettes, following Paddam et al. (2010) and St. Marie et al. (2021) recommendation to establish content validity. Then, the vignettes were revised in response to feedback received from the AML practitioners, before a pilot test was conducted using six volunteer compliance officers and risk management staff of WEMA bank Plc (the author of this dissertation worked at WEMA bank previously) to gauge their opinion before uploading the final version of the vignettes on a hosted web site. Further, this action was intended to determine if the vignette presented a credible, realistic scenario to the average targeted respondent. As a result, it is believed that the external validity of this study vignette is suitable for its intended use. This study used a vignette-based field experiment where varying versions of vignettes were used to depict the context and information about the risk-based approach (i.e., Business lines, customers, products and services, and location) to human subjects.

The vignettes were developed according to the guidelines outlined by Cantor et al. (2014), which calls for a common module that provides contextual information that is intended to be invariant across a variety of versions of the vignette. In addition, experimental cues of the vignette provide information on the 'factors of interest, and each necessary version of the vignette systematically varies to convey specific but different levels of the factor of interest to human subjects. The details of the vignette included participant role, common module, and experimental cues (See Table 10 & 11) and are described in more detail as follows.

The participants were asked to assume the role of an anti-money laundering expert in the following vignettes. The vignettes illustrate twelve instances of bank customer financial

transactions with money laundering and non-money conviction outcomes involving bank customers. The vignettes used in this study was carefully developed allowing for the manipulation of the factors of interest in the experimental cues: uncertainty of the risk of money laundering (is there a potential it occurs).

TABLE 10. SUMMARY OF VIGNETTES USED FOR THIS STUDY

Summary of vignette used for this study	
Money Laundering Techniques	Vignettes
Bulk Cash Smuggling	***Case 1.*** Mrs Hussai, a 35- year -old British National, is the sole signatory to PDTransfer Ltd company bank account. This company bank account was opened and used within the UK (United Kingdom) authority. The company runs a service for transmitting money from the UK mainly to Pakistan. The company work by collecting cash from its clients after satisfactory ID verification and then deposit the funds to its bank account before onward payment to the destinated beneficiary in Pakistan. The recent review of PDTransfer Ltd bank records showed that between 1st July 2018 and February 2020, US$3.7 million cash deposits went through the account in more than 400 transactions, and then transferred abroad, principally to a Pakistan based currency exchange business account. PDTransfer Ltd keeps records to show the identities of the various clients from whom the money has been collected in the UK and of those to whom it was ultimately beneficiary in Pakistan.
Structuring	***Case 2.*** Mr Evans, a 46- year -old British National, regularly comes into the banking hall to make cheques lodgement into his company account. A first customer due diligence checks conducted by the bank on Evans revealed that he is the proprietor of a motorcycle workshop and garage. And as part of the workshop operating procedure, their customer pays by cheque, which must be lodged in the workshop company bank account. The recent review of Evan's business transactions showed nearly 40 cheques (amount valued between $573 and $6500) deposits totalling over $170,000 within a 3-month period. The record also revealed corresponding debits with transaction narration for; entertainment (amount valued between $50 and $560), dining (amount valued between $70 and $6500), jewellery (amount valued between $573 and $6500), and electronic purchases (amount valued between $106 and $860). ***Case 3.*** Miss Abiola, a 25- year -old Nigerian National, regularly comes into the banking hall to make a cash deposit into his account. Due to the way she dresses when she visits the bank, the tellers suspect that she is a peasant (farmworker), but they are not sure of this. On one occasion, a branch teller personally asked Abiola about her occupation, and she became belligerently rude and stopped visiting the branch regularly to make deposits. This change in behaviour prompted one of the bank tellers to review her account. Abiola's bank records indicated her occupation as a student. They also revealed that, prior to her less frequent visits, there was a point (2 months period) where she was depositing in US$ approximately $2200 thrice a month in a variety of lower bills, including $20's, $10's, and $5's. ***Case 4.*** Dr Bello, a 52- year -old Nigerian National, regularly comes into the banking hall to cash cheques from various customer accounts. A first customer due diligence checks conducted by the bank on Bello revealed that he is the chief medical director of a privately owned hospital. And as part of the hospital operating procedure, their patient billing settlement is subcontracted to a management firm, who in return collects cheque payments from patients and transfer them directly to Dr Bello. The recent review of Bello's transactions records indicated that he usually cashed about twenty to fifty of these cheques cumulatively every ten or eleven days. They also revealed that, within the last 12 months period, he cheque-cashed in US$ approximately US$8990 during each visit to the bank.

Virtual Currencies	***Case 5.*** Mr Aigbedion, a 35-year- old Nigeria National, is the sole signatory to Tech Ltd company bank account. A first customer due-diligence check on the company profile indicated that the company is a Nigeria-based company that sells encryption services and devices to customers from across the world, and estimated revenue from sales and subscription services exceeded $32 million. The current review of Tech two-year account records revealed that a total of 24 credit inflow of varying value between US$20,000 to US$36,000. The transaction narration notes, "Ongoing subscription fees" and originated from Tech distributors across foreign jurisdiction including the USA, Canada, Australia, Thailand, and the United Arab Emirates. The account balance as at the date of review is US$106,857.57, and the varying sums relating to the 24 debit transactions in the bank account records transferred to 3 different bank accounts owned by crypto exchanges companies. ***Case 6.*** Mr Adebayo, a 65- year-old Nigerian National, runs a bank account linked to his business interests, which included a convenience store, a property portfolio, and a currency exchange business. Two years ago, the customer-due-diligence report on his business income generation process revealed there are Anti-money laundering system and control in place that fully complied to a satisfactory standard to guide against the inflow of illicit cash into the business. Additionally, Adebayo keeps a proper record of all the business transactions, and a complete history could be ascertained by considering electronic data. However, a recent review of his business account found a US$6,378 transaction relating to a currency exchange deal, and this amount deviates from the average single transaction value of US$2000 occurring in his past transaction history.
Misuse of legal entities (Shell companies)	***Case 7.*** Mrs Wards, a 60-year-old British National, completed a one-off debit transfer in US$ approximately US$320,000 from her business account to an offshore jurisdiction (Dubai) account for the purchase of a property with the sum. This company bank account was opened and used within the UK jurisdiction. A first customer- due-diligence check on Wards business activities indicated the source of funding for this transaction came from her trading activities. Her business bank account had no traces of physical-cash deposits, but solely business trade-related transfer payments. Though her business transactions annual turnover exceeds US$1.5 million, this transaction processing officer had concern on the source of funds, because Ward's spouse was a famous businessperson that once held a senior political position in the UK, 10-years ago. ***Case 8.*** Mrs Hughes, a 37-year-old British National, is the sole signatory to Besco Ltd company bank account. This company bank account was opened and used within the UK jurisdiction. The company runs a diamond trading enterprise. Recent customer due diligence checks on the company profile indicated that Besco Ltd appeared on a national newspaper page, promoting investments with a guaranteed tax-free return of 13.5% per annual. Shortly, after this advertisement, Besco Ltd accounts became active since 2years. And within 3months, the account witness US320,000 credit inflow in 10 transfers from accounts run by Besco Ltd at other local banks domiciled in the UK. The review of Besco Ltd bank r ecords also indicated that Hughes had withdrawn the sum of USDD$171,000 in cash from her company account in twelve debit transactions across the counter within the same period.
Complicit Professionals and Financial Services Employees	***Case 9.*** Mrs Adaku, a 35- year -old Nigerian National, is the sole signatory to Coxfx Ltd company bank account. The company runs a service bureau for its clients and has a functioning AML (Anti Money Laundering) unit within its business premises. The company receive cash monies and processed all the cash as payments into and out of the company bank accounts, exchanging US dollar to euro and vice versa. The recent review of Coxfx bank records indicated that between 1st March 2020 and November 2020, US$1.8 million cash

	deposits went through the accounts in 420 transactions. The ultimate destination of these exchange payments ware paid to three personal accounts owned by the same individual - Adenike Bosede. Coxfx maintains a know your customer file for each client. ***Case 10.*** Mrs Bosede, a 55- year -old Nigerian National, is the sole signatory to Kunfix Ltd company bank account. This account was opened in 2016 within the UK jurisdiction. The Company runs and trades on the Nigeria money market and has substantial assets. In July 2020, Bosede transferred a sum of about US$3 million to Kunfix Ltd bank account. The Fund originated from a bank in Switzerland owned by Bosede. She explained to her UK account manager, that she needed to do this because somebody was trying to gain access to her Switzerland bank account, probably with a view to accessing her account and making unauthorised withdrawals from it. She told the account manager there would only be a short time before she would wish to transfer the sum back to the Switzerland bank account. In late August 2020, Bosede indicated that she wanted to return the money to her Switzerland bank account and enquired when she would be able to do so.
Trade-based money laundering	***Case 11.*** Mr Martins, a 39- year -old British National, is the sole signatory to a personal bank account opened on 6 March 2020. On 6 March and 4 April 2020, Martins deposited on each occasion the sum of US$90,000. A first customer- due-diligence check on Martin indicated the source of funding for these deposits came from sales of properties. The recent review of his bank records (due to the statutory policy on continuous on -going customer-due-diligence) revealed an outflow transfer of $95,000 from his account on 30 April 2020 to another bank account domiciled in a foreign jurisdiction (United Arab Emirates) owned by an individual. This fund transferred originated from the first two consecutive cash deposits of $90,000, and the account balance is $85,000 (30 September 2020) as at the date of this review. ***Case 12.*** Mr. Davis, a 65-year- old British National, recently bought a luxury car worth US$55,500. He funded the purchase partly through a five -year loan of US$40,000 from a UK commercial bank and paid the balance US$15,500 in cash. A first customer - due diligence check on his source of income, indicated his occupation as the sole owner of a car dealership showroom, and the motor company predicted annual turnover is US$1 million. Further credit checks revealed that Davis had utilised similar loans schemes within the last five years, for six luxury cars procurements. Davis opted for early repayments of these loans in cash within six months of loan disbursement.

TABLE 11. SUMMARY OF VIGNETTE KEY RISK INDICATORS

Money Laundering Techniques	Vignettes	Key risk Criteria	AML/ money laundering indicators	Outcome
Bulk Cash Smuggling	Case 1	Customer Risk-High Geographic Risk-High Transaction Risk - High	PDTransfer Ltd keeps records to show the identities of the various clients from whom the money has been collected in the UK and of those to whom it was ultimately beneficiary in Pakistan.	Non-conviction
	Case 2	Customer Risk-Low Geographic Risk-Low Transaction Risk - Low	The record also revealed corresponding debits with transaction narration for; entertainment (amount valued between $50 and $560), dining (amount valued between $70 and $6500), jewellery (amount valued between $573 and $6500), and electronic purchases (amount valued between $106 and $860).	Convicted

Structuring	Case 3	Customer Risk-Low Geographic Risk-High Transaction Risk - Low	Abiola's bank records indicated her occupation as a student. Her record also revealed that, there was a point (2 months period) where she was depositing in US$ approximately $2200 thrice a month in a variety of lower bills, including $20's, $10's, and $5's.	Non-conviction
	Case 4	Customer Risk-Low Geographic Risk-High Transaction Risk - Low	The recent review of Bello's transactions records indicated that he usually cashed about twenty to fifty of these cheques cumulatively every ten or eleven days. They also revealed that, within the last 12months period, he cheque-cashed in US$ approximately US$8990 during each visit to the bank.	Convicted
Virtual Currencies	Case 5	Customer Risk-High Geographic Risk-High Transaction Risk - High	Varying sums relating to the 24 debit transactions in the bank account records transferred to 3 different bank accounts owned by crypto exchanges companies.	Convicted
	Case 6	Customer Risk-High Geographic Risk-High Transaction Risk - High	The customer-due-diligence report on his business income generation process revealed there are Anti-money laundering system and control in place that fully complied to a satisfactory standard to guide against the inflow of illicit cash into the business. Additionally, Adebayo keeps a proper record of all the business transactions, and a complete history could be ascertained by considering electronic data.	Non-conviction
Misuse of legal entities (Shell companies)	Case 7	Customer Risk-High Geographic Risk-Low Transaction Risk - Low	A first customer- due-diligence check on Wards business activities indicated the source of funding for this transaction came from her trading activities. Her business bank account had no traces of physical-cash deposits, but solely business trade-related transfer payments.	Non-conviction
	Case 8	Customer Risk-High Geographic Risk-Low Transaction Risk - High	The company runs a diamond trading enterprise. Recent customer due diligence checks on the company profile indicated that Besco Ltd appeared on a national newspaper page, promoting investments with a guaranteed tax-free return of 13.5% per annual. Shortly, after this advertisement, Besco Ltd accounts became active since 2years.	Convicted
Complicit Professionals and Financial Services Employees	Case 9	Customer Risk-High Geographic Risk-High Transaction Risk - High	The recent review of Coxfx bank records indicated that between 1st March 2020 and November 2020, US$1.8 million cash deposits went through the accounts in 420 transactions. The ultimate destination of these exchange payments ware paid to three personal accounts owned by the same individual-Adenike Bosede. Coxfx maintains a know your customer file for each client.	Convicted

	Case 10	Customer Risk-Low Geographic Risk-Low Transaction Risk - Low	The Company runs and trades on the Nigeria money market and has substantial assets.	Non-conviction
Trade-based money laundering	Case 11	Customer Risk-High Geographic Risk-High Transaction Risk - High	A first customer- due-diligence check on Martin indicated the source of funding for these deposits came from sales of properties.	Non-conviction
	Case 12	Customer Risk-High Geographic Risk-Low Transaction Risk - High	Further credit checks revealed that Davis had utilised similar loans schemes within the last five years, for six luxury cars procurements. Davis opted for early repayments of these loans in cash within six months of loan disbursement.	Convicted

6.4 Expert versus Novice

This experimental study analysis sought to determine how does the quality of AML probabilistic risk assessments made by professionals compare to that of novices? A comparison of experts and novice judgments is of interest because there is a significant difference in domain knowledge on the practical application of AML risk-based judgment during risk assessment.

The judgment of AML expert advisors remains critical when determining AML risk (Hanea & Nane, 2019; FATF, 2013b; Hopkins & Shelton, 2019). Money laundering indicators, regulatory and policy guides are commonly identified as examples to illustrate suspicious reasoning. Whether focused on difficult-to-know actions or inherently unknowable potentials has become a routine procedure guiding technocratic procedures in AML risk assessment. Cynics wonder whether these experts possess enough objective information about money laundering activities (which cannot by definition be monitored) to appropriately assess money laundering risks. Even though experts typically play prominent roles in AML risk assessment, the act of not tracking and measuring their performance against explicit benchmarks of accuracy and rigour is however odd. Several parameters associated with money laundering, such as large cash payments, are viewed as indicators of money laundering risk. Although such parameters serve as proxy measures for understanding money-laundering behaviour, they may result in compliance officers prematurely accepting that all large cash payments are suspicious, thereby increasing reporting of false positives (Demetis, 2010).

6.4.1 Participants

The participants comprised of 155 individuals from 13 countries (see Appendix 5) who participated in the study, of whom 80 were experts from the commercial banking sectors and 75 were novices from postgraduate business schools with no experience in money laundering risk assessment. The expert group consisted of commercial banks staff from 8 departments actively involved in their respective institution's AML risk assessment activities. See Table 12 below for a complete list of the various department. The mean years of experience in AML functions within this group were 6.7 years.

TABLE 12. PARTICIPATES AML JOB RELATED ROLE

S/N	Expert's Department	Frequency	Percent
1	AML Compliance	38	47.5
2	AML Risk	18	22.5
3	MLRO	14	17.5
4	Training	1	1.3
5	Internal Audit	1	1.3
6	Banking Operation	2	2.5
7	AML Consultant	1	1.3
8	Financial Crime	5	6.3
	Total Experts	80	100

6.4.2 Procedure

The participants first read the experimental instructions from Page 3 of the online survey document and then received an invitation email reiteration of these instructions. The instruction stated that the purpose of the study was to examine professional' AML risk assessment and requires each participant to assess twelve cases of bank's customer financial transactions with money laundering and non-money laundering conviction outcomes The participants was asked to assume the role of an anti-money laundering expert in the following vignettes. The participants made probability assessments on each of the 12 cases using two components. For each presented scenario, each participant would select either "Yes" or "No" if they think there is any suspicious activity relating to money laundering in the case that might likely lead to a money laundering conviction outcome. They are also required to indicate their confidence in percentage confidence estimate between 50% to 100%. A value of 50% would mean they are not confident about their response and implied their selected answer as a complete guess. A value of 60% would

indicate a higher degree of your level of certainty. A stated value of 100% would mean completely certain about the choice. The responses were rounded to the nearest 50%, 60%, 70%, 80%, 90%, or 100% for analytical purposes (Yates et al., 1989). These estimates will then be subjected to probability judgment analysis as outlined by Wilkie and Pollock (1996), which calculates an overall probability judgment score and decomposes this score to reveal various underlying aspects of judgment, including levels of overconfidence and discrimination. These scores provided the medium for comparing the performance of the participants.

6.4.3 Data and statistical analysis

In examining the data there are basic issues that need resolved before statistical analysis can be undertaken. These issues relate to the probability responses, r. Some subjects gave probability values of 1 (100%) for all or nearly all cases and others gave some probabilities below 0.5 (50%). There appears to be five major problems with the data on the subject's probability responses, r, that need to be resolved which are highlighted in Table 13 below.

TABLE 13. DATA RELATED ISSUES AND CORRECTIONS

S/N	Issues	Resolution
1	Four cases do not appear to have values for the probability responses 'r'.	These participants' whole set of responses were omitted from the analysis.
2	5 participants have given 'r'=1 for all cases.	These participants' complete responses were omitted from the analysis.
3	10 participants have given r=1 for more than 9 cases out of the total 12 cases,	These participants' complete responses were omitted from the analysis.
4	15 participants have given 'r' values below 0.5.	These values were be corrected by changing the 0/1 (yes/no) response, d, from 0 to 1, and changing the probability response, r, to 1-r.
5	14 participants worked in AML regulated entities that are not commercial banks.	These participants' whole set of responses were omitted from the analysis.

6.4.4 Independent vignette case result analysis

The mean outcome index, $M(c_j)$, is a simple measure of overall accuracy for an assessor, j, used with the half range method. For dichotomous probability outcomes, it is simply the proportion of correct assessments.

An important anticipation of this study was for expert to have higher proportion rate of correct responses based on their familiarity with AML risk assessment, but this was not the case. Table 14 indicates that, although the novice participants were slightly more successful

(performed better in 7 out of the 12 cases) than the experts at selecting the right conviction outcome, this difference was not statistically significant in 11 out of the 12 cases. The pairwise comparison difference was only statistically significant at H(1) =7.074, p < .008 in case 1. The statistical difference for case 1 may exist because case 1 involves transactions with a high-risk jurisdiction indicator on FATF grey list (Pakistan, see Amin, Khan & Naseer, 2020) at the time of this experiment. This factor might have biased the experts toward opting that case 1-related transactions are instances of money laundering. The apparent direct association between money laundering indicators and threshold for the forming of suspicion among AML experts may have had some effect on their judgment. This is an interesting issue that is also likely to affect the other performance statistics.

TABLE 14. PROPORTION OF CORRECT RESPONSES ↑

Case	Trial outcome [a]	Expert (N=80)	Novice (N=75)	Test Statistics	Comparison significance (p) [b]
1	0	23.8%	44.0%	7.074	0.008*
2	1	80.0%	68.0%	2.893	0.089
3	0	21.3%	12.0%	2.357	0.125
4	1	51.2%	64.0%	2.557	0.110
5	1	66.3%	66.7%	0.003	0.956
6	0	41.3%	42.7%	0.32	0.859
7	0	46.3%	33.3%	2.674	0.102
8	1	72.5%	78.7%	0.790	0.374
9	1	71.3%	73.3%	0.83	0.773
10	0	37.5%	37.3%	0	0.983
11	0	33.8%	32.0%	0.053	0.817
12	1	56.3%	62.7%	0.656	0.418

[a] Definition of values (0= not convicted, 1= convicted)
[b] Pairwise comparisons (expert vs novice) via Mann-Whitney U test and Kruskal-Wallis Test; *P < .05

Schraw and Roedel (1994) found that bias was related to test item difficulty. They assumed that item's difficulty were answered less accurately. Schraw and Roedel observed that changes in the degree of overconfidence across different levels of item difficulty indicated that overconfidence was a byproduct of test difficulty; the easier an item, the less overconfident subjects were when judging their performance on these items.

There was evidence that the magnitude of judgment error was a near perfect linear function of test item difficulty. When test item difficulty increased, overconfidence increased as well. When test items were easy, judgment errors were minimized. Thus, item case difficulty would have been a potential confounding consideration if the items selected for the present study were ones the expert participants found easy, but the novice participants found hard.

It is interesting to note that the proportion of correct responses are below 50% for cases with not-convicted outcome and above 50% for cases with convicted outcome for both the expert and novice participants. It appears the subjects had a conviction bias in their money laundering assessments compared with the actual trial decisions.

Table 15 indicates that, the weight assigned probability responses, 'r' for all novice participants were higher than that of the experts' participants in 9 out of the 12 cases. A pairwise comparison showed a statistically significant difference of for cases 4 (*H(1)=4.204, p = 0.040*) and 6 (*H(1)=4.528, p = 0.033*). Across both cases, experts had lower mean probability ratings, and all three key risk criteria indicated in the transactions were high-risk. Experts likely identified these high-risk factors during their judgment because of their experience, which may have reduced their assigned probability weights systematically compared to novices who don't know what factors constitute high-risk factors. Probability theory plus noise holds that people estimate probabilities using rational mechanisms, but these mechanisms can be influenced by random noise and errors, which result in systematic effects or biases (Costello, Watts & Fisher, 2018). This result observation shows higher probability weighted scores for novices compared to experts in situations with significant risk indicators.

TABLE 15. THE MEAN PROBABILITY ($\bar{R}_J$) TABLE

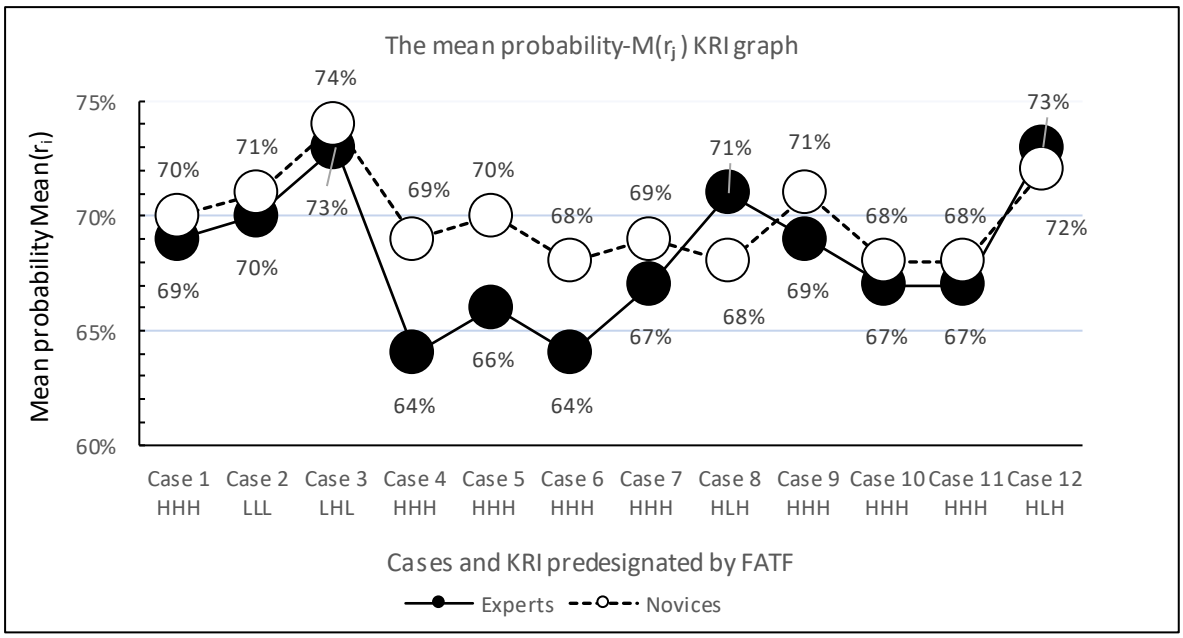
Case No.		r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12
Expert N=80	Mean	0.691	0.695	0.728	0.642	0.661	0.643	0.674	0.714	0.688	0.669	0.673	0.732
	S.D	0.134	0.160	0.177	0.140	0.141	0.140	0.141	0.172	0.171	0.149	0.167	0.179
	Median	0.650	0.700	0.700	0.600	0.600	0.600	0.625	0.650	0.700	0.600	0.600	0.700
Novice (N=75)	Mean	0.703	0.707	0.739	0.687	0.699	0.681	0.692	0.675	0.707	0.681	0.677	0.716
	S. D	0.159	0.158	0.160	0.154	0.152	0.139	0.161	0.147	0.140	0.132	0.138	0.155
	Median	0.700	0.700	0.700	0.600	0.700	0.650	0.700	0.620	0.700	0.640	0.640	0.700
Test Statistic		0.23	0.301	0.262	4.204	2.812	4.528	0.626	1.334	1.592	0.840	0.685	0.095
Comparison significance (p) [a]		0.881	0.583	0.609	0.040 *	0.094	0.033 *	0.626	0.248	0.207	0.359	0.408	0.758

[a] Pairwise comparisons (expert vs novice) via Mann-Whitney U test and Kruskal-Wallis Test;
*P < .05

Figure 23 shows the graph of the mean probability ($\bar{r}_j$) for the key risk indicator analysis for the cases. For all cases with high-risk rating for the three key risk criteria present in the case (case 1, case 4, case 5, case 6, case 7, case 9, case 10, and case 11), the experts' mean probability was below 70%, whereas such a trend was not reported for the novice participants. This shows that the experts were better able to discriminate between higher and lower key risk criteria indicators, as reflected in the mean probability. Thus, estimates of key risk criteria as per the statutory AML guideline contributes to AML risks assessment decisions. However, the overall mean lower rating associated with all cases with high-risk rating for the three key risk criteria for the experts participates speculates that expert's lower certainty on the accuracy of their decisions in such circumstance.

In order to identify specific cognitive strategies, professional and novice judgment is compared in terms of overall accuracy and in terms of the underlying dimensions of accuracy components, such as calibration and resolution.

FIGURE 23. THE MEAN PROBABILITY CHARTS



Definition; KRI (Key risk indicator), H=High, L=Low,

6.4.5 Overall accuracy (MSPS) and the Mean Outcome Index

TABLE 16. DESCRIPTIVE STATISTICS- EXPERT VS NOVICE

Measures	Expert (N= 80)	Novice (N= 75)
MSPS		
Mean	0.2967	0.3027
Median	0.2880	0.2790
Std. Deviation	0.0624	0.0746
Variance	0.0039	0.0056
Skewness	1.0188	1.1560
Std. Error of Skewness	0.2689	0.2774
Kurtosis	1.2086	1.0654
Std. Error of Kurtosis	0.5318	0.5482
Range	0.2980	0.3720
Minimum	0.1930	0.1750
Maximum	0.4910	0.5470
BIAS		
Mean	0.1904	0.1896
Median	0.2080	0.2000
Std. Deviation	0.1532	0.1449
Variance	0.0235	0.0210
Skewness	-0.2343	-0.0365
Std. Error of Skewness	0.2689	0.2774
Kurtosis	-0.4130	-0.0945
Std. Error of Kurtosis	0.5318	0.5482
Range	0.7250	0.7000
Minimum	-0.2170	-0.1670
Maximum	0.5080	0.5330
SLOPE		
Mean	0.0159	0.0070
Median	0.0110	0.0130
Std. Deviation	0.0597	0.0656
Variance	0.0036	0.0043
Skewness	0.8059	0.0932
Std. Error of Skewness	0.2689	0.2774
Kurtosis	0.6516	-0.1445
Std. Error of Kurtosis	0.5318	0.5482
Range	0.3000	0.3040
Minimum	-0.1170	-0.1500
Maximum	0.1830	0.1540
SCATTER		
Mean	0.0111	0.0132
Median	0.0070	0.0090
Std. Deviation	0.0106	0.0121
Variance	0.0001	0.0001
Skewness	1.2019	1.5491
Std. Error of Skewness	0.2689	0.2774
Kurtosis	0.7798	2.2531
Std. Error of Kurtosis	0.5318	0.5482
Range	0.0420	0.0560
Minimum	0.0000	0.0000
Maximum	0.0420	0.0560

Table 17 contains the mean values of accuracy measures based on the individual scores for the experts and novice participants, averaged across participants and probability assessment methods. Values from the table reveal that the expert participants mean MSPS (0.2967) was slightly lower than for the novice participants MSPS (0.3027). In order to test the reliability of group differences by comparing them with those statistics, nonparametric tests were used (Siegel, 1956). Mann-Whitney U test and Kruskal-Wallis Test found no significant difference (*H(1)=0.006, p-value = .826*). Surprisingly the MSPS scores for the experts and novice participants were slightly worse off than the MSPS =0.25 for a uniform assessor who would select answers at random and report 50% probability judgments that each of the chosen alternatives is correct. Only 20% of the participants from the expert and novices group actually did better than the uniform assessors (MSPS < .25). A lack of sufficient probabilistic assessment skills may account for this poor performance. AML experts, for example, usually qualify risk in terms of high and low risk in the real-world risk assessment, not in probability scores (de Wit, 2007), as required in this vignette assessment.

TABLE 17. MEAN ACCURACY MEASURES AND COMPARISON OF SIGNIFICANCE (P)

Component measure	Expert	Novice	Test Statistic	*p*-value
Overall				
$\bar{c}$ ↑ (proportion correct)	0.5010	0.5122	0.105	0.7460
MSPS ↓	0.2967	0.3027	0.006	0.9370
MSPS < .25 ↑	20%	20%	0.000	0.8610
Calibration				
Bias 0 (overconfidence)	0.1904	0.1896	0.065	0.7990
Bias_sq ↓	0.0595	0.0567	0.754	0.7540
Resolution (discrimination)				
Slope (SL) ↑	0.0159	0.0070	0.273	0.6010
Resolution variation (RV) 0	0.2261	0.2328	0.918	0.3380
Noise				
Scatter (f) ↓	0.0111	0.0132	1.743	0.1870

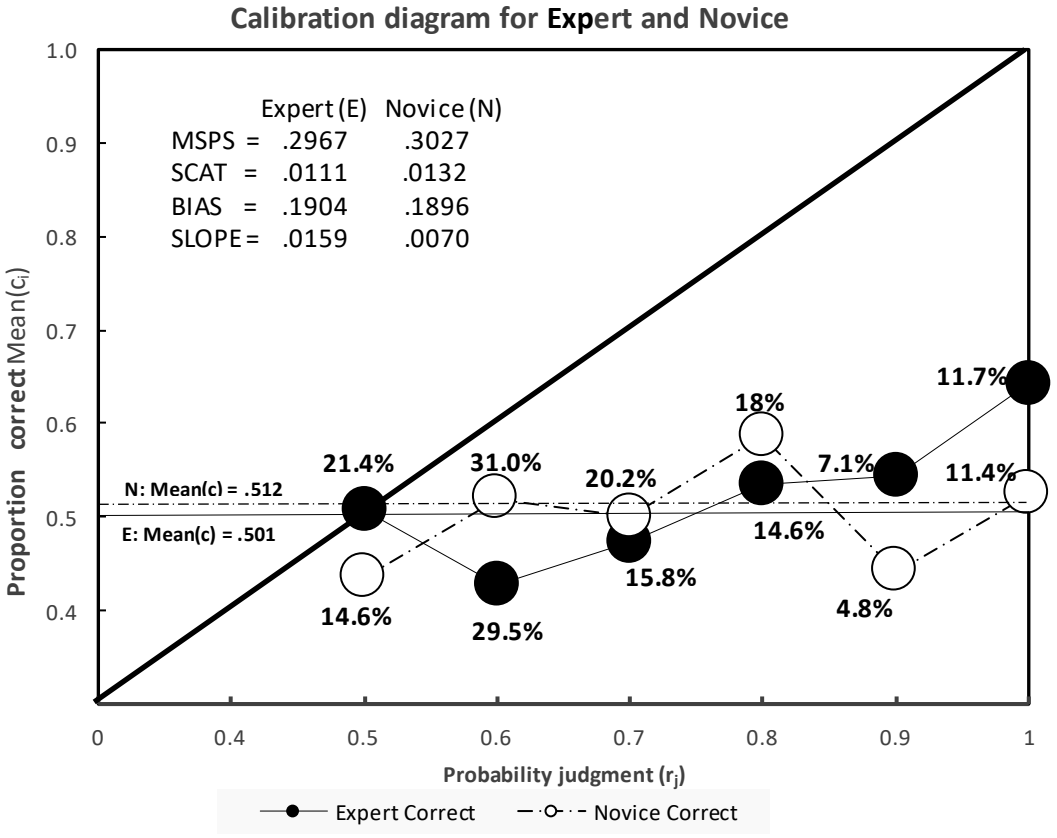
Pairwise comparisons (expert vs novice) via Mann-Whitney U test and Kruskal-Wallis Test; *P < .05

Definition in text; ↑-larger values better; ↓-smaller values better; 0-zero the best value.

6.4.6 Accuracy component analysis- Calibration.

Calibration is one of the most commonly used measures for assessing the accuracy of judgments expressed in probabilistic form (Keren, 1991). Core features of confidence calibration involve the measure of the extent that the judgments attached to various events match the relative frequencies with which those events occur. The use of a calibration diagram enhances the study of calibration (Yates et al., 1989). In a calibration diagram, all participant's probability estimates are categorised into scores intervals (for example, 0.50-0.59, 0.60-0.69, 0.70-0.79, 0.80-0.89, 0.90-0.99 and 1) and analysed into plots. A calibration curve is a common way to analysis probability judgments and confidence ratings (Keren, 1991). Observing judges' probabilistic assessments, verifying the associated propositions, and then observing the proportion of true responses in each category of response permits us to assess judges' calibration empirically (Hathout, et al., 2019; Lichtenstein, Fischhoff, & Phillips, 1977).

FIGURE 24. CALIBRATION DIAGRAM FOR EXPERT AND NOVICE



Probability curves show the relationship between the relative frequency plots of correct answers in each category with the average probability answers for those categories (Harvey,

1997). Figure 24 is the calibration diagram for both the expert and the novice participant's judgments. The horizontal axis represents the participant's probability estimates, and the vertical axis defines the relative frequency plots of correct answers in the score category. In each coordinate point, a number next to it indicates what percentage of cases that specific point represents. For example, on the upper calibration curve for the expert participants in Figure 24, the top point shows that 11.7% of their judgments were 100% certain and that approximately 70% of their answers were accurate. Novice participants' judgments are plotted in open points (dash lines), while experts' judgments are plotted in filled points (solid lines).

Illustrated in Figures 24 and 25 are the covariance graphs for the judgments made by the expert and the novice participants. The covariance graph provides an additional virtual illustration approach to probabilistic judgment accuracy component analysis (Yates & Curley, 1985). In the figures 21 and 22, each covariance graph comprises horizontal and vertical lines along coordinates $(0, \bar{r})$ and $(\bar{c}, 0)$, respectively. The horizontal axis is determined by the outcome index. Alternative outcomes resulting from the outcomes index are also identified, i.e., answers that were correctly answered (c=1) or incorrectly answered (c=0). The number in parentheses next to each outcome index value indicates the frequency of occurrence. For instance, in Figure 24, it is shown that the expert participants selected the correct alternative 481 times but were wrong on 479 instances. Participants' range of probability judgments are described on the vertical axis of each graph.

In Figures 24 and 25, the distributions shown are proportional histograms. The total sum of the distribution proportions on both hand sides of each graph is 100%. Consider, for example, the histogram on the right-hand side of the expert participants covariance graph. There it is shown that 7.5% of the total 960 judgments made by those experts were probability scores of 100% certainty on the actual correct choice. While on the opposite histogram of the same graph with the incorrect response, 4.2% of the expert participants' total 960 judgments were probability scores of 100% certainty on wrong choices.

Bias towards overconfidence or underconfidence are factors that can contribute to poor calibration (Harvey, 1997). Typically, overconfidence is associated with more difficult judgmental tasks, while underconfidence is a form of flawed self-believe that is associated with easier tasks (Lichtenstein & Fischhoff, 1977; Moore & Cain, 2007). A probabilistic

judgment is overconfence to the extent that the bias is positive and large (Yates et al., 1989). In the covariance graph (see Figures 24 and 25), the intersection point of horizontal and vertical dotted lines is the bias indicator point for each participants group. The horizontal line passes through the mean probability judgment ($\bar{r}$). The vertical line goes through the mean outcome index or base rate $\bar{c}$, which is also the proportional correct in the current study. The bias reflects overconfidence (positive) when the intersection is at any point above the 1:1 diagonal, and any point below represents underconfidence (negative) and is perfectly calibrated if it is on the diagonal line (Caycedo-Marulanda et al., 2021). The bias reflects overconfidence when the intersection is at any point above the 1:1 diagonal, and any point below represents underconfidence and is perfectly calibrated if it is on the diagonal line. Hence, Figures 24 and 25 show that the intersection point of horizontal and vertical dotted lines for the expert and novice participants falls above the 1:1 diagonal. This result suggests that the expert and novice participants are overconfident in the AML risk assessment (the overconfidence bias). However, the expert (0.1904) participants' bias score appears slightly higher than the novice (0.1896) but this difference was not statistically significant (*H(1) =0.065*, *p*-value = 0.799), as indicated in Table 17.

FIGURE 25. EXPERT COVARIANCE GRAPH

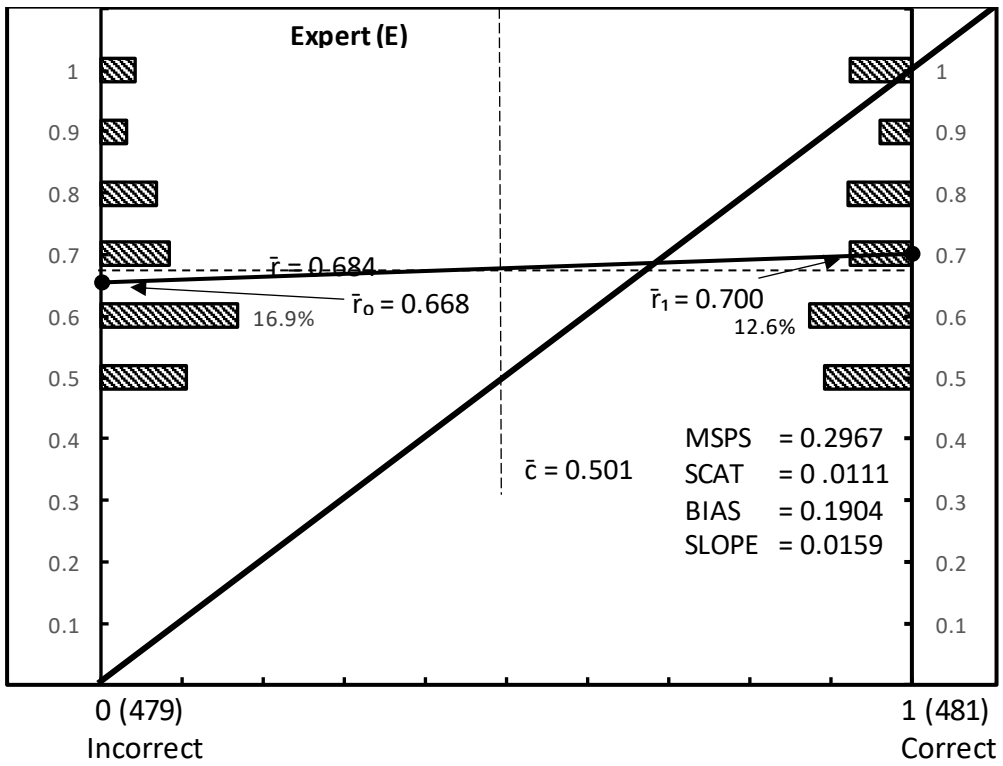
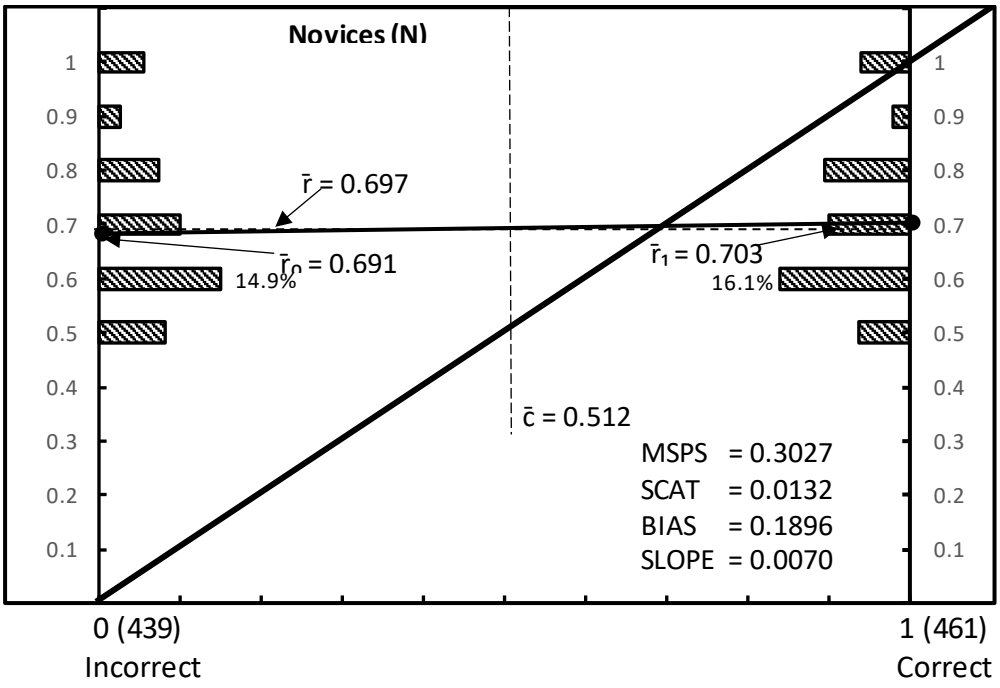


FIGURE 26. NOVICE COVARIANCE GRAPH



6.4.7 Resolution (slope)

Another underlying aspect of judgment identified from the literature for probability judgment analysis is discrimination (also known as 'resolution'). The degree of resolution corresponds to the probability categories in which correct and incorrect answers are allotted (Harvey, 1997). Resolution refers to the ability to discriminate between instances where an event is likely to take place from when it is not, which is arguably a crucial skill in the present context of AML assessment.

Basically, the slope index is the regression line for probability judgments regressed on outcomes, passing through the coordinate points (0, $\bar{r}_0$) and (1, $\bar{r}_1$) in the covariance graph (Yates et al., 1989). The maximum possible slope of one is achieved when accuracy is perfect. In figures 25 and 26, the virtual inspection of both covariance graphs shows the steeper (better) slope for the expert participants compared to the novice participants. This result shows that the experts were slightly able to differentiate, on average, between instances when a financial transaction was likely to result in money laundering crimes and when it was not. In addition, the computation value of the slope index evidence in Table 17 shows an expert slope of 0.032 and a novice slope of 0.012. These values are far from perfect, and there was no significant difference between expert and novice participants in

slope scores. As shown in Table 17, the distribution comparison of slope values for individual participants in the two groups was not statistically significant (p=0.6010).

An analysis of the calibration diagram also reveals the associated resolution component (RV) via its vertical coordinates of the points (Yates et al., 1989). There is good resolution to the extent that the points are far away from the target event's Mean(c), overall relative frequency. Like the visual tread revealed by the array of points in figure 24, the values in Table 17 also indicate RV was higher for novices (0.2328) than for experts (0.2328), but the difference between the two groups was not statistically significantly different (*H(1) =0.918, p-value = 0.3380*).

6.4.8 Scatter (error variation) measure

The final aspect of judgment accuracy discussed in the preliminary framework is scatter (error variation). This measure is based on the noise or scatter in the probabilistic judgments that are not related with the accuracy of the answer (Harvey, 1997). Yates et al. (1989) attributed the causes of error variation to two sources. The first is the judge's inherent inconsistency. Second, it can also occur when a judge is perfectly consistent but relies on cues that are not sufficiently related to the outcome. In Figure 25 and 26, the dispersion of histograms on either side of the covariance graph represents scatter (error variation). Scatter increases with the degree of dispersion of the distributions. Comparisons between Figures 25 and 26 show that novice participants slightly have worst scatter (higher) scatter values compared to experts, but according to Table 17, this difference was not statistically significant between the scatter values for the two groups of participants (*H(1) =1.743, p=0.187*).

6.4.9 Further comments on the accuracy components

In summary, the results indicate that there no statistical difference in all the performance measures of the experts compared to that of the novices. However, it was observed that the novice participants slightly did better in deciding when a financial transaction was likely to be a case of money laundering crime. The study, the novices (0.5122) achieved a higher proportion of correct indication of convicted and non-convict money laundering cases overall than the expert (0.5010) participants. In addition, the novices possess slightly less overconfidence than the experts in the study. Despite this, expert participants' assessments were slightly better in other performance such as the MSPS, slope, noise, and scatter.

6.4.10 Further comparisons for expert vs novices using outcome index

To further compare experts' and novices' performance where outcome index is 1 (conviction cases) and 0 (non-conviction cases), in terms of the trial outcomes, the mean accuracy measures were examined. Table 18 below indicates that there were no statistically reliable differences between the expert and novice participants in terms of overall accuracy, calibration, Slope, and Noisiness. Also, overall, the differences between the expert participants' judgments and those of the novices' participants for conviction cases (outcome index 1) paralleled the observed difference for non-conviction cases (outcome index= 0). The one noteworthy exception was that the slope measure was significantly (*H(1) =5.191, p=0.0227*) better for the novice than for the expert participants in the non-conviction cases.

TABLE 18. MEAN ACCURACY MEASURES AND COMPARISON OF SIGNIFICANCE *(P)*

	Conviction cases (Outcome index = 1)				Non-conviction cases (Outcome index = 0)			
Component / Measure	Expert	Novice	Test Statistic	p-value	Expert	Novice	Test Statistic	p-value
Overall								
$\overline{c}$ ↑	0.6625	0.6889	0.1970	0.6569	0.3396	0.3356	0.0840	0.7720
$\overline{PS}$ ↓	0.1953	0.2174	0.6320	0.4266	0.3980	0.3877	0.1130	0.7364
Calibration								
Bias 0	0.0340	0.0144	0.1820	0.6699	0.3469	0.3647	0.4490	0.5030
Bias_sq ↓	0.0466	0.0480	0.7530	0.3856	0.1973	0.2019	0.2050	0.6505
Discrimination								
MR ↑	0.1399	0.1584	1.0500	0.3060	0.1915	0.1750	1.6860	0.1940
Slope ↑	0.0463	0.0251	0.0890	0.7653	-0.0365	-0.0144	5.1910	0.0227*
Noisiness								
Scatter ↓	0.0088	0.0110	2.4340	0.1188	0.0091	0.0108	1.2820	0.2576

Pairwise comparisons (expert vs novice) via Mann-Whitney U test and Kruskal-Wallis Test;
*P < .05
Definition in text; ↑-larger values better; ↓-smaller values better; 0-zero the best value.

6.5 Male versus Female analysis

Another important consideration in the risk assessment domain is the inconsistent risk calibrators across gender. Some researchers suggest that this inconsistency may be caused by a variety of genetic, hormonal, and environmental factors (Zaidi, 2010). The labour market is perhaps of greatest concern to economists and policymakers, as there have been gender differences in several different domains (Croson & Gneezy, 2009). Bakan (l966) and Carlson (1972; 1971) are often cited in social psychology as a source of earlier interpretations of gender differences. A distinction was made between agentic (such as seeking power and success, achieving recognition, and succeeding individually) and

communal (e.g., forming relationships, collaborating, and giving back to others) values in these studies. With males perceived as possessing agentic traits (Agut et al., 2022), whereas females seen as possessing the communal traits (Allen et al., 2021). Physiological and psychosocial explanations have been advanced for these observed gender-based differences. Compared to males, females tend to be socialized from a very early age to use structured and collaborative approaches to information interpretation and problem solving, whereas males are often encouraged to approach using a more unstructured and individualistic manner (O'Donnell & Johnson, 2001). This gender disparity in the structure of approach to activities becomes more enunciated with age (Serbin et al. 1982).

However, Meyers-Levy (1986) provided a theoretical interpretation of this gender perspective to judgments and behaviour. This interpretation, also known as the selective hypothesis, suggests that males are prone to process information selectively: they selectively employ heuristic devices based on subsets of information cues that are highly available since they are well-represented single inferences or salient concepts. But females are inclined to evaluate all cues thoroughly. The selective hypothesis tested by Darley and Smith (1995) in an experiment where males and females listened to either objective or subjective advertising claims for either a low-risk or moderate-risk product consequently show females are less likely to miss subtle cues, and their judgment is adjusted accordingly. However, Males did not change processing strategy between the two risk conditions used in this study and failed to detect the risk level change.

The gender-specific processing difference predicted by the selectivity hypothesis map directly onto the task environment in which AML experts perform carry risk assessments. As a result of the selectivity hypothesis, AML experts evaluate risk in an environment characterized by gender-specific processing differences. For example, in cases where an AML expert expectations of a customer transaction activities align with the transaction trends they observe in the transaction history of a customer account, there is no suspicion, and the risk assessment task is somewhat effortless. Consequently, a heuristic approach will save time and be more efficient than a comprehensive but equally effective approach. The heuristic approaches may, however, become ineffective when analytical procedures become more complex owing to unusual transactions or activities, and both male and female

Cognitive psychology and marketing research suggests that gender may be an individual-level factor that affects performance in judgment tasks and that gender's impact changes as task complexity increases (Chung & Monroe, 2001). Despite the fact that females and males perform equally well in varying level of complex task, males predict better performance for themselves and are more likely to evaluate their completed performance favourably. (Feather, 1969). Beyer (1990) was among the first researchers to observe that women have low expectations of themselves when it comes to tasks that are perceived as masculine. In light of the general perception of finance as a math-heavy, male-dominated field, women's low self-evaluations have been explained be consistent this theory. There is no gender gap in expectancies, evaluations, or attributions to ability when considering the feminine task (though not in favour of the female. However, there is a consensus among investigators that women are less overconfident while men are more confident when making decisions under risk (Estes & Hosseini, 1988).

A recent study done by Bordalo et al. (2019) examined how gender stereotypes affect confidence in different abilities. According to their study, stereotypes lead to gaps in performance between men and women that are driven by a lower level of confidence among women, and neither effort nor task difficulty show consistent gender differences. Compared to women, men exhibit more overconfidence, according to experimental evidence (Lundeberg, Fox, & Punccohar, 1994). In some cases, however, females have made more accurate and calibrated judgments than males. These authors found that men tend to be overconfident in comparison to women (Thaler, 2020), especially when they make poor decisions (Lundeberg, Fox, & Punćcohaŕ, 1994). According to Newman (1984), although girls were less confident than boys, girls were actually better at discriminating between instances where a specific event would occur. While a recent study by Lackner and Sonnabend (2020) examined gender differences in a high-stakes decision-making environment and found that, on average, women overestimate their abilities less often than men. Moreover, they found no significant differences across gender in the margin of overconfidence. A study by Lundeberg et al. (1994) found gender differences in task confidence to be associated with both task context and domain.

Some also studies indicated differences in confidence of men and women were specific on the content and context of the questions (Lundeberg, Fox, Brown & Elbedour, 2000). Some

domains show greater confidence among men than women, such as mathematics, while other domains (e.g., learning and memory, experimental design) do not. Men and women both seemed to be overconfident about their answers' accuracy. There were, however, gender differences when participants made errors. Many forms of gender bias today are subtle rather than obvious (Biernat, Tocci & Williams, 2012).

Gender differences also lie in the interpretation of the meaning of ''risk''. Men typically focus on the probability or likelihood component of risks, whereas women focus on future consequences (Schubert, 2006). Women perceive risks as higher than men if the future consequences are losses (Yates & Stone, 1992; Schubert et al., 1999).

Gender has been identified as an important influence on risk judgment. Risk related judgment which is a combination of outcome evaluations and probability judgments. Schubert (2006) suggests that males and females assign similar values to outcome evaluations in risk judgment, but that probability weightings differ across genders. Fehr-Duda (2006) utilised bounded rationality theory to further the understandings for gender differences in probability weighting. The results of Fehr-Duda's (2006) study suggest that females tend to be more conservative when faced with purely risky situations, which results in them responding less to probability information and being more outcome oriented when faced with ambiguous situations. Based on empirical evidence (Powell et al., 2001), it appears that women tend to avoid risk more than men in experiments with risky gambles (Levin et al., 1988; Johnson & Powell, 1994; Powell & Ansic, 1997 1999). Similar results have been found for contextually risky decisions (Jianakoplos & Bernasek, 1998; Grossmann & Eckel, 2000). Conversely, contradictions have also been found (Johnson & Powell, 1994; Schubert et al., 1999). Social psychology suggests that women overestimate the probability of unpleasant events and overestimate their chances of bad stuff happening to them. They esteem events as being more unpredictable, less controllable, less confident, and less likely to be controllable (Slovic, 1992; Lloyd & Archer, 1976). Men perceive greater probabilities for gains than women, and women are less probabilistic.

Such differences are significant in risk analyses since they can affect the assessment method chosen and how subjective outcomes and probability judgments are made (Schubert, 2006). The paper explores the effect of a variety of factors included in experimental representations of AML risk assessment on gender-specific judgements

because important distinctions between men and women might be hidden among the experimental population sample.

The literature review indicate that female is commonly stereotyped as more risk averse than male in financial decision making. With some evidence that gender differences in risk taking may be due to differences in subjects' valuations of outcomes or to the way probabilities are processed. The second analysis examines how males and females weigh probabilities differently, as well as the quality of their risk judgments using the framework from the first study. AML risks are crucial concerns for banks, and the attitudes towards risk of decision makers within the banks play a large role in the choices made and hence the accuracy of bank's risk assessment.

6.5.1 Participants

There were 155 participants in the study from 13 countries (see Appendix 4), with 49 males and 31 females being experts in active roles involved in AML risk assessment, as well as 50 males and 25 females being novices.

6.5.2 Results

Table 19 indicates that, the expert females were slightly more successful (performed better in 7 out of the 12 cases) than experts males at selecting the right conviction outcome, this difference was not statistically significant in 11 out of the 12 cases. The pairwise comparison difference was only statistically significant at $p < .05$ in case 11. Similarly for the novice participants, the novice female was also outperforming the novice males with slightly more successful (performed better in 7 out of the 12 cases) than the experts at selecting the right conviction outcome, this difference was not statistically significant in 11 out of the 12 cases.

TABLE 19. PROPORTION OF CORRECT RESPONSES ↑

Case	Trial outcome [a]	Expert Males (N=49)	Expert Females (N=31)	Novice Males (N=50)	Novice Females (N=25)	Comparison significance (p) b											
						Expert Males vs Expert Females		Expert Males vs Novice Males		Expert Males vs Novice Females		Expert Females vs Novice Males		Expert Females vs Novice Females		Novice Males vs Novice Females	
						Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*
Case1	0	24%	22%	40%	52%	0.038	0.846	2.694	0.101	5.525	0.019*	2.581	0.108	5.124	0.024*	0.961	0.327
Case2	1	73%	90%	70%	64%	3.329	0.068	0.145	0.703	0.701	0.402	4.516	0.034*	5.594	0.018*	0.272	0.602
Case3	0	18%	25%	16%	4%	0.62	0.431	0.097	0.756	2.884	0.089	1.147	0.284	4.792	0.029*	2.242	0.134
Case4	1	48%	54%	62%	68%	0.258	0.612	1.682	0.195	2.8391	0.122	0.401	0.526	0.987	0.32	0.257	0.612
Case5	1	63%	70%	68%	64%	0.498	0.481	0.244	0.622	0.004	0.951	0.078	0.78	0.303	0.582	0.118	0.731
Case6	0	40%	41%	40%	48%	0.01	0.922	0.007	0.934	0.343	0.558	0.029	0.864	0.202	0.653	0.43	0.512
Case7	0	42%	51%	26%	48%	0.578	0.447	3.087	0.079	0.175	0.676	5.394	0.020*	0.071	0.79	3.582	0.058
Case8	1	75%	67%	76%	84%	0.568	0.451	0.003	0.955	0.695	0.405	0.651	0.42	1.916	0.166	0.627	0.428
Case9	1	69%	74%	78%	64%	0.211	0.646	0.938	0.333	0.216	0.642	0.153	0.696	0.668	0.414	1.648	0.199
Case10	0	38%	35%	42%	28%	0.087	0.768	0.106	0.745	0.832	0.362	0.336	0.562	0.349	0.555	1.378	0.241
Case11	0	42%	19%	24%	48%	4.632	0.031*	3.92	0.048*	0.175	0.676	0.236	0.627	5.113	0.024*	4.353	0.037*
Case12	1	57%	54%	60%	68%	0.04	0.841	0.082	0.774	0.808	0.369	0.207	0.649	0.987	0.32	0.45	0.502

[a] Definition of values (0= not convicted, 1= convicted)

[b] Pairwise comparisons (expert vs novice) via Mann-Whitney U test and Kruskal-Wallis Test; *P < .05

Overall, female novices did better than all other participants in six (6) of the twelve (12) cases, followed by female experts in four cases, and novice men in the remaining two cases. This gender effect is particularly relevant to this study. It may appear that the female participant in both group (female experts and novice females) paid more detailed attention to the subtle clues in each case than their male counterparts while determining the outcome for each case. This finding is consistent with some earlier findings on gender difference. For example, according to Smith (1995), females are less likely to miss subtle clues, and their judgment is adjusted accordingly (see Smith, 1995). Another striking observation in the outcome index analysis presented in Figure 27 and 28, shows the proportion of correct responses are below 50% for cases with non-convicted outcome and above 50% for cases with convicted outcome for all level of participants. It appears the participants had a conviction bias in their money laundering assessments compared with the actual trial decisions.

FIGURE 27. THE PROPORTION OF CORRECT RESPONSE-EXPERT FEMALES VS EXPERT MALES

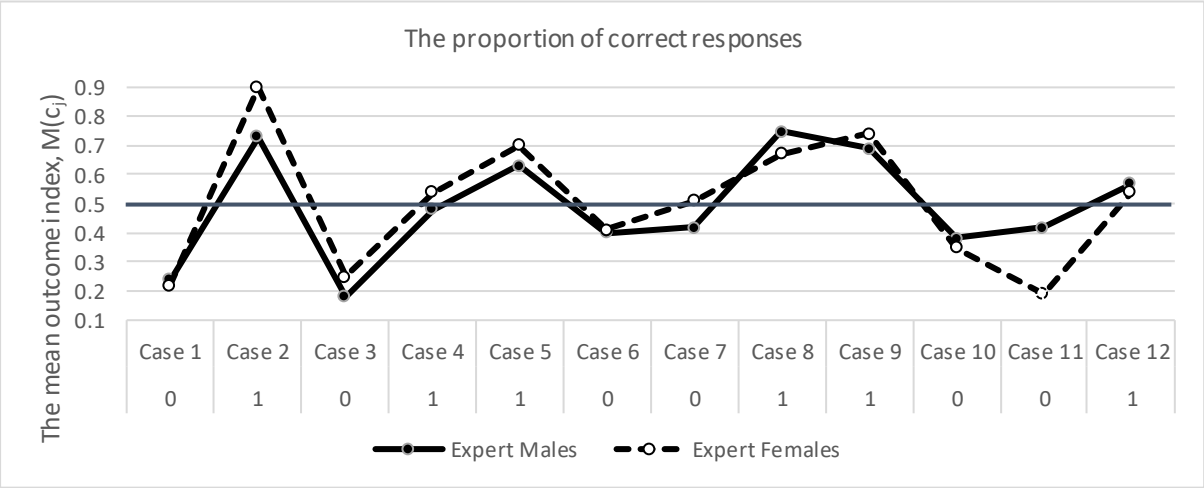
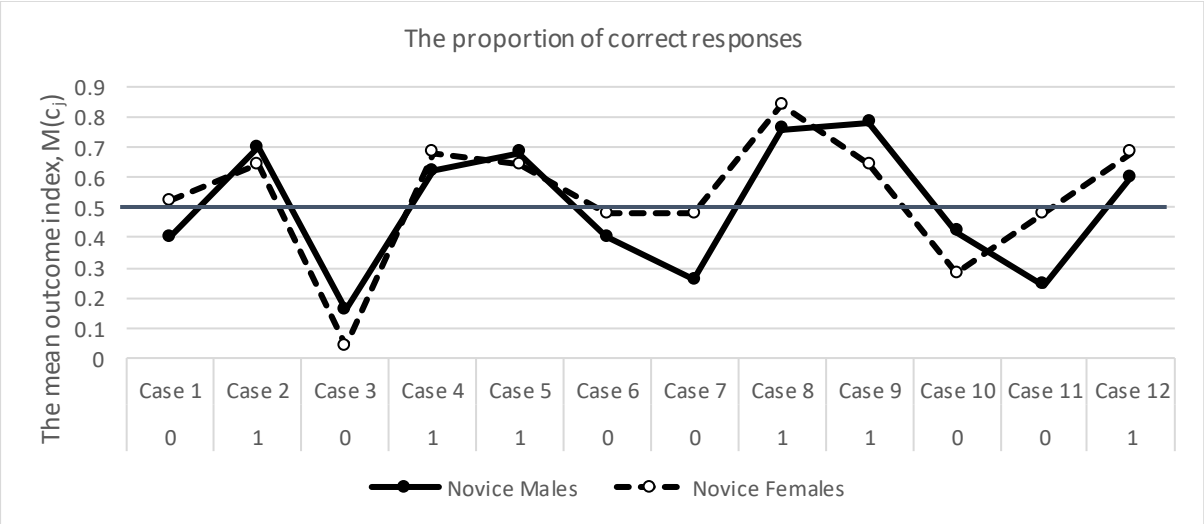


FIGURE 28. THE PROPORTION OF CORRECT RESPONSE-EXPERT FEMALES VS EXPERT MALES



However, smaller differences in conviction bias in their money laundering assessments were produced by the female-novice group than was the case with the experts-males, experts-female, and novice-male groups; the expert male, expert female and novice-male demonstrated similar patterns of conviction bias in their money laundering assessments compared with the actual trial decisions.

Table 20 shows that females mean probabilities differently than do males. On average the females. Figure 29 shows that on average the expert male's probability mean are flatter than the females and more depressed in 10 out of the 12 probability mean instances. Expert females appear to more optimistic about the accuracy of their decisions. Only on one

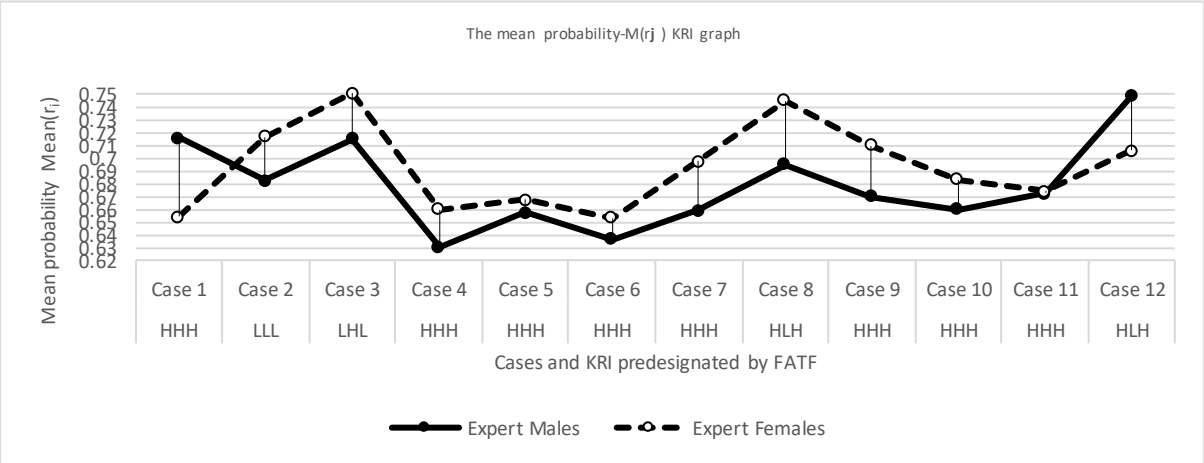
occasion out of the twelve cases do this gender effect differ significantly between the genders. Interestingly, although both the mean probability of the male expert group and the mean probability of the female expert group in these instances were below 72%, it is striking to note that most of the instances in which the mean probability of the female experts was precisely below 72% were only in instances with three high KPIs. Whereas such a trend was not reported for other levels of participants. However, the expert females appear to be more pessimistic about cases with all three high key risk criteria present (case 1, case 4, case 5, case 6, case 7, case 9, case 10, and case 11). These results are confirmed by Fehr-Duda et al. (2006), one of the relative few study that address the question of gender specific weights.

TABLE 20. THE MEAN PROBABILITY ($\bar{R}_J$) TABLE

Case no	Expert Males (**Overall Mean = 0.68**)	Expert Females (**Overall Mean=0.69**)	Novice Females (**Overall Mean= 0.70**)	Novice Females (**Overall Mean=0.69**)	Comparison significance (p) b											
					Expert Males vs Expert Females		Expert Males vs Novice Males		Expert Males vs Novice Females		Expert Females vs Novice Males		Expert Females vs Novice Females		Novice Males vs Novice Females	
					Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*	Test Statistic	*p-value*
r1	0.7151	0.6535	0.6912	0.7272	3.842	0.05*	1.024	0.312	0	1	0.922	0.337	2.086	0.149	0.496	0.481
r2	0.6822	0.7161	0.7292	0.664	1.029	0.31	2.727	0.099	0.179	0.672	0.133	0.716	1.911	0.167	3.668	0.055
r3	0.7143	0.7506	0.7392	0.7376	0.653	0.419	0.658	0.417	0.471	0.492	0.041	0.84	0.04	0.842	0.009	0.923
r4	0.6302	0.6597	0.6848	0.6916	0.344	0.557	3.846	0.05*	2.679	0.102	0.864	0.353	0.807	0.369	0.005	0.945
r5	0.6571	0.6668	0.7196	0.6564	0.017	0.895	4.398	0.036*	0.003	0.958	2.909	0.088	0.005	0.946	3.523	0.061
r6	0.6361	0.6526	0.7066	0.6292	0.008	0.927	6.516	0.011*	0.037	0.847	4.052	0.044*	0.012	0.913	4.273	0.039*
r7	0.6592	0.6971	0.6814	0.7132	0.702	0.402	0.125	0.724	1.384	0.239	0.136	0.712	0.129	0.72	0.589	0.443
r8	0.6949	0.7445	0.6846	0.6572	0.998	0.318	0.112	0.738	0.659	0.417	1.1	0.294	2.513	0.113	0.204	0.652
r9	0.6716	0.7135	0.7078	0.7064	1.243	0.265	2.914	0.088	0.835	0.361	0.102	0.75	0.003	0.953	0.362	0.547
r10	0.6598	0.6832	0.6748	0.6936	0.097	0.755	0.311	0.577	1.264	0.261	0.08	0.777	0.651	0.42	0.579	0.447
r11	0.672	0.6742	0.6826	0.6648	0.005	0.943	0.547	0.46	0.139	0.709	0.442	0.506	0.161	0.688	0.095	0.758
r12	0.7482	0.7058	0.7184	0.7124	1.05	0.305	0.444	0.505	0.605	0.437	0.314	0.575	0.101	0.751	0.055	0.815

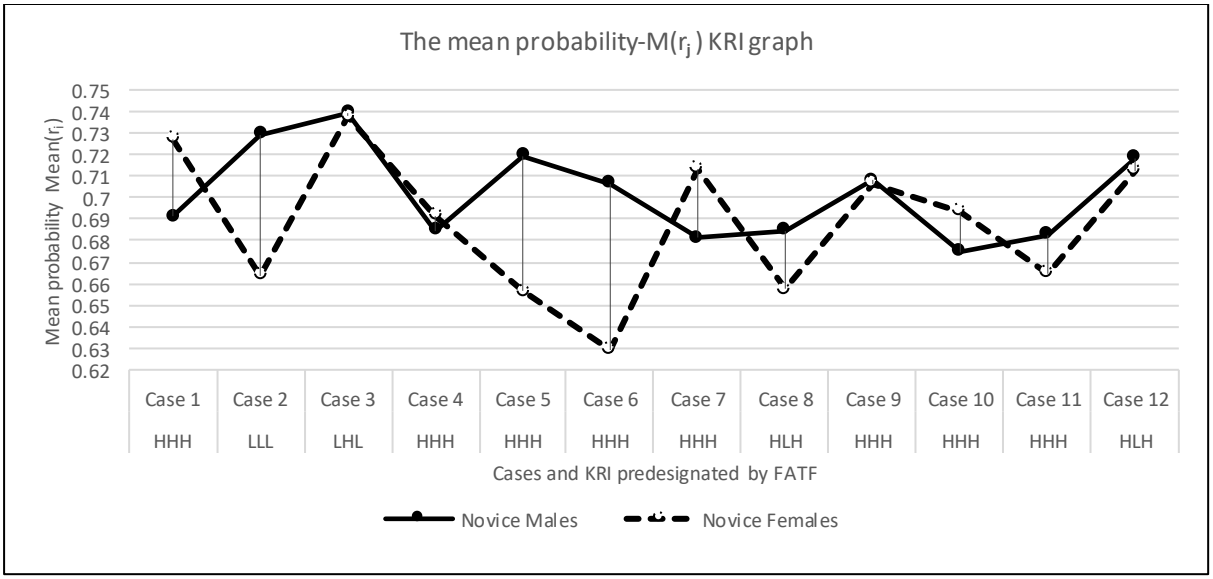
[a] Pairwise comparisons via Mann-Whitney U test and Kruskal-Wallis Test; *P < .05,

FIGURE 29. THE MEAN PROBABILITY GENDER CHARTS-EXPERT MALES VS EXPERT FEMALES



Definition; KRI (Key risk indicator), H=High, L=Low,

FIGURE 30. THE MEAN PROBABILITY GENDER CHARTS-NOVICE MALES VS NOVICE FEMALES



Definition; KRI (Key risk indicator), H=High, L=Low,

In order to identify specific cognitive strategies, professional and novice judgment is compared in terms of overall accuracy and in terms of the underlying dimensions of accuracy components, such as calibration and resolution.

6.5.3 Overall accuracy

Table 21 contains the descriptive statistics of the various accuracy measures and table 19 contains the mean values of the accuracy measures based on the individual scores for expert-male, expert-female, novice-male and novice-female participants, averaged across participants and probability assessment method. Also reported are the associated mean comparison p-values.

TABLE 21. DESCRIPTIVE STATISTICS- GENDER

Measures	Expert Male (N= 49)	Expert Female (N= 31)	Novice Male (N=50)	Novice Female (N=25)
MSPS				
Mean	0.2971	0.2961	0.3112	0.2855
Median	0.288	0.279	0.294	0.263
Std. Deviation	0.065	0.0592	0.08	0.0603
Variance	0.0042	0.0035	0.0064	0.0036
Skewness	1.1098	0.8638	0.9375	1.7585
Std. Error of Skewness	0.3398	0.4205	0.3366	0.4637
Kurtosis	1.6417	0.4754	0.613	3.1243
Std. Error of Kurtosis	0.6681	0.8208	0.6619	0.9017
Range	0.298	0.243	0.372	0.247
Minimum	0.193	0.21	0.175	0.22
Maximum	0.491	0.453	0.547	0.467
BIAS				
Mean	0.1883	0.1938	0.2058	0.157
Median	0.208	0.233	0.2085	0.15
Std. Deviation	0.1637	0.1374	0.1416	0.1489
Variance	0.0268	0.0189	0.02	0.0222
Skewness	-0.2854	-0.0647	-0.2029	0.3255
Std. Error of Skewness	0.3398	0.4205	0.3366	0.4637
Kurtosis	-0.3428	-0.8516	-0.2155	0.8563
Std. Error of Kurtosis	0.6681	0.8208	0.6619	0.9017
Range	0.725	0.509	0.6	0.7
Minimum	-0.217	-0.042	-0.133	-0.167
Maximum	0.508	0.467	0.467	0.533
SLOPE				
Mean	0.0163	0.0153	0.0057	0.0096
Median	0.011	0.011	0.0135	0
Std. Deviation	0.055	0.0675	0.0655	0.0669
Variance	0.003	0.0046	0.0043	0.0045
Skewness	1.0181	0.6394	-0.0416	0.3677
Std. Error of Skewness	0.3398	0.4205	0.3366	0.4637
Kurtosis	0.9755	0.3989	-0.1108	-0.0496
Std. Error of Kurtosis	0.6681	0.8208	0.6619	0.9017
Range	0.249	0.284	0.301	0.28
Minimum	-0.066	-0.117	-0.15	-0.126
Maximum	0.183	0.167	0.151	0.154
SCATTER				
Mean	0.0115	0.0106	0.0139	0.0116
Median	0.008	0.005	0.009	0.008
Std. Deviation	0.0106	0.0107	0.0121	0.0123
Variance	0.0001	0.0001	0.0001	0.0002
Skewness	1.1617	1.3375	1.2719	2.2784
Std. Error of Skewness	0.3398	0.4205	0.3366	0.4637
Kurtosis	0.7039	1.3117	1.0149	6.4548
Std. Error of Kurtosis	0.6681	0.8208	0.6619	0.9017
Range	0.041	0.042	0.051	0.055
Minimum	0	0	0	0.001
Maximum	0.041	0.042	0.051	0.056

Aggregate calibration diagrams for the experts across gender participants are presented in Figure 31 and 32. As shown in Figures 33, 34, 35 and 36, the covariance charts for expert-male, expert-female, novice-male and novice-female participants are all presented separately.

Table 22 reveals that female participants answered more vignettes correctly than their male counterparts. Though the novice-female participants provided slightly more correct answers than expert-female participants. But according to Kruskal-Wallis test, however, found no significant difference between the two groups (*H(1)=0.593, p-value = 0.4413*).

The expert male had the third-highest proportion of vignettes answered correctly, while the novice male had the least. Overall, Kruskal-Wallis's test did not detect significant differences among the four groups.

In this study, the novice-female MSPS = 0.2855 was the lowest (best) out of the four groups, and the expert-female MSPS = 0.2971 was next. The expert male came third with MSPS = 0.2971, whereas the novice male had the highest mean MSPS = 0.3112. There was no significant difference among the four groups. These scores may be indicative of poor probability assessment skills on the part of the participants. Since they did not outperform the MSPS value of less than 0.25, which is the expected score for an assessor with no knowledge who always assigns a probability of 0.50 to the chosen option.

TABLE 22. MEAN ACCURACY MEASURES AND COMPARISON OF SIGNIFICANCE (P)

Group					Comparison significance (p)											
Component / Measure	Expert Male	Expert Female (2)	Novice Male (3)	Novice Female (4)	1 vs 2		1 vs 3		1 vs 4		2 vs 3		2 vs 4		3 vs 4	
Overall					Test Statistics	*p-value*	Test Statistics	*p-value*	Test Statistics	*p-value*	Test Statistics	*p-value*	Test Statistics	*p-value*	Test Statistics	*p-value*
$\bar{c}$ ↑	0.497	0.508	0.502	0.533	0.52	0.8203	0.002	0.9687	1.014	0.314	0.144	0.7044	0.593	0.4413	1.278	0.2582
MSPS ↓	0.2971	0.2961	0.3112	0.2855	0.12	0.9135	0.397	0.5287	1.047	0.3063	0.56	0.4543	0.837	0.3602	2.119	0.1455
MSPS <.25 ↑	0.2041	0.1935	0.18	0.24	0.13	0.8841	0.092	0.762	0.124	0.724	0.023	0.879	0.174	0.676	0.37	0.543
Calibration																
Bias 0	0.1818	0.1851	0.2	0.1545	0.004	0.9488	0.101	0.7501	0.836	0.3604	0.109	0.741	1.352	0.245	2.253	0.1334
Bias_Sq	0.0617	0.0559	0.0621	0.0460	0.088	0.767	0.013	0.911	1.156	0.282	0.213	0.644	0.884	0.347	2.204	0.138
Discriminatio n																
Slope ↑	0.0163	0.0153	0.0057	0.0096	0.025	0.8744	0.223	0.6365	0.194	0.6598	0.044	0.8344	0.093	0.7603	0	0.9955
Resolution Variation 0	0.2238	0.2296	0.2352	0.2278	0.387	0.54	2.05	0.153	0.033	0.868	0.424	0.518	0.109	0.742	0.829	0.368
Noisiness																
Scatter ↓	0.0115	0.0106	0.0139	0.0116	0.139	0.7095	1.709	0.1912	0.03	0.8633	3.054	0.0805	0.079	0.7781	0.926	0.336

Pairwise comparisons via Mann-Whitney test; multiple group comparison via Kruskal-Wallis Test

Definition in text; ↑-larger values better; ↓-smaller values better; 0-zero the best value.

6.5.4 Calibration measures

Similarly, when considering the bias measure, the novice female participants also had less overconfidence (0.1545). The expert male and expert female participants had a close range of overconfidence levels (0.1851 versus 0.1818). The novice male exhibited the highest level of overconfidence among the four groups. There were no statistically significant differences among the group.

The difference among these groups is slightly visible on the calibration diagrams of Figure 31 and 32. The diagrams plot the proportion correct in each category, $\bar{c}_k$, against the corresponding mean probability response $\bar{r}_k$. The area of each point $(\bar{r}_k, \bar{c}_k)$ is in direct relation to the percentage of probability responses made for that judgment category.

The number placed adjacent to each point refers to this percentage. Figure 31 and 32 indicates that all groups were overconfident over most of the probability range. It also suggests that the novice male participants overconfidence was somewhat stronger than that of the other participants.

The calibration curves generally fall below the identity line, indicating that the proportion correct was generally less than the mean probability assessed within each of the 'k probability categories. Furthermore, the calibration curve derived from expert male and expert female participants' assessments intertwine the same path trend. This may reflect the widespread consensus among financial services providers on potential red flags that suggest money laundering risks, with AML experts agreeing on many proxies for money laundering risks.

The difference in overconfidence across gender is also evident on the covariance graphs in Figure 33(expert males), 34(expert females), 35(novice males), 36(novice females). Overconfidence is indicated in a covariance graph by the distance of the intersection point of the mean probability line $(\bar{r})$ and the mean outcome index $(\bar{c})$ from the 1:1 diagonal line. Figure 33-36 indicate that the bias is positive (overconfidence) for all the four gender groups because the intersection is above the 1:1 diagonal. However, bias for the novice female participants (Figure 35) is slightly smaller than that for the expert male, expert female, and novice male participants. The comparison of biases for individual participants in the four groups was not statistically significance, as indicated in Table 22.

FIGURE 31. CALIBRATION DIAGRAM FOR EXPERT-MALE AND EXPERT-FEMALE

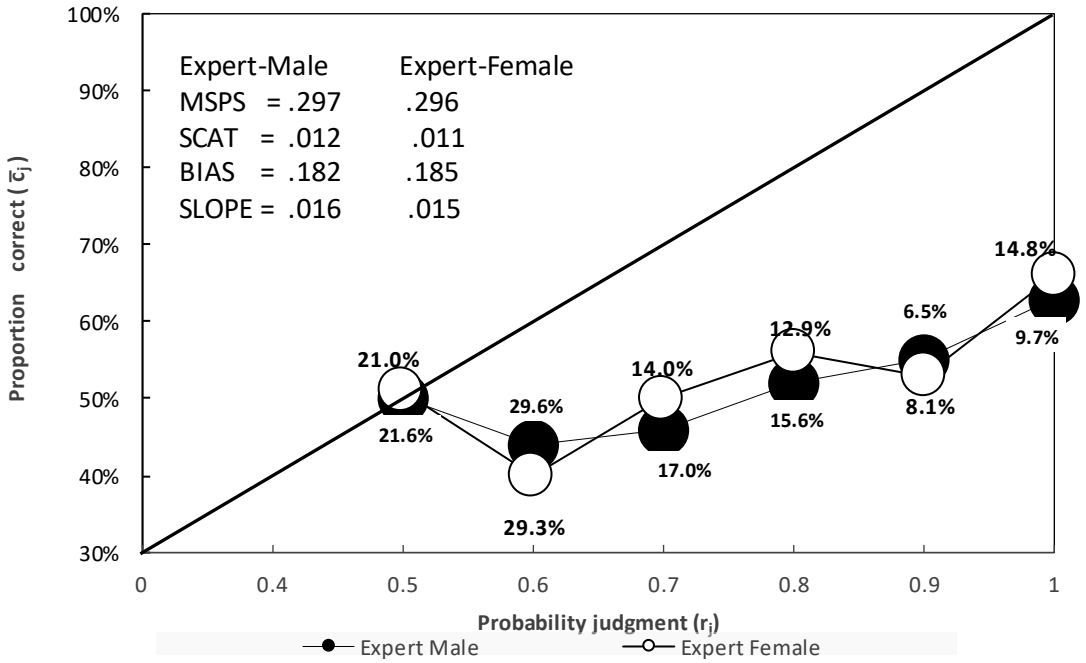


FIGURE 32. CALIBRATION DIAGRAM FOR NOVICE-MALE AND NOVICE-FEMALE

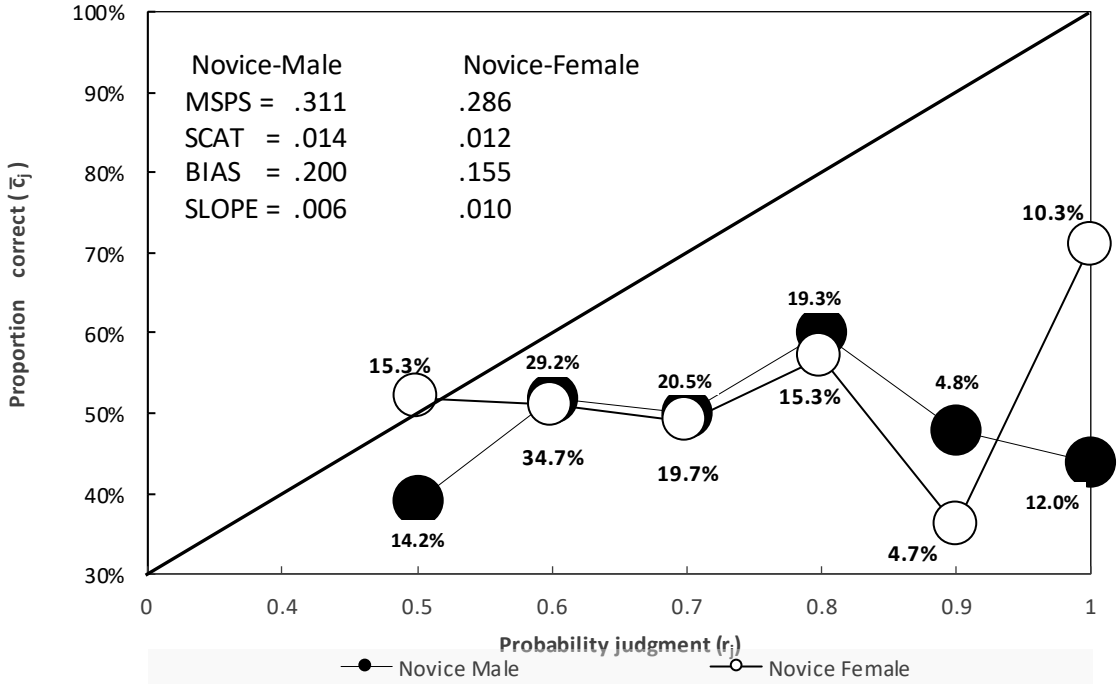


Figure 33. Expert-male covariance graph

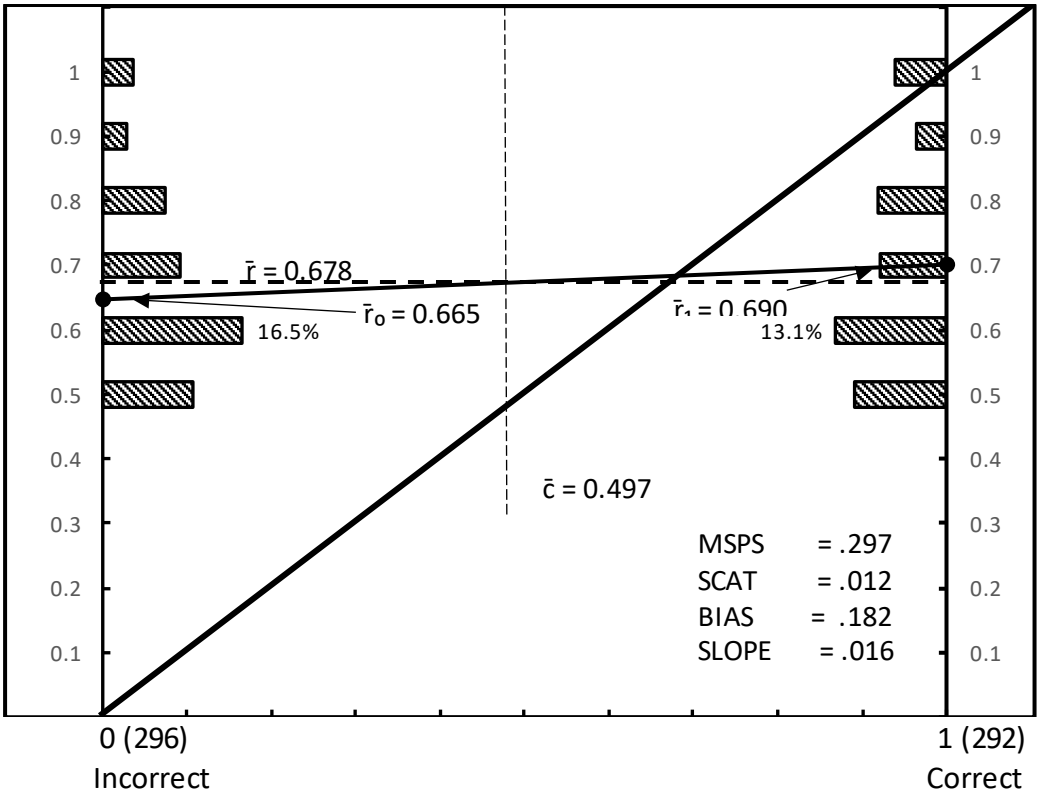


FIGURE 34. EXPERT-FEMALE COVARIANCE GRAPH

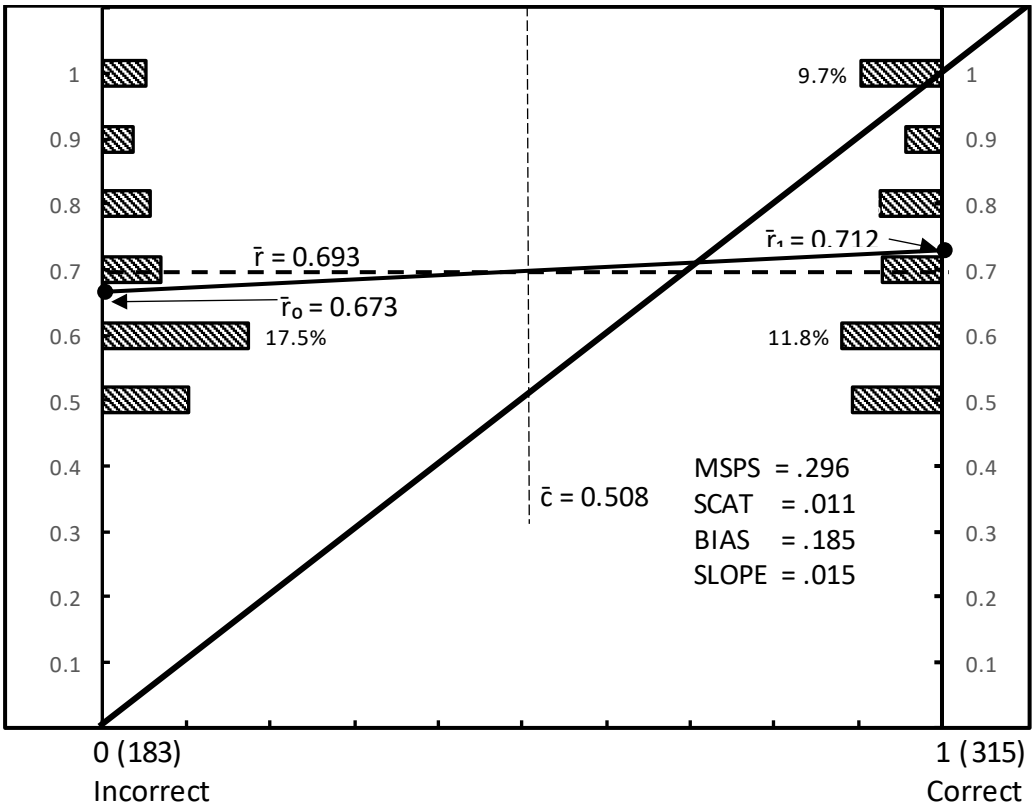


FIGURE 35. NOVICE-MALE COVARIANCE GRAPH

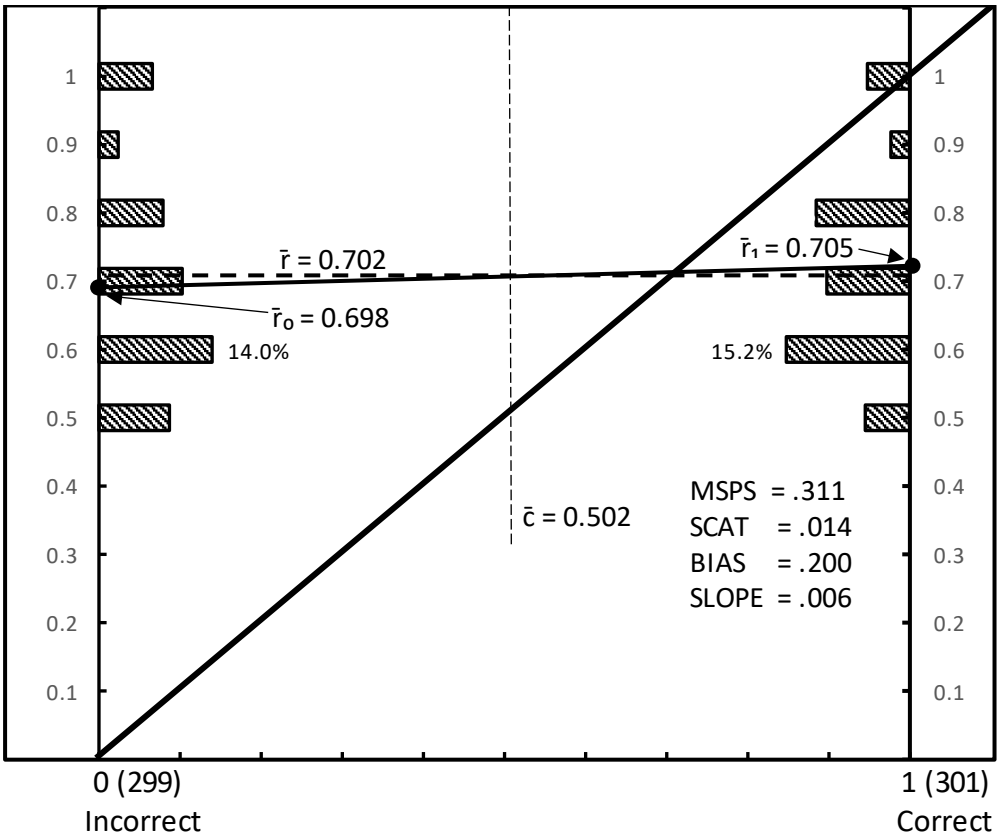
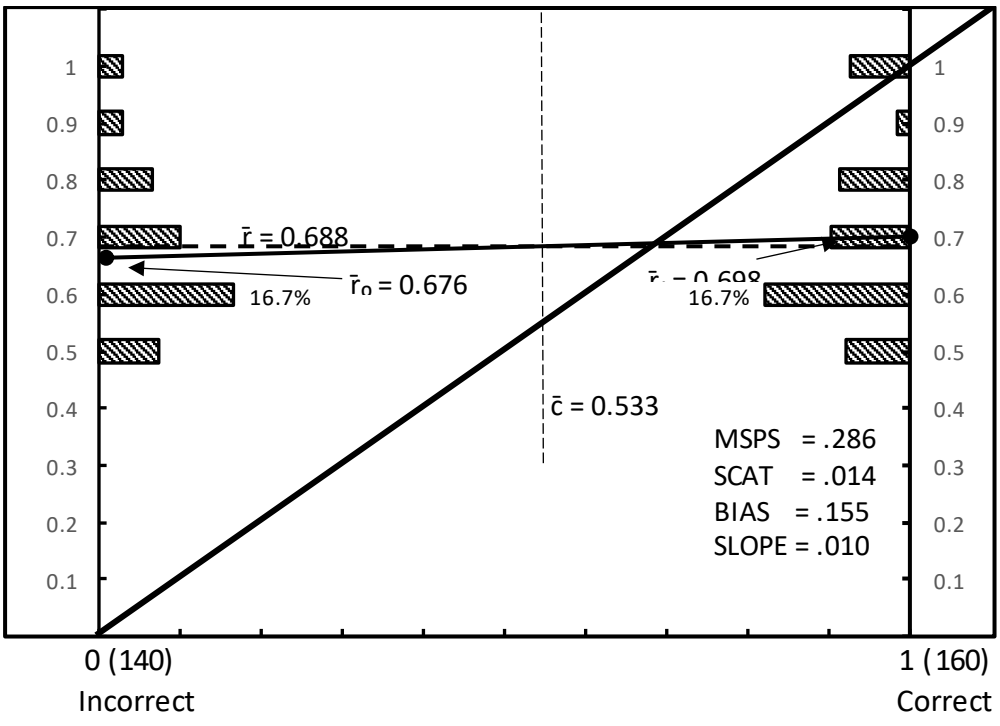


FIGURE 36. NOVICE-FEMALE COVARIANCE GRAPH



6.5.5 Resolution (Slope)

In Figures 33, 34, 35 and 36, the virtual inspection of the four covariance graphs shows that the expert male has slightly the steeper (better) slope when compared to the other participants. This belief was further validated by the slope values indicated in table 19 with experts having a slope value of 0.0163, and that of the female expert value of 0.0153. Whereas the novice female did better off with a slope of 0.0096, compared to the male novice participants with slope value of 0.0057. This result suggests that the experts were better able to differentiate, on average, between instances when a financial transaction was likely to result in money laundering crimes and when it was not. However, as shown in Table 19, the distribution comparison of slope values for individual participants in any of the pair group was not statistically significant.

The related resolution component (RV) of the MSPS relates the slope or resolution component to the variance of the outcome index for expert male participants (02238) yet again appear slight better than that of the expert female participants (02296) Similarly the novice female participants did slight better off than the novice male counterpart. The best value on this measure is zero. It was however, observed that both the expert and novice female participants had relatively close slope range value. Surprisingly, the difference in slope scores across gender was slightly more pronounce in favour of expert male. Specifically, expert male had slightly better (higher) slope scores than expert female participants, followed by the novice female before the novice male. Thus, the expert male participants were better able to differentiate, on average, between instances when they were correct and instances when they were incorrect. However, as indicated in table 19, the distribution comparison of slope values for individual participants for any of the pair wise comparison was not statistically significance.

6.5.6 Scatter (noise) measures

Expert female participants had slightly less excess variation or 'noise" associated with their probability judgments than the expert male, expert female, and novice male participants, as indicated by their better scatter scores. Importantly, the novice female participants had significantly less excess variation or 'noise" associated with their probability judgments than the novice male participants. The Kruskal-Wallis test found that this difference was not significant ($H(1)=3.054$, p-value =0.0805).

The relative frequency histograms in the covariance graphs (Figures 33–36) show examples of these distributions. The percentage indicated next to each distribution's longest bar indicates the proportion of times that participants evaluated the probabilities associated with a given judgment category given that their answer choices were either correct or incorrect. Overall, comparison of the histograms illustrates that the scatter scores are better (Woodsome et al., 2018) for experts female participants than for other groups.

CHAPTER 7 GENERAL DISCUSSION AND CONCLUSIONS

7.1 Introduction

AML risk assessment involves more than just assessing risks, it also involves classifying them and determining how they manifest themselves in suspicious transactions. Although suspicious transactions are the core of AML risks assessment system, there are no universally accepted methodologies for describing their nature (Cindori, 2013). This thesis examined the quality of AML expert judgment. Realistic decision-making often occurs with insufficient time to gather all possible evidence before a decision must be taken, requiring an efficient process for prioritising between potential action sequences. A well-known problem in the literature is distinguishing between suspicious and non-suspicious behaviours (Bello & Harvey, 2017). False-positives and false-negatives are both controlled to enhance quality control of suspicion transaction reporting; however, the pressure is most critical for missing false-negative reports (Amicelle and Iafolla, 2018). Yet, there have been relatively few studies on the individual-based role in assessing money laundering risk (Isa et al., 2015). Even though scholars in this field have noted and studied various risk assessment approaches, the studies lack a strong theoretical foundation for linking expert cognitive factors to the quality of AML risk assessment in financial institutions (Jamil et al., 2022). This thesis highlighted some of the issues through two studies.

The first study investigated factors influencing AML experts risk assessment. The adoption of the risk-based approach to AML, which means customers are risk rated based on variables such as geographic risk, customer risk, and product or service risk, which may increase or decrease the perceived risk posed by a particular customer or transaction is problematic (Bello & Harvey, 2017). Money laundering detection, for example, has to be based on a subjective assessment of an assessor, as there are no physical indicators to detect money laundering risk (Sinha, 2014). In this study, the purpose was to identify factors that influence money laundering risk estimates. That is, what particular factors influence expert's risk estimates the most during risk assessment. To proceed along these lines, two different exploratory methods were employed. First, an opinion poll was conducted on 1497 individuals who were directly or indirectly responsible for making AML risk assessments in the real world. This poll contained questions relevant to the research, such as the contexts and information that they thought were most useful to form a reasonable belief that

particular transactions have potential for money laundering and the factors that were most likely to influence the quality of risk assessment decisions in this domain. This was followed by semi-structured interviews conducted on nine AML experts based on four themes: the effectiveness of risk assessments, the risk assessment process, the main factors that influence risk judgement and perceived process improvement opportunities. The interview responses were then subjected to thematic analysis.

While the unstructured interview provided information regarding the motivation behind the particular factors that influence experts' decisions. The focal point in this first study focuses specified risk factors such as the customer risk, geographic risk, transaction risk and three contextual (Legislative factors, Personal factors, Organizational policy) factors that may influence estimates of money laundering risk likelihood. Hence these highlighted points basically formed the main theme of the short polls and unstructured interviews. However, the information gathered also provided notable insight and perspective on many other relevant factors affecting AML risk assessment-using practice.

The second study involved a vignette experimental study that provided a controlled environment to examine the quality of AML risk assessment linking expert cognitive factors to the quality of AML risk assessment in financial institutions. In the AML context, appropriate judgment and confidence levels are vital since underconfidence may lead to denying financial assistance unnecessarily, while overconfidence may lead to trusting and authorising a high-risk offender. An experimental study using vignettes was designed to investigate the quality of probability judgment in this context. The vignette experimental study composing the second part of the research was based on two main concepts that are highly important to the underlying accuracy dimension of AML risk assessment: calibration and resolution. This research highlights some of the issues through the following three main research objectives. First, to examine the quality of AML risk assessment. Second, to provide an understanding of how likelihood judgments are formed within the context of AML risk assessment. Third, to develop a quantitative methodology for assessing the quality of AML risk assessment. Like other areas of expert judgment, likelihood judgment is promoted as a method to improve AML risk assessment accuracy and analytical rigor. But these methods have received little empirical testing within the AML risk assessment context. In this project, I considered AML risk assessment from a probability judgment perspective to examine the

quality of professional probability judgment in terms of performance on some underlying accuracy components. Two analyses were conducted using this experiment. The first analysis focused on the effectiveness of experts AML risk assessment and investigated how does the quality of AML probabilistic risk assessments made by experts compare to that of novices. In turn, the second analysis examined the quality of AML probabilistic risk assessments across gender. Through the analysis carried out in this experimental, invaluable insight and information were gained on the relatively inadequate research aspect on the ineffectiveness of the risk-based approach in AML. This research highlights some research judgmental process which carries fundamental significance for AML risk experts.

This final section of the thesis is devoted to general discussions and conclusions about these findings in terms of their contribution to the body of literature, their limitations, their potential future research directions, and their useful implications for the procedure of financial institution AML risk assessment.

7.2 Factors influencing expert judgment

The implementation of the risk-based approach to AML, which rates customer risk based on factors like geographic risk, customer risk, and product or service risk, which may raise or lower the perceived risk posed by a specific customer or transaction, is problematic (Demetis, 2010). Money laundering detection, for example, has to be based on a subjective assessment of an assessor, as there are no physical indicators to detect money laundering risk (Sinha, 2014). It is, thus, important to understand the motives and consideration informing experts risk estimates during AML risk assessment. Toward that end, this research highlights some of the issues. It shows that despite the emphasis on experts adopting suitable modification actions in response to perceived risk during risk assessment, respondent often significantly depended on their organization processes or domicile statutory requirement to know when their risk estimates are reasonable accurate. Respondents also view the risk assessment process as essential a standardize laydown process that everyone goes through during risk assessment.

This research also provided insights into AML experts actual thoughts when making AML risk assessment decisions. First, respondents largely perceive money laundering indicators are the most useful evidence necessary for them to form a reasonable belief that customers

transactions are potential instances of money laundering crimes. This perspective was largely shared by all respondent in respective of their length of stay of employment in the industry. The absence of physical indicators for money laundering leads to generated risk indicators ranking highly in terms of motivation, reasoning, and defining normal and abnormal transactions. Importantly, supervisory bodies of financial institutions occasionally provide these sets of indicators in combination with institution-self-generated risk indicators that serve as triggers for AML monetary system profiling and specific examinations of flagged transactions. The problem presented by this approach enumerated in this research work is that the participation of supervisory bodies' involvement in defining these indicators created an administrative definition of normality and abnormality which is perceived with a negative consequence if overlooked. Among the direct consequences of this problem is the administrative approach on the part of the respondents in decision-making regarding the use of risk indicators to know an abnormality in transactions. For example, there was a consensus among respondents in this study that by virtue of a prospective customers or business entities originating from a designated high-risk country may automatically exclude such customers from certain entitled financial services. In fact, all related transactions from such accounts are subject to be reported as suspicious transactions in most instances.

Second, because the definition of absolute risk of money laundering transaction is lacking (van Duyne et al., 2018), respondents viewed the consistency of their perceived risk with the regulatory requirement as the most popular way of determining whether their decision has been accurate during the AML risk assessment process. In this approach, caution was the driving force, but it is in opposition to the risk-based approach, that gives flexibility to experts to decide what should be considered suspicious or not. Participants also showed a tendency to place more weight on written procedures and policies during risk assessments, even when context consideration based on economic rationality is sufficient. According to the respondents, they opted for the option to report any transactions perceived as having some element of uncertainty. However, there was a statistically significant positive correlation between length of experience and decision accuracy indicator, the more experienced participants opted for consistency of their perceived risk with that of their organisational requirement. This suggests that as the experts' experience increases in the industry, they tend to align their decision accuracy from a regulatory perspective to an

organisational perspective. In broader context, the FATF's 40 recommendations on money laundering, which form the foundation of international AML standards, were developed to work in sophisticated financial environments (Sharman & Chaikin, 2009). These guidelines provide a subtle pivot for transferring accountability burdens during risk assessments. Consequently, the AML experts seem to regard these guidelines as the definition of scopes for their AML risk assessments. In this context, the concept of money laundering risks poises whole range of theoretical and political concerns, from obscure bias to authorised exclusion.

Third, as evident in the influence of regulatory response to AML activities, respondents largely perceive statutory interpretation of policies as the major causes for variation in risk estimates during the rendition of suspicious activities report. Official guidelines requires that suspicious transaction be reported only when there is reasonable reason to suspect that financial transactions are linked to proceeds from crime. Consequently, this guidance gives suspicious activities a dimension of interpretive flexibility, which enables financial institutions defines what is suspicious without obtaining consensus. Hence, rather than a matter of discovery, suspicion is one of interpretation. This result is consistent with the work of Amicelle and Iafolla's (2017) conclusion on suspicion in the making, that State security-oriented institutions and their designated controlled are regularly involved in contentious argument when interpretative statements take precedence over cold facts during the quality control process of suspicious activity reporting.

Fourth, an organisational related policy and processes is considered the most significant factor that influences the outcome of AML risk assessment decisions. Most respondents expressed the view that banks are very rigid with their risk assessment procedures, and that they follow standard procedures for assessing risk, which are strictly monitored for consistency. Again, caution was considered to be the driving force for this view since everyone was expected to align their perceived risk to the institution's risk appetite. Though, operational difficulties persist with CDD policy and procedures implementation - interpretation, compliance costs, and scope (McLaughlin & Pavelka, 2013). An overview from study one suggests that the alignment of judgments and banks supervisory recommendations executed as organisations' laydown processes is most significant factor that influences AML risk assessment. This result has shown that the decision-making process involved in money laundering risk assessment presents unquestioned dilemmas, reinforcing

the findings of previous literature on AML risk assessment. It creates a need to find or construct standards of normality that can guide judgment making (Bergström et al., 2011). More than 90% of practitioners reported that during risk assessment they usually examines the origin of funds involve in the transactions, the potential likelihoods of money laundering, and consequences if the transaction eventual turns out to be a case of money laundering. Hence, risk assessment cogitates about specific specified risk factors such as the customer risk, geographic risk, transaction risk and any other contextual factors that may influence estimates of money laundering risk likelihood. Regardless of the state of the estimates, the expert's perception of the transaction data is itself an interpretation based on past experience and partly structure by the rule of evidence.

Some interesting patterns emerged regarding reasons and motivations as practitioners preferred risk rating during AML risk assessment. For occasion where practitioners choose to assign a risk without interpretation, there was a strong impact of perceived regulatory framework alignments. Practitioners often refrain from further individual risk interpretation when a perceived risk parameter is well documented and with general consensus. In risk assessment, regulatory triggers were rated as the most important pathways by respondents. The triggers are used during the setting up of the AML monitoring system as well as during staff training. According to the study, this attitude has been influenced by caution to avoid reprimands through fines, which invariably have an impact on both the bank's operating cost and reputation. It also emerged that when customers provided incomplete information, experts presumption amounted to a high degree of suspicion.

From practitioners' open-ended responses, it was clear that regardless of their jurisdiction of residence, the same specific factors influenced their risk judgments. For most of interviewees in this study, the inclination was to focus on box-ticking rather than to exercise their judgment on a case-by-case basis. This research result is confirmed by Zavoli and King (2021), a similar work that study the implementation of AML obligations in practice. However, unlike Zavoli and King (2021) study, that drawn upon semi-structured interviews only, the methodology design in this study combined the analysing of data gathered from short polls and structured open-ended question to conclude that AML experts in order to construct their reasonable judgment during AML risk assessment, they typically stick to either on their organization processes or domicile statutory requirement. A regulatory

framework was crucial for the study's interviewees to use in order to validate the accuracy of their risk assessments and their job-role experience (which allowed them to know which legal framework to use in uncertain situations). It was also claimed that regulatory frameworks provided a sense of direction when assessing risk and could help avoid being reprimanded by regulators. Finally, it also aligning decision to the regulatory framework that creates the required degree of satisfaction amounting to a sense of belief as to whether a transaction is suspicious or not.

After discussing the significance and applicability of the study's findings, it is possible to consider the value of this contribution and potential directions for further study.

7.2.1 Implications for practice and AML related policies

The FATF conducts global evaluations to determine the effectiveness of the AML System in different countries, but these evaluations cannot accurately predict the effectiveness of the current AML System (Zavoli & King, 2021). In particular, there have been few studies focused on assessing customer risk, specifically relating to the individual's role in determining money laundering risk (Isa et al., 2015). Moreover, by adopting a regulatory focus or policy driven response to AML risks assessment or suspicious transactions, experts can create risks of false positives or false negatives that impact the regulatory regime negatively. The failure to implement AML regulations effectively would undermine the AML system as well as the filtering obligations imposed upon regulates (Zavoli & King, 2021). This is particularly evident when looking at experts' views on money laundering risk and how they carry out their risk assessment. Although financial institutions are implementing extensive customer due diligence processes and enormous financial costs to ensure their customers' infrastructures are in compliance with the expected framework, the implementation of policies and procedures has become increasingly problematic (McLaughlin & Pavelka, 2013). AML frameworks should be rethought in light of actual operations rather than a more continuous focus on expansion domestically and internationally.

The results of this research reinforce concerns regarding the functioning of reports of suspicion activities. Risk-based approach has mostly been promoted as a methodology for determining what is likely to be suspicious based on risk rating incidence. However, there is no current way to guarantee that actual reports are proportionate to actual events related

to money laundering (Bello & Harvey, 2017; Zavoli & King, 2021). Hence, through policies and procedures, regulatory inference of money laundering risks is used to distinguish between suspicious and non-suspicious activities. This form of response on the part of AML experts results mainly from the negative consequences such as cost relating to sanctions and fines when regulatory investigation results of actual incidence of money laundering crimes reveal reporting entity responses being counterintuitive to regulatory risk assessment framework expectations. Consequently, risk assessment for differentiating suspicious and non-suspicious has been reduced to an administrative basis instead of objective criteria. The quality of report will largely be defused with potential large quantity of false positives that might undermine the effectiveness of the AML system. This has a considerable implication in practice since law enforcement rely to some extent on the result of the risk assessment for intelligence and investigation activities.

During the risk assessment process, the expert faces uncertainty at its core. Even though the risk-based approach can help to reduce this uncertainty to some extent, customers with premeditated criminal motives may not come out clean or straight when dealing with financial institutions. In certain instances, criminals may even understand the KYC legislation guiding the documentation requirements for operating and making transactions with banks. Hence, the fact that banks assess risks based on KYC/CDD documentation raise the concern on the completeness of the information these documentations portray on the actual activities a customer gets involved. Customers present documentation proving who they would like the bank to perceive them as. Hence, the lack of access to some other information about who a customer truly is outside of the legislative KYC requirement may contribute to the complexity in carrying out risk assessment by AML experts. As a result, AML experts are subtly pushed toward predetermined risk categorization templates in order to build credibility and accuracy in their judgments. Hence, laws enforcement should bear in mind the difficulties in assessing AML risk when dealing with the regulated entities. If compliance officers are under unfair pressure, they will not be working to prevent money laundering, but they will just be protecting themselves (see Bello & Harvey, 2017).

7.3 Experts versus Novices

AML experts are required to make important decisions regarding information that might lead to a suspicion or knowledge of money laundering. Poorly informed decision-making can

have a wide range of consequences, from reputational damage to regulatory reprimand and fines (Gelemerova, 2009). Experts in this domain face the dilemma of maximizing sensitivity while reducing false-positives and false-negatives by making reasonable assessments (Maurer, 2005). However, practice variation, i.e., assessing similar activities or transactions differently, remains a recurring issue, although, quality assurance initiatives, such as providing continuing training and publishing guidelines for risk assessment, are taken to address this issue. Assessing money-laundering risk is not an exact risk measurement but embodies the subjective, impressionistic evaluation of the assessor (Riccardi et al., 2019; Sinha, 2014). Since all assessments and predictions are influenced by uncertainty, probability theory offers a chance calculus (Costello & Watts, 2014). To this end, a probability judgment accuracy framework derived from Yates (1982) was extended to examine the quality of AML experts risk judgment in terms of performance accuracy on two underlying accuracy components, calibration, and resolution. In the evaluation of a participant's probability assessment, the dichotomous trial outcome probabilities (0 for not guilty and 1 for guilty) was used, as there exists no precise data that could be used to generate the outcome data. In the AML context, appropriate judgment and confidence levels are vital since underconfidence may lead to denying financial assistance unnecessarily, while overconfidence may lead to trusting and authorising a high-risk offender. Consequently, this thesis investigated expert probability judgments in an AML setting, focusing on calibration and resolution. A method was developed to examine the quality of AML risk assessment. Considering the expert vs novice comparisons, we draw the following conclusions.

First, both experts and novices were biased to label all transactions as suspicious and both groups guilty bias was symmetric. They overwhelmingly preferred false-positive over false negative errors regardless of transaction perceived likelihood of money laundering risk. The result suggests that although AML risk assessment procedures are aimed at increasing the reliability of the AML reporting system, the occurrence of human bias during risk assessment is likely to increase the overall rate of false positive report. Furthermore, in previous research, it was argued that experts do not exhibit the same bias as novices (Bond, 2008; Krems & Zierer, 1994). However, the current results do not support this conclusion for AML risk assessment. Instead, the findings are consistent with the finding on cognitive

biases that expert judgments under uncertainty are susceptible to the same cognitive biases as novice judgments (Mizrahi, 2013, 2018; Murray, et al., 2011).

Second, based on proportion accuracy Mean(c) scores, expertise did not significantly affect the capability to distinguish between financial transactions linked or not linked to proceeds of crimes. I found a poor correlation between participant level of expertise and predictive accuracy. Novice participants slightly outperformed expert participants in the proportion of correct answers, despite evidence from the study that expert participants adhered to practice guidelines. This study speculate that practice guideline decreased the objectivity of experts' opinions, and this effect was noticeable in cases involving transactions high risk indicators-particularly FATF high risk jurisdiction. Similarly, these findings extend support to Rubinson's (2010) work that human have a propensity to overestimate the reliability of their own beliefs, interpret facts in accordance with those beliefs, and draw conclusions based on pre-existing objectives, procedures, or methodologies that, by their very nature, only look at what is required to support the approach. The adherence to practice guideline reflects that expert utilise the underlying risk-based methodology during the interpretation of what should be considered suspicious or not in the scenarios presented in the vignettes. Although Stewart et al.'s (1997) work suggests that apart from personal characteristics, task domain can also affect experts' diagnostic or predictive accuracy. Phillips et al. (2004) noted that expert diagnostic or predictive abilities might not be possible in domains with little opportunity for effective feedback and considering that national FIUs do not regularly provide AML experts with effective feedback regarding suspicious transactions filed (Gelemerova, 2009; Lannoo & Parlour, 2021). This may be compared to weather forecasting, for instance, where accurate and timely feedback are provided regularly or even daily on predictions, providing windows of opportunity for improving certain accuracy dimensions. Consequently, the findings of this study suggest that national FIUs should regularly provide feedback to AML experts regarding the quality of suspicious transaction reports in order to improve their cognitive processes and biases.

Third, novices and experts alike appear to be overconfident about their distribution judgements, and this effect was slightly more pronounced in expert groups. In Lichtenstein et al. (1977) view, overconfidence bias emerges when judgments are made about difficult items. Hence the observed overconfidence bias appears to reflect the reality identified in

the literature that it is difficult for experts to distinguish financial transactions that are truly suspicious from those which are not (e.g., Bello & Harvey, 2017). Moreover, experts' judgments about their answers to money laundering suspicious transactions were particularly good at distinguishing between instances when those answers were correct and instances when they were incorrect. Expertise in many settings seems to depend on perception skills, particularly the ability to make good distinctions (e.g., Klein & Hoffman, 2020). Such ability is essentially relevant because they are supposed to be the basis for reporting suspicious transactions. Overall, these findings agree with Mizrahi (2013) conclusion that expert opinions are considerably less accurate than random chances

7.3.1 Implications for practice and AML related policies

This study has implications for the training of AML experts as well as policy implications. Current training adopts risk-based theory-oriented approaches for assessing money laundering. However, the finding from this study show that this approach may not improve the filtering obligation imposed on banks for the effectiveness of the AML reporting structure. Our results raise the question of how malefic a bias is if over 85% of experts (89% of novices) are affected? The implications of wrong risk estimation for financial institution filtering obligation are far-reaching. The overconfidence bias alone affects more than 85% of experts, and if other biases also contribute to flawed risk judgments to a similar extent, then a substantial proportion of AML experts risk assessment decision may be imprecise. Moreover, overconfidence is only one cognitive bias among many other biases (e.g., confirmation biases, omission biases, hindsight bias). Given the nature of money laundering and the variability of the underlying criminality, it is difficult to gain a clear picture of the problem, and without which effective action is impossible (Lannoo & Parlour, 2021). In addition, human biases and social consensus seem to be incorporated into the design of AML risk assessments specific to the assumed nature and level of the money laundering risk, as determined by government decision-makers (Van Duyne, Harvey, & Gelemerova, 2018). Hence, factors affecting the quality of risk assessment (such as overconfidence) remains an important aspect of scientific interest in this domain.

The experts in the sample preferred false-positive errors over false-negative errors, which may increase inefficiency and expensive costs associated with high false-positive judgments (Amicelle & Iafolla, 2018; Lorenz, Silva, Aparício, Ascensão, & Bizarro, 2020). But why should

the AML experts' judgments have a fairly average proportion accuracy of mean outcome accuracy scores? The ability to discriminate well requires the person reporting judgments to understand how things will turn out. But this is not the case for AML risk assessment domain, where there is little or no feedback from enforcement agencies to AML experts on how well their filed suspicious transaction. Establishing a practice and feedback regimen is one way to facilitate the development of expertise in specific judgments (Phillips, Klein & Sieck, 2004). An approach like this is traditional for strengthening skills that can be defined and measurable. However, in the current AML compliance sanction regime, it is possible that even if experts are willing to stick with their intuition on risk judgment, the adverse effects of AML enforcements on noncompliance may skew some risk assessment decision outcomes toward enforcement side. Laws enforcement agencies should bear in mind the difficulties in assessing AML risk when dealing with the regulated entities. If AML compliance officers are under unfair pressure, they will not be working to prevent money laundering, but they will just be protecting themselves (Bello, 2017).

According to this study, it is necessary to take into account the poor performance of experts when using a risk-based approach to predict money laundering risk. Several studies have highlighted the inadequacy of the risk-based theoretical framework for AML, which hinders the use of the risk-based approach to estimate customer risk (Amicelle & Iafolla, 2018; Bello & Harvey, 2017; Demetris, 2010). AML risk categorization is difficult due to the elusive concept of risk and its intrinsic paradoxes. While risk-based approaches are desirable, the approach is not sufficient to maximize AML experts' judgment accuracy. An alternative uncertainty-based approach has been proposed for assessing AML risk in order to improve the conceptualization problem of risk in the AML domain and will contribute to aligning banks' interests with those of regulators without imposing fines or other pressures (Bello & Harvey, 2017). As a result of insufficient information occasioned during AML risk assessment in banks, the uncertainty-based approach relies on the premise that decisions are made based on incomplete information, hence more accurate money laundering risk estimates can be achieved with theories of decision-making under uncertainty. As opposed to decision-making under risk-based approach conditions, that operates on the basis of predefined risk parameters with known degree of consequences before actual risk judgment (Demetris, 2010.

7.4 Judgment variation across gender

There is evidence that males and females have different probability weighting schemes and valuation schemes when faced with risk and decision making. However, sufficient academic attention has not been paid to gender-specific differences in AML risk judgments despite their existence in financial decision making and other psychological domains. A general lack of confidence is more typically perceived in women than in men because men tend to be overconfident rather than lacking confidence in a particular task or item (Lundeberg et al., 1994). Croson and Gneezy (2009) provide an overview of the literature in economics and psychology that suggests women are less confident and competitive than men. A contribution to the literature is this study exploration of gender differences in confidence in AML risk assessment related context. Major conclusions concerning the males versus female's comparisons are summarized as follows

First, in general there was scanty evidence to support the notion that females lack confidence. In general, the result of study indicates that males and females do not strongly differ in their probability weighting schemes, which is consistent with earlier studies (see Fehr-Duda, 2004). However, a point of departure from Fehr-Duda (2004) work is the findings that on average the expert female's probability mean were higher than the experts. males for expert groups (expert males versus expert females) and novice groups (Novice males versus novice females), indicating the female appear to more optimistic about the accuracy of their judgment accuracy compared to the expert male. Similarly, this study can safely conclude that all participants appear to have a conviction bias in their money laundering assessments compared with the actual trial decisions in respective of gender.

However, smaller differences in conviction bias in their money laundering assessments were produced by the female-novice group compared to the other level of participants (experts-males, experts-female, and novice-male groups). Novice females were less sensitive to label all transactions as cases of money laundering crime. This difference was strong enough to make the novice female to be more successful (performed better in 6 out of the 12 cases) than the other 3 levels of participants (expert male, expert female, novice female) at selecting the right conviction outcome, increase the accuracy in the determining the outcome.

On the overall accuracy measure of probability judgment, this research found that expert females were more accurate compared to expert males at determining whether or not financial transactions were related to money laundering offences. Female superiority in the overall accuracy is also consistent with results on gender differences for the novice participants. The female novice participants were more accurate than male novice in knowing when financial transactions were linked or not linked to money laundering crimes. This finding is consistent with research in cognitive psychology and marketing that suggests that females may be more accurate decision makers in complex decision tasks. For example, a similar study by Chung and Monroe (2001), on the effects of gender and task complexity on audit judgment found that in the more complex task, females were more accurate than males. In other domain especially in psychological contexts, Hall et al. (2016) for instance demonstrated that females have greater ability in judging personality. Their work demonstrated that females excel in remembering others' appearance and nonverbal behaviour, and they respond more quickly on accuracy tasks, as well as they have more extensive knowledge of the meanings and usages of nonverbal communication as assessed on a written test.

An important finding is that item-specific gender differences in confidence may be dependent on the task since this finding contrasts with some earlier experimental evidence on overconfidence that suggest that males are more overconfident than females (Deaux & Farris, 1977). However, the present results have an interesting resemblance to Lundeberg et al. (1994) work on gender differences, that found scanty evidence to support the notion that women lack confidence in a psychology course examination context. Both males and females (but especially novice males) in this study display some level of overconfident than warranted in the accuracy of their answers

Furthermore, on certain accuracy measures, this research found that expert male participants were better than experts females at calibrating their confidence, whereas novice female participants had a better ability to calibrate their confidence than novice male participants. Remarkably, novice female participants exhibited better confidence calibration than the male expert participants. Male experts' calibration performance was affected by their dependence primarily on clues from the predesignated risk indicator (risk-based approach) for risk judgments, which adversely affected their confidence rating, whereas this

effect did not impact the judgement performance of female novice participants. Another interesting finding was that expert male participants also showed greater discrimination between confidence when correct and confidence when wrong than novice male participants. In the same line, expert female participants also showed greater discrimination between confidence when correct and confidence when wrong than novice female participants. However, novice female participants were more aware than the novice male participants that their answer to difficult items might be wrong. Calibration of confidence is an important aspect of risk assessment. The state of confidence is responsible for the weighting that experts attribute to a determined assumption concerning the assessment (Freitas, 2021). Certainly, knowing what one knows and what one doesn't know has important implications for money laundering risk assessment in the light of the absence of physical indicators

In conclusion, the current investigation raises the possibility that men sometimes have too much confidence, particularly when they are wrong, rather than that women necessarily lack confidence. Comparing prospective general confidence to retrospective and task- or item-specific confidence may lead to the common perception of females lack confidence rather than male's overconfidence (Lundeberg et al., 1994). Contrary to many real-world circumstances, this study was able to measure confidence using an objective standard (accuracy of response), which solves the issue of using men's levels of confidence as the norm (Roberts, 1991). By applying this standard, this thesis can demonstrate the drawbacks of considering exclusively male behavior to be the norm (Lundeberg et al., 1994). Clearly, being overconfident when wrong may not be a very desirable trait in the context of AML risk assessments, as appropriate judgment and confidence levels are vital in this context because overconfidence could lead to trusting and authorizing a high-risk financial transactions and clients.

7.4.1 Implications for practice and AML related policies

This study currently stands alone by virtual of the relative few studies on prior research on the quality of AML risk assessment and gender comparisons. The results are in line with other areas of gender literatures, which have a substantial proportion of null findings, but with a gender difference slightly in favour of females. For example, a meta-analysis by Hyde and Linn (1986) for gender differences in verbal ability indicated a slight female superiority

in performance. They found that 66% of the 165 reports included did not show a statistically significant sex difference, while 56 (34%) did (Halpern, 1992, 84).

Presently, gender differences in AML risk assessment ability are routinely ignored in training, and personnel assignment to AML risk assessment related functions. On the basis of these results, one may speculate the need for more emphasis on gender diversity in the finance industries, especially in roles involved with anti-money laundering (AML) as the financial industry is still largely male-dominated. For example, a recent report on the number of full-time financial and insurance employees in the UK (UK) showed that as of 2021, there were 516 thousand male full-time workers compared to 344 thousand female full-time workers (Statista, 2022). There is need for more research work to be carried out as gender-typing of AML risk assessment is a complex issue. More research is also necessary before implications can be made to training of AML experts and designing of decision aids.

Furthermore, this research finds slight interaction effect between gender and judgment accuracy. If supported by additional research, these results may have important implications for financial institution in terms of training, decision aids, assignment of personnel to AML risk assessment tasks, and the AML risk assessment review process, all of which typically ignore gender differences in decision-making abilities. Future work with practitioners in organizational settings will enhance the understanding of judgments processes under the impending constraints of organizational politics, motivational contingencies, and informational externalities. Further work in these venues will be imperative for improving the quality of AML risk assessment in the banking sector.

In the following session, the limitations of the two studies that were conducted for this study are highlighted and possible suggestions for future studies.

7.4.2 Limitations and future studies

It should be noted for study 1, that all these generalizations and recommendations should be considered within the limitations of survey methodology. One of the drawbacks of surveys is the calibre of the data they produce. Rarely can one be certain of the respondents' sincerity, motivation, dedication, and consistency in responding to the questions. The respondents' sincerity, motivation, dedication, and consistency are rarely guaranteed. It is recommended to filter, monitor, and carefully check answers as

precautionary measures against these possible errors (Burns & Bush, 2000; Frankfort-Nachmias & Nachmias, 1996). Therefore, the researcher performed regular controls on the answers, performed random checks via email, and rigorously eliminated forms if any suspicion was present. The literature has acknowledged all these potential problems since the 1950s (Deming, 1950), yet survey methodology remains one of the most popular, widely used, and well-established approaches to research in the field. Consequently, this technique leads to unquestionably valuable results if executed carefully and meticulously.

For study 2, it is also important to take into account the restrictions on the generalizability of the study's findings. The distinction between actual life processes and vignette scenarios is one crucial element. Vignettes can't fully depict people's lives as they actually are. This raises crucial questions about the analysis, reporting, and generalizability of vignette-based data as well as the applicability of the findings to other contexts. With this objective, money laundering risks are categorized in the ordinal scale of low, medium, and high-risk categorizations under the assumption that risk can be better managed when structured into constituent components. However, in this study, participants were required to respond based on a probability scale of 50 to 100. It might appear that experts might have faced some level of difficulty in quantitating their risk judgment. As a result, this may lead to respondents with the same opinion potentially selecting different categories, creating a source of response bias in the survey. This bias, will, in turn, make it difficult to qualify what opinion the resulting data truly represents. Hence a direction for future research will be to utilize an ordinal scaling response methodology during the instrument design.

The ability to discriminate well requires the experts to understand how things will turn out. But this is not the case for AML risk assessment domain, where there is little or no feedback from enforcement agencies to AML experts on how well their filed suspicious transaction. Establishing a practice and feedback regimen is one way to facilitate the development of expertise in specific judgments. An approach like this is traditional for strengthening skills that can be defined and measurable (Phillips, Klein & Sieck, 2004). It will be interesting for future research to compare assessment accuracy with and without feedback.

There are two aspects of AML expert judgment that fall outside of the scope of this study but could be explored as separate streams of research in the future. First, it would be interesting to evaluate to what extent performance-based regulation can contribute to AML

banks' monitoring frameworks and its impact on AML experts' decision-making. The current sanction focus regime, as demonstrated in this study, subtly enforce AML experts to follow prescriptive processes, techniques, or procedures during risk assessment rather than be focus on desired measurable outcomes. Second, it is important to assess to what extent the risk-based approach biases expert decision in line with the regulatory framework. In this sense, future research might analyse if and how expert risk judgment varies when an alternate approach, such as the uncertainty-based approach in carrying risk assessment, especially looking how experts measure their responsibility in this regard.

There was no significant difference in judgment across gender, though this research found females were slightly more accurate than their male counterpart both in the expert's group and the novices group. Since there aren't many studies on judgment accuracy in this field, it was challenging to locate studies that were similar to or comparable to this one. Therefore, more research is required to confirm the findings of these works before any firm conclusions can be drawn. Below is a discussion of some of the other crucial factors taken into account during the ethical evaluation of research. A general observation about the participants' accuracy levels can be made, namely that the accuracy levels were typically low. With the exception of expert males, whose mean accuracy judgment was just slightly below the midpoint .5, the accuracy scores of the remaining participants (expert female, novice male, and novice female) were just slightly above 0.5. The inherent complexity of the case materials was one of the possible explanations for this performance, and it was probably more likely. These were adapted from actual financial transactions that were reported as suspicious transactions, investigated, and the results of which led to money laundering convictions and not-convictions. Even though the present study modified these cases, they were still relatively complex. It is unclear whether a simpler case would have any impact on the outcomes that were found. Third, it is unclear whether the relatively inexperienced participants' lack of experience had an impact on the study's ability to generalize the findings. The probability judgment analysis, however, indicated that the results were unaffected by the experience of the AML experts. Another consideration has to do with how participants were compensated. The experts received no compensation. It is unknown how this method of compensating participants would affect the outcomes.

The study responds to calls to examine the individual-based role in assessing money laundering risk (Isa et al., 2015) from the perspective of judgement and decision making (Jamil et al., 2022). The analysis follows Yates (1982), which can be applied when using dichotomous outcome indices, and more generally when using non-dichotomous weighted outcome indices (that requires modifying the outcome index variable, which is not considered here). Yates (1982) undertook a similar decomposition of the MSPS (although he used the term Mean Probability Score, MPS). Yates used alternative formula specifications, but the results are the same in the case of a dichotomous outcome index. The formula specifications outlined in equations (1 to 6) can also be applied to full-range probability forecasts by substituting $r_{i,j}$ with $p_{i,j}$ and $c_{i,j}$ with e_i in the equations for dichotomous and non-dichotomous empirical probabilities e_i. This could provide an additional method to analyse the results. It can also be useful when analysing composite forecasts or the coherence (consistency) of probability assessments between participants.

Limitations of the study stem from its status as an exploratory examination piece. By attempting to examine the quality of expert judgment, this study illustrates the existence of overconfidence cognitive bias but provides minimal clarification of the mechanisms behind it. Future studies might well examine how to help AML risk experts calibrate their confidence judgements. Researchers must look beyond the specific effects observed in this study in future studies. Another area for possible consideration will the possible cognitive bias by judges in trial decisions. It will also be important to examine the ways in which cultural and gender differences influence risk discrimination and cognitive bias associated with money laundering risk indicators. The experimental design of our study is based on the experimental paradigm of Cantor et al. (2014), that calls for a common module that provides contextual information that is intended to be invariant across a variety of versions of the vignette. To date, its validity has not been proven in the AML risk assessment context, and thus the results of this study should be interpreted cautiously.

Another limitation is the lack of benchmarking of this study data and findings with similar studies on risk assessment in other domains. Existing research conducted by C-Rise; Memorial University is relevant to the current work. For example, Noroozi et al. (2013) estimated the risk of human error in engineering maintenance context using the success

likelihood index method. Therefore, a direction for future work might be to benchmark this study data with such research on human factors.

7.5 Concluding remarks

There have been relatively few studies examining the role humans plays in assessing money laundering risk, especially the quality of their risk assessment (Isa, et al., 2015). Though, there has been a lot of research attention on other job roles in banks, such as audit, that show that a variety of individual-level factors influence auditor judgment (an extensive review of the 20 years studies was documented by Solomon & Shields, 1995). This thesis used decision science and psychology related theory in developing the experimental vignette-based survey to examine the quality of AML risk assessment.

Along with the ongoing fascination with measuring the risk of money laundering in the academic world and the general media, my personal perception on AML risk assessments has changed. At first, it was thought that the risk-based approach to AML risk assessment would provide a solution. Nonetheless, as a result of interaction with experts, this study offers a more realistic perspective. The sheer variety of problems that AML experts face during AML risk assessment appears to present an impassable barrier to accurate risk judgment, according to contacts with AML experts. Practitioner feedback emphasized this gap between theory and practice very explicitly:

"I think we are all afraid of our legislation, you know, because this is what the legislation says. As soon as you know this person is born there, he is residing there, he should be high risk. We say that sometimes, it is a bit sad when we talk about it as a human […], but I would say maybe the rationale behind is because if a person is residing there and since it is high risk, you assume that institutions [in that location] do not have the proper AML safety control, so that is why they are on the list. […] I would say at the end of the day, I would not really have comfort, you know, even after having done a full review, I would not be sufficiently confident about the documents I have received […]. It is a bit difficult to explain because I do have clients from high-risk jurisdictions in […], maybe a client who is of Pakistani citizenship but is residing in the UK could change my way of seeing things because he would be high risk because of his Pakistani citizenship, and he is residing in the UK. Then maybe there could be some form of balance''. Respondent R6

Therefore, assessing money laundering risk is an arduous and complex decision-making process. AML risk assessment involves more than risk estimation but equally entails categorizing them and determining how they manifest themselves in suspicious transactions. In spite of the fact that suspicious transactions form the core of AML risk assessments, no universally accepted methodologies exist for describing their nature. Detections and classifications of money laundering risk result from predetermined established control mechanisms tailored to detected risk. For example, money laundering risk assessment involves filtering all available information to identify suspicious transactions or customers. A set of preventives and measuring pathways is evidently necessary to detect suspicious transactions because of the complexity of money laundering crimes. This study introduces a theoretical-based model (see Figure 3) as a suitable means to improve the understanding of the various pathway suspicion threshold judgment enumerated during AML risk assessment. Risk judgment is theorised in the model using a deduction-related construct comprising direct-evidence components (money laundering indicators) and circumstantial evidence components (suspicious context). Based on an analysis of the model's structure as it relates to risk judgment, this study found that AML experts tend to use risk-based principles more when estimating money laundering risks, resulting in less sensitivity to personal risk perceptions and decisions, and a lower likelihood of incorporating irrelevant information unrelated to regulatory and organizational framework labels during risk judgment. However, money laundering-related transactions are often indistinguishable from legitimate financial transactions, as money laundering crime does not come with convenient red flags. The decision process in risk assessment lacks clear operationalization, and experts often fine-tune their judgments in order to reflect their organizations' risk appetite, as reflected in FATF guidelines. Regardless of gender factors, experts were found to be biased toward prescriptive approaches when assessing money risk. The avoidance of sanctions and accountability-related issues has subtly guided experts to interpret risk based on regulatory interpretations. A feedback mechanism that is effective at alleviating biases, improving processes, and resultant judgment accuracy may be valuable to experts in this domain.

In future research, it may be beneficial to examine and test the relationships between the construct variables, which capture the underlying mediating strategy that fuels experts' risk

judgments. It is especially important to include this step in the development of knowledge on money laundering risks, since money laundering risk assessment allows countries and businesses to identify, assess, and understand their money laundering risks. After proper understanding of these risks has been achieved, countries and corporations can implement AML measures corresponding to the level of risk. Consequently, modelling the relationship between the construct variables could help researchers approach the phenomenon from the perspective that better reflects reality.

Another direction for future research is to explore opportunities provided by technology as a solution for AML risk assessment. Technology can facilitate the monitoring of money laundering activities by private entities and notification to public authorities (Lannoo & Parlour, 2021). Information technologies, such as Distributed Ledger Technology, can dramatically change the assessment and detection of money laundering (Sunyaev & Sunyaev, 2020). Distributed Ledger Technology is an innovation linked to the blockchain concept and has the principal advantage of data integrity and the potential to enhance data integration and intelligence sharing among AML stakeholders. With the distributed ledger, all customer background and identification information from multiple sources, including banks, retail shops, tax authorities, business ownership, investments, income from employment and judicial authorities, can be stored on one blockchain network so institutions can tap into it during the CDD process and to monitor transactions for the detection of possible instances of money laundering. As such, money laundering risk assessment and the idea of the distributed ledger technology's application could be a direction for future research.

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Appendix

Appendix 1

Money Laundering Technique	Cases	Narration
Bulk Cash Smuggling Cases	**Case** 1: United State of American (US-Treasury, 2018)	In September 2017, the sentencing of Mexican National who headed a large-scale marijuana trafficking and money laundering conspiracy organization took place in the southern district of Texas. A total of 10 other co-conspirators were also sent to prison. The organization were trading marijuana supplied from Mexico. Their duties included receiving marijuana shipments from Mexico for distribution using tractors trailers and their vehicles in the Dallas areas. They used couriers operating personal vehicles and tractors to deliver the drugs and sell them, then transport the money to Mexico. It was established that between October 2011 to May 2012, the niece to the organization head transported a total of $171,000 cash proceeds from the drug sales in four instances.
	Case 2: France (Raza et al., 2020).	The French police discovered an international money laundering organization that was specifically focused on cannabis sales and distribution in the Paris region of France in the early months of 2014. A Moroccan dealer who specialized in smuggling cannabis from Morocco to France and selling it on the streets of Paris was one of the

		groups. While an India national organizes the use of mules to collect the money from the sale of street drugs. This segregation of roles was carved to break the link between the drug supplier and sales proceeds collector, thereby attempting to demonstrate that the source of illicit cash in the custody of the India national resulted not from proceeds of criminal activities. The job description entailed the recruited mules receiving orders from the Moroccans to hand over the collated cash proceeds from the drug sales to the India national. Within six months, the India national arranged for the transportation of approximately €10million cash in drug proceeds by car from France to Belgium for the purchases of gold, with pre-generated false invoices registered in his company name. The India national usually deposited the bulky cash as payment for the gold into respective gold trader's bank accounts. The false invoices were necessary to support response to government authorities' questions during further transportation of the acquired gold to the destination of sales, which in this case was either Dubai or India. The relatives of the India national were regularly engaged for the transportation of the acquired gold from Belgium to Dubai or India. In order to pay the Moroccan drug dealers for the cannabis they supplied to France, the proceeds from the sale of the gold were then transferred via tightly controlled foreign exchange operations in Dubai.
	Case 3: Netherlands (Soudijn & Reuter, 2016)	Due to a report by the Netherlands' financial intelligence unit (FIU) about a bank's suspicious transactions, the police opened an inquiry in 2005. It turned out that a female employee, whose mother had just been released

		from prison in the Netherlands after serving 5 years for cocaine trafficking, had unlawfully changed smaller denominations into €500 bills for her boyfriend, a drug lord from Colombia, as well as for other Colombian customers. She split up the money into smaller amounts during her break to get around the reporting restrictions. Additionally, the subject had five of her co-workers at three other branch locations participate in her activities. Following the incident, the police found cocaine, cutting agents, and cash receipts. It was discovered following a phone tap, that a courier carrying a sizable sum of money was about to depart for Ecuador from Schiphol airport and this subsequently led to his arrest. Following the arrest, two house searches uncovered cash, cash notes, money-counting machines, and a firearm. A list and diary of 51 courier travel movements from 9 May to 13 August 2005 were included in the financial notes. The accounting records were written on five numbered sheets of paper, each with 31 lines, and they covered the inflow and outflow of funds from 21 July to 6 August 2005. Additionally, € 797,265 was discovered when a principal suspect's home was searched. The police also discovered an additional €1,808,000 at a second address. Additionally, at a different location, two suspected cocaine traffickers were detained, € 62,820 was seized, and a notebook (14 pages) listing the proceeds from cocaine trafficking, including the money given to the cash smuggling organization, was discovered. Drug administration data, including numbers, dates, and names, appeared in the coordinator's notebook as money received.

	Case 4: Nigeria (EFCC, 2012)	In an attempt to smuggle out US$7 million (roughly N2 point 1 billion), the Economic and Financial Crimes Commission (EFCC) detained a bulk currency smuggler in September 2012. The offender was detained while traveling to Dubai, at the Lagos' Murtala Mohammed International Airport (Nigeria). He claimed to have $4.15 million in cash on him, but a careful examination and search revealed that he actually had $7,049,444 on him. He reportedly confessed to being a courier employed by twenty people after further questioning by the law enforcement officer. Additional EFCC investigations revealed that the offender is a frequent traveller to Dubai and one of several individuals who deliver illegal cash believed to be criminal proceeds.
Structuring Cases	Case 5: USA (US-Treasury, 2018)	The US national money laundering risk assessment report for 2018 describes a money laundering crime operation by a Las Vegas man who used structured techniques to launder cash proceeds from marijuana and codeine sales. His mode of operation entailed distribution of illegal drugs from Nevada to other States using a false name. He opened bank accounts to receive payments from the recipient of his drug distribution and used the false name to get a driver's license, rent an apartment, get a car loan, and open several bank accounts. He received structured withdrawals and continued trading while avoiding the currency transaction reporting requirement. His distributors made structured payments totalling about $856,000 in drug proceeds into his account from other states.
	Case 6: Canada	In 1999, a Canadian national who was a formal customs official was charged with possession of proceeds of crime.

	(Schneider, 2004b)	The Canadian national stole the sum of US$1.6 million in cash (money that was seized by the Canadian Customs) and absconded with the funds. Investigation revealed that the Canadian national recruited his wife and others to open several accounts and subsequently made structured deposits into these accounts regularly. The Canadian national knew from his prior training as a custom official that any cash deposit over $10,000 may result in a currency transaction report, according to the investigation report. Hence, he and his accomplices deliberately structure the stolen amount through various deposits ranged from $1,600 to $2,700 into 44 bank and credit union accounts, into which a total of US$680,000 was successfully deposited.
	Case 7: USA (I. Benjamin, 2019)	In 2015, the conviction of a US-based medical practitioner on tax evasion and structuring was affirmed by the Eleventh Circuit Court of Appeals. The medical practitioner, as part of his procedure, subcontracted his payment billing processes to a management firm. In return, the firm received cheque payments from his patients and mailed them directly to him, who then cashed about twenty to fifty of these cheques every ten days. In his usual practice, the practitioner will always ensure that the cumulative cheque value cashed at any instant falls below $10,000. However, during the investigation of an unrelated crime which led to a search of the practitioner's apartment by law enforcement agents, US$24,000 physical cash was found in his custody. Further investigation also showed that he never cashed checks worth more than $10,000 in order to keep from

		being reported to the authorities and the IRS (Internal Revenue Service).
Virtual currencies Cases	North Korean (USHomeland-Security, 2020)	A virtual currency exchange in 2018 was hacked by North Korean accomplices (Yinyin and Jiadong), who stole virtual currency valued at close to US$250 million. In order to prevent law enforcement from tracing the funds, the money was then cleaned up through a large number of automated cryptocurrency transactions. The co-conspirators submitted altered photos and forged identification documents to get around the know-your-customer restrictions of several virtual currency exchanges. The North Korean government used some of this money that was obtained through money laundering to pay for the infrastructure needed for carrying out cyberattacks on the financial sector. More than US$100 million worth of virtual currency, mostly obtained through hacks of virtual currency exchanges, was laundered by Yinyin and Jiadong between December 2017 and April 2019. The defendants operated through separate accounts as well as accounts that were linked to their names. Although the defendants operated businesses in the US, they never registered with FinCEN. The co-conspirators are linked to the November 2019 theft of virtual currency worth about $48.55 million from a South Korean virtual currency exchange.
	USA (USHomeland-Security, 2020)	From December 2014 to November 2019, Mohammad (who was a former bank employee) owned and ran Herocoin, an illicit virtual currency money service company. He ran a business that included providing Bitcoin-cash exchange services, and for that he could charge commissions of up to 25%, which is a lot more

		than the going rate in the market. Mohammad advertised his business on the internet under the handle "Superman29" to buy and sell Bitcoin in Southern California for up to $25,000 in transactions. In typical transaction, he usually met clients in public places to conduct transactions. Even though Mohammad frequently knew the money belonged to criminal activity, he rarely asked the clients where they got their money from. During investigation, Mohammad only acknowledged knowing one Herocoin customer who was involved in illegal activity on the dark web. The network of Bitcoin ATM-style kiosks was later acquired by Mohammad, who then advertised it online. The kiosks were located in malls, gas stations, and convenience stores in the counties of Los Angeles, Orange, Riverside, and San Bernardino. Customers could use cash to buy Bitcoin, an online cryptocurrency, from these kiosks, or sell Bitcoin for on-site cash. Mohammad processed the cryptocurrency that was put into the machines, provided the cash that users would withdraw, and kept the server software that ran the machines in working order. He was able to keep track of and identify each transaction that took place on the machines. Mohammad purposely neglected to register his business with the U.S. government throughout the time that the Herocoin business was in operation. The Financial Crimes Enforcement Network (FinCEN) of the Treasury Department. Mohammad acknowledged that he was required to create and maintain an effective anti-money laundering program, file currency transaction reports for exchanges of more than $10,000 in local currency,

		perform due diligence on clients, and file suspicious activity reports for transactions over $2,000 involving clients he had grounds to believe were engaged in illegal activity—but he chose not to. Mohammad further acknowledged that he did not have a program in place for his network of Bitcoin ATMs that would have allowed him to ask customers conducting multiple transactions up to $3,000 for identification or confirm that the person listed on any provided identification was the one making the transaction. Mohammad registered his company after FinCEN contacted him in July 2018 regarding the requirement, but he continued to flout federal law pertaining to money laundering, performing due diligence, and disclosing suspicious customers. Law enforcement conducted numerous transactions with Mohammad throughout the course of its investigation, including three consecutive purchases of Bitcoin totaling $14,500 by the same undercover agent from an ATM kiosk in Lakewood on September 12, 2018, for which Mohammad failed to submit the necessary currency transaction report. According to the plea agreement, Mohammad also engaged in numerous in-person transactions from February 2019 to August 2019 with undercover agents who claimed to work at a "karaoke bar" that employed Korean women who amused men in a variety of ways, including by engaging in sexual activity. He met with an agent on August 28, 2019, and traded 1.58592 Bitcoin for $16,000 in cash that the agent claimed was the result of criminal activity. For these transactions, Mohammad never reported any suspicious activity or currency transactions. Mohammad

		acknowledged that he exchanged between US$15 million and US$25 million through both in-person exchanges and transactions that took place at his Bitcoin kiosks.
Misuse of legal entities (Shell companies) Cases	Kenya (Van der Does de Willebois, Halter, Harrison, Park, & Sharman, 2011)	Kenya's government issued an invitation for bids in 2002 to change its passport production systems. The Kenyan government signed a contract with Anglo-Leasing and Finance Ltd (an unidentified Shell company registered in the United Kingdom), for €31.89 million, five times the amount of the French company's bid of €6 million. Even though Anglo-Leasing had suggested giving the French company the actual work, the Kenyan government still made its choice. Whistle-blower information that was leaked to the press implied that dishonest senior politicians intended to steal the deal's excess funds. But when it became impossible to determine who controlled Anglo-Leasing, efforts to investigate these allegations were frustrated.
	USA (Van der Does de Willebois et al., 2011)	Accusations relating to a Foreign Corrupt Practices Act (FCPA) investigation in the U.S. were resolved against Daimler AG and three of its subsidiaries in March 2010. DaimlerChrysler Automotive Russia SAO (DCAR), now known as Mercedes-Benz Russia SAO, a Russia subsidiary of Daimler AG, entered a partial guilty plea to one count of conspiring to bribe foreign officials and one count of bribery of foreign officials. DCAR and DAIMLER made over €3 million [US$4,057,500] in improper payments to Russia government officials employed at their Russia governmental customers, their designees, or third-party shell companies that provided no legitimate services to DAIMLER or DCAR with the understanding that the funds would be passed on, in whole or in part, to Russia

		government officials," Daimler AG stated. The declaration of facts details 25 sets of inappropriate payments, including cash transfers and payments to accounts held in Latvia, Switzerland, the United States, and unspecified countries. Some of the 27 companies involved were named on the accounts (16 named and 11 unnamed), and they had addresses or were registered in the United Kingdom, Costa Rica, Seychelles, Ireland, Bahamas, Cyprus, and the United States.
Complicit Professionals cases	Canada (Schneider, 2004b)	Schneider (2004b) analysis of money laundering cases describes a money laundering crime operation by a New York-based drug trafficker, who used revenue derived from drug sales to purchase properties through the help of complicit professionals. His mode of operation entailed smuggling of cash generated from drug sales (usually in American currency) in United States to Canada using his brother. Following the delivery of the currencies in Canada, the cash is handed over to other family members of the drug trafficker for onward usage to purchase properties using their respective real estate lawyers, who in turn act as the family member's agent in the real estate transaction. It was established that between May 1992 to September 1995, one of the family members, real estate lawyer received a total of US$188,503.11 for the purchase of properties on behalf of the drug trafficker family member.
	Canada (Schneider, 2004b)	Police investigation report on the activities of a Quebec liquor smuggler who invested the revenue generated from the smuggled liquor sales in housing development through the help of complicit lawyers. Law enforcement agencies identified three attorneys who facilitated the

		Quebec smuggler to create and operates investment shell corporations used as vehicles for laundering proceeds derived from smuggled liquor sales. Their jobs entailed receiving funds from the Quebec smuggler to set up companies often used to front for investment in the housing development sector. The lawyers operate the various setup companies bank accounts and initiate transaction relating to the companies share structures and bank lending. Record evidence apprehended by law enforcement agencies during a search of one of the attorney's office pieces of evidence that approximately US$245,000 were received from the Quebec smuggler for investment purposes.
	Canada (Schneider, 2004b)	Schneider (2004b) analysis of money laundering cases describes a money laundering crime operation by an Alberta-based drug trafficker, who used revenue derived from drug sales to purchase properties through the help of a complicit professional. The job description of the complicit professional who in this case turns out to be a lawyer includes accepting cash from the Alberta trafficker and then helps to deposit these funds in trust for the Alberta trafficker client, using names of created shell companies with the client names as one of the directors. After a few days, the fund will subsequently be withdrawn and used for the purchased of real estate and car assets. It was determined that between August 1999 and October 2000, the lawyer deposited $265,500 in cash on behalf of the Alberta drug dealer in trust, as well as another $118,000 on behalf of a company the client had set up.

	Russia and Canada (Schneider, 2020)	In 2007, a businessman from the UK reported that a Russian organized crime syndicate group had stolen the credentials for his company. The syndicate group used the stolen company credentials to fraudulent obtain US$227-million tax refund from the Russia government and quickly distributed these funds to different beneficiaries in various jurisdictions outside Russia. According to the case report, funds left Russia through bank transfers to several beneficiaries via Cyprus and Lithuanian banks acting as intermediaries. In accounts with major banks, including Royal Bank, CIBC, and TD Bank, about twenty Canadian citizens and businesses received money. One of the Canadian beneficiaries of this illicit fund was a construction company based in Alberta but with a corporate address registered in Moscow. The company received $144,371 from Cyprus in 2011 just two months after it was created and was subsequently closed two years after operations. The Calgary lawyer who registered the Construction company confirmed he closed the company on instruction from his client in Cyprus but failed to disclose the identity of the client.
Trade-based money laundering cases	Venezuela (ICIJ)	The subject is a Venezuela construction mogul and the ruler of a well-known wealthy family. The subject keeps a lower profile than other members of Venezuela's business elite. But the subject is believed to have benefited from close ties to previous governments because the subject family companies have won major government contracts for public works in Venezuela. At one time, the subject was investigated for suspected corruption by Venezuela's government on an allegation that the subject helped divert US$500 million from state-

		owned companies through collaboration in the improper sale of public assets. The investigations were later dropped. According to a report, the subject set up a London-registered ABC company, using Swiss national lawyers as nominee shareholders to conceal the subject family's ownership. ABC limited was paid more than US$146 million by Venezuela government agencies to implement some construction projects, but some of these funds were transferred to offshore companies and bank accounts belonging to family members of the subject.
	Iran and Turkey (ICIJ)	The subject is an Iranian-Turkish trader, who, in 2017, pleaded guilty in a U.S. federal court of helping Iran evade sanctions. According to prosecutors, the subject bribed officials of a State-owned bank to allow Iran to use proceeds from oil and gas sales to buy gold. As part of the subject elaborate scheme, the subject facilitated billions of U.S. dollars in gold purchases from the currency exchange company ABC limited and other Turkish sellers, according to court records. The subject's employees usually smuggled the gold in suitcases from Turkey to Dubai, where it was sold, according to the report. The proceeds from the gold sales were then used by Iran to make international payments, including in dollars via the U.S. financial system, which was a violation of U.S. sanctions laws. Three months after the subject was arrested, one of the banks the subject had accounts with DEF bank limited filed suspicious activity reports relating to some transaction in the customer accounts operations. DEF bank limited noted that US$133 million worth of transactions made by the subject had ties with entities

		linked to a multi-jurisdictional investigation of money laundering and other offences
	Ukraine (ICIJ)	The subject is a well-known business mogul and as a leading adviser to a Ukrainian PEP. Among the subject's most prominent ventures were the subject family's energy group, ABC energy limited, which received hundreds of millions of dollars in loans from Ukrainian state banks that it never repaid. In 2017, DEF bank flagged $230 million moved by the subject's U.K.-based company, XYZ limited, over five years (2010-2015). XYZ limited funnelled secret payments for political consulting to Mr Cafe, a friend to U.S. PEP, according to the investigation report. Mr Cafe was convicted of tax and bank fraud in 2018. Some of the transfers to Mr cafe-related shell companies appeared disguised as payments for computer hardware.

Appendix 2

S/N	LIST OF LINKEDIN AML PROFESSIONAL'S ASSOCIATION
1	ABA International: International Anti-Money Laundering
2	ACAMS UK Chapter
3	AML - Anti Money Laundering Group
4	AML & KYC Leaders
5	AML and MLRO Executives
6	Anti-Money Laundering & Financial Crime Risk Management Network
7	Anti-Money Laundering Experts
8	Anti-Money Laundering Specialists
9	Association of Compliance Professionals
10	Counter-Fraud, AML & Financial Crime
11	Financial Risk Management Network
12	Financial Services Regulation
13	Fraud Intelligence
14	Fraud Prevention Specialists
15	Governance, Risk and Compliance Management (GRC)
16	International Compliance Association Network and Study Group
17	Money Laundering Bulletin

18	Money Laundering Reporting Officers Group - MLRO / MLCO
19	OFAC Compliance
20	Payment, Fraud & Crypto Professionals
21	Risk, Regulation & Reporting
22	Finance & Banking, Fintech, Regtech professional
23	KYC360

Appendix 3

AML professionals' country of work-Opinion Poll			
S/N	Country Name	Frequency	Percent
1	Afghanistan	1	0.1
2	Albania	1	0.1
3	Algeria	2	0.1
4	Andorra	1	0.1
5	Argentina	1	0.1
6	Aruba	1	0.1
7	Australia	34	2.3
8	Austria	3	0.2
9	Bahamas	3	0.2
10	Bahrain	7	0.5
11	Bangladesh	1	0.1
12	Belgium	5	0.3
13	Bosnia and Herzegovina	1	0.1
14	Botswana	4	0.3
15	Brazil	9	0.6
16	Brunei	1	0.1
17	Bulgaria	5	0.3
18	Canada	43	2.9
19	Cayman Islands	3	0.2
20	Colombia	8	0.5
21	Costa Rica	2	0.1
22	Curaçao	1	0.1
23	Cyprus	4	0.3
24	Czech Republic	2	0.1
25	Denmark	7	0.5
26	Djibouti	1	0.1

27	Dominican Republic	1	0.1
28	Ecuador	1	0.1
29	Egypt	2	0.1
30	El Salvador	1	0.1
31	Estonia	8	0.5
32	Finland	2	0.1
33	France	23	1.5
34	Germany	21	1.4
35	Ghana	5	0.3
36	Gibraltar	1	0.1
37	Greece	7	0.5
38	Guatemala	1	0.1
39	Guernsey	2	0.1
40	Guyana	1	0.1
41	Honduras	1	0.1
42	Hong Kong	11	0.7
43	Hungary	5	0.3
44	India	300	20.0
45	Indonesia	17	1.1
46	Ireland	27	1.8
47	Isle of Man	9	0.6
48	Israel	3	0.2
49	Italy	11	0.7
50	Jamaica	4	0.3
51	Jersey	1	0.1
52	Kenya	9	0.6
53	Kosovo	3	0.2
54	Latvia	6	0.4
55	Lebanon	4	0.3
56	Liberia	1	0.1
57	Lithuania	7	0.5
58	Luxembourg	14	0.9
59	Malaysia	35	2.3
60	Mali	1	0.1
61	Malta	4	0.3
62	Mauritius	11	0.7
63	Mexico	18	1.2

64	Montenegro	1	0.1
65	Morocco	2	0.1
66	Nepal	1	0.1
67	Netherlands	24	1.6
68	New Zealand	5	0.3
69	Nigeria	11	0.7
70	Norway	3	0.2
71	Oman	1	0.1
72	Pakistan	24	1.6
73	Philippines	16	1.1
74	Poland	33	2.2
75	Portugal	10	0.7
76	Puerto Rico	5	0.3
77	Qatar	5	0.3
78	Republic of North Macedonia	2	0.1
79	Romania	3	0.2
80	Russia	2	0.1
81	Saint Kitts and Nevis	1	0.1
82	Saint Lucia	2	0.1
83	Saudi Arabia	10	0.7
84	Singapore	43	2.9
85	Slovakia	3	0.2
86	Slovenia	1	0.1
87	Somalia	1	0.1
88	South Africa	27	1.8
89	South Korea	1	0.1
90	Spain	8	0.5
91	Sri Lanka	6	0.4
92	Sweden	8	0.5
93	Switzerland	12	0.8
94	Syria	1	0.1
95	Thailand	3	0.2
96	The Gambia	1	0.1
97	Trinidad and Tobago	3	0.2
98	Tunisia	3	0.2
99	Turkey	11	0.7

100	Turks and Caicos Islands	1	0.1
101	Uganda	1	0.1
102	Ukraine	4	0.3
103	United Arab Emirates	45	3.0
104	United Kingdom	232	15.5
105	United States	182	12.2
106	Venezuela	1	0.1
107	Vietnam	3	0.2
108	Yemen	1	0.1
109	Zimbabwe	5	0.3
	Total	1497	100.0

Appendix 4

Vignettes participants country of origin			
S/N	Country Name	Frequency	Percent
1	Nigeria	98	63.2
2	UK	36	23.2
3	USA	4	2.6
4	India	7	4.5
5	Singapore	1	0.6
6	Cyprus	1	0.6
7	Italy	1	0.6
8	Malta	1	0.6
9	Portugal	1	0.6
10	UAE	2	1.3
11	Russia	1	0.6
12	Ghana	1	0.6
13	Pakistan	1	0.6
	Total	155	100