

**Sector-wide ML/FT Risks Exposure Assessment:
A semi-quantitative approach to a, mostly, qualitative risk**

Daniel Brusso¹

SBS – Department of Operational Risk Supervision

Farida Paredes²

SBS – Department of ML/FT Risk Supervision

Abstract

The supervision of Money Laundering and the Financing of Terrorism (ML/FT) risks is a complex task that requires a precise allocation of efforts and resources, given that these are always restricted. Therefore, it is necessary to have a solid risk-based supervision framework that enables the identification of the supervised entities that signify a greater ML/FT risk exposure for the systems in which they operate, as well as the circumstances that underlay that risk. The Superintendence of Banking, Insurance and AFPs of Peru (SBS) supervises a wide range of entities, not only banks and other credit institutions, but also trustees, funds transfer companies, electronic money issuers, insurance companies, pension administrators, among others. For that reason, the SBS has developed a methodology that measures the ML/TF risk exposure of each supervised sector, starting by measuring three ML/FT risk factors: (i) Geographical areas, (ii) Products, and (iii) Customers; components from which the total exposure of each entity can be estimated, which are then aggregated to identify the riskiest sectors. This methodology has allowed the SBS to focus its efforts under a top-to-bottom approach, starting with the riskiest sectors, passing through the entities with the highest exposure, and finally, evaluating its riskiest products, the riskiest area in which it operates, or the characteristics of the customers they serve.

Keywords: AML Supervision, ML/FT Risks, Sector-wide risk assessment, Supervision Methodology

¹ Operational Risk Supervisor at the Superintendency of Banks, Insurance and Private Pension Funds Managers of Peru – Bachelor on Business Administration, Master degree on Banking and Financial Regulation – University of Navarra
dbrusso@sbs.gob.pe

² Chief of ML/FT Risks Department at Superintendency of Banks, Insurance and Private Pension Funds Managers of Peru – Public Accountant and Bachelor's in law, M.B.A. at Mondragon University, Ph.D. Candidate on Culture and Governance in Organizations – University of Navarra
fparedes@sbs.gob.pe

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Acronyms

DSRLAFT	ML/FT Risks Supervision Department (SBS – Peru)
EDD	Enhanced Due Diligence
FI	Financial institution
FIU	Financial Intelligence Unit of Peru
ISOC	Semi-annual Compliance Officer's Report
ML/FT	Money Laundering and Financing of Terrorism
PEP	Politically Exposed Person
RBA	Risk-based approach
SAR	Suspicious Activity Report
SBS	Superintendency of Banks, Insurance and Pension Funds

I. Introduction

By 2010 the Money Laundering and Financing of Terrorism Risks Supervision Department (DSRLAFT) had been created by the Superintendency of Banks, Insurance and Private Pension Funds Administrators of Peru (SBS) as a department in the Deputy Risks Superintendency. Since its founding, the team ahead of the project sought to develop a model that took into consideration the risk-based approach (RBA), which, at the time, was already implemented for other risks supervised by the Peruvian financial regulator and supervisor, such as credit, liquidity, market, and operational risks.

During that year, the DSRLAFT team started to seek for similar implement models to comply with FATF Recommendations, but that could be consistent with Basel Core Principles for Banking Supervision. Using the taxonomy made by the Operational Risk data Exchange Association (ORX) and the Accounting Manual for Financial, Insurance and Private Pension Funds issued by SBS, we developed a questionnaire for each supervised sector which covered: the impact, the risk perception, SARs related statistics, for the three ML/FT risks factors: Geographical Areas, Products, and Costumers. The first launched questionnaire was designed for the financial sector (banks, finance entities and micro finance entities), and it represented a challenge not only for the SBS, but also for the institutions, since it was the first time they have to obtain data related to ML/FT risks factors, furthermore, they had to change the way they thought how the AML/CFT systems had to be implemented, as it was always viewed from a legal approach. It took almost half a year for the DSRLAFT to validate the information provided by FIs and a similar time to finish the first ML/FT Risks Exposure Report and share its results with other supervisors at SBS, FIU and the FIs.

When FATF published the amended version of the first 40 + 9 Recommendations to have a unique framework for preventing ML/ FT, it was recognized that a new approach should be apply in order to prevent criminals from misusing the FIs, and that the RBA could help them to understand better these criminal phenomena inside the financial system and provide a common and known framework and methodology for them. Not long after that, the Basel Committee for Banking Supervision and the International Association of Insurance Supervisors also modified their core principles to introduce the RBA into the AML related principles.

These changes helped FIs and DSRLAFT to improve the first versions of the questionnaires and the methodologies developed in order to acquire better information about risks exposures and finally, improve the AML system itself. The way ML/FT was seen by the FIs also changed, going from a legal approach to the RBA used in other areas of the FIs, demanded different tools, procedures, and profiles of the AML teams inside the FIs. For the SBS, it was also necessary to develop new regulations that defined ML/FT Risks, its difference to operational and legal risk, risks factors and

the requirement of developing and implementing methodologies to assess these risks in order to prevent FIs being misused by criminals.

After 11 years of the first questionnaires and methodologies, DSRLAFT has developed a new and robust methodology that seeks to assess the exposure of FIs, to implement the RBA in the supervision and regulatory process; and, by sharing the results with authorities and FIs, help the financial system to improve their tools and other components of the AML system. Furthermore, we aim to comply with FATF's Recommendation 1, by identifying, assessing, and understanding the ML/FT risks.

Since the trends and typologies used by criminals evolve each year, we are aware that reviewing the methodology is a continuous process, and we hope we could improve it in near future using data science tools.

II. Data

Probably the most relevant factor when developing a risk methodology is data availability, and not just any data, but reliable data. For that reason, this section will describe the type of data that is requested to institutions and how it is obtained.

Required data

In Peru, the competent authority that oversees compliance with the provisions on ML/FT risk prevention by banks is the Superintendence of Banks, Insurance and Pension Fund Administrators (SBS). The specialized department that exercises such supervision is the DSRLAFT.

One of the most important tools available to the DSRLAFT for conducting off-site supervision, and through which information related to the ML/FT risk factors of the supervised entities is obtained, is the system called the "Biannual Report of the Compliance Officer" (ISOC, by its acronym in Spanish), which is filled out by the entities on the SBS's extranet. The ISOC is the primary source of information for supervisory actions.

The SBS defines the content of the ISOC, which provides information about the exposure and management of ML/FT risks. For example, the bank is requested to attach all its internal ML/FT risk management policies, report the statistics of unusual and suspicious activities reported to the Financial Intelligence Unit (FIU) of Peru, and complete statistical reports of its presence in the geographical areas of the country, the types of products it offers and the characteristics of its customers.

Within the ISOC, there are three templates that institutions must complete (Excel files). The first one is related to the institution's correspondent banking relationships. The second one is related to

the entry of cash in foreign currency (mainly US dollars) through the institution's channels. And finally, the third one, which is divided into three sections, requires entities to report information related to each of the regulatory ML/FT risk factors: Geographical Areas, Products and Customers³. The methodology presented in this paper uses the data provided in the latter. Said template has an annual periodicity and is divided as follows:

1. The **geographical areas**⁴ in which they operate. The main criteria to fill this part of the template is to consider the area where the customer is located, as it is, most likely, the area where they conduct their economic activities; thus, the place where the ML/FT risks arise⁵. Regarding each geographical area, the institutions must disclose the following data (**See Annex 1a**):
 - a. The institution's **risk assessment of each area** where they operate (From 1 to 5, being 5 the highest level of risk). Institutions are mandated to assess the risks they are exposed by each of the three risk factors; that means that they have an appreciation – not only an educated guess or expert judgement – of the riskiness of each area, product, or customer's characteristics; thus, they are required to grade them in a scale from 1 to 5.
 - b. **Number of customers in the area**. The customers that reside in the reported area; considering those who, at the end of the year, have at least S/ 1 (Peruvian soles) on a deposit or a loan, or have used a service at least once over the year.
 - c. How many of those **customers are subject to Enhanced Due Diligence (EDD)**⁶.
 - d. **Transactional volumes**:
 - i. By passive products (Deposits). All deposits held at the end of the year.
 - ii. By active products (Loans). All outstanding loans at the end of the year.

³ According to article 4° of the Peruvian ML/FT risk management regulation. (Resolución SBS N° 2660-2015).

⁴ Peru is divided into 25 regions. The template also considers "Abroad" as an extra geographical area, for customers whose residence is registered outside the country.

⁵ At some point, we considered using the "location where the operations take place", namely, the agency/office; however, nowadays most transactions are conducted online, so they cannot be allocated to a specific location. Furthermore, we had to consider that a significant number of customers (legal persons) conduct their transactions in Lima, the country's capital, however, they conduct their economic activities elsewhere, which would lead to an overestimation of said region. Now, since all customers must disclose where they reside, it is easier to allocate them in the region they declare when conducting the customer's due diligence.

⁶ Peruvian regulation stipulates that EDD must be applied mandatorily to the following customers: (a) non-residents, (b) not domiciled legal persons, (c) trusts, (d) NGOs, (e) PEPs, (f) PEP's relatives, (g) companies where PEPs are shareholders, (h) shareholders or partners of those companies, (i) customers that receive transfers from high ML/FT risks jurisdictions, (j) persons publicly known to be under investigation for ML/FT related crimes, (k) customers related to those persons, (l) companies that provide correspondent services in countries with low or null taxation, or that are not subject to banking regulation or supervision, and (m) other assumptions established by the institution.

Regarding literal (m), institutions are mandated to apply EDD to customers identified, by them, as high-risk. Usually, this condition is the main source of EDD customers. Institutions classify customers as high risk per other regulatory mandates, for example, through the customer's ML/FT risk scoring, the customers' segmentation, or the monitoring of the customer's transactional activity.

- iii. By other services (Transfers, currency exchange, etc.). The sum of all services provided throughout the reporting period (one year).
 - e. **Number of Suspicious Activity Reports** (SARs) reported to the FIU in the area. Considering only the SARs issued in the reporting period.
 - f. **Amount of money reported in those SARs.** The sum of all the money reported in the SARs in the reporting period.
 - g. Number of **agencies/offices** in the area.
 - h. Number of **complementary channels.** These are the channels other than agencies, namely, correspondents and basic operation's establishments; ATMs excluded.
- 2. The financial **products** they offer to their customers. For the purpose of standardizing the reporting, we use a product taxonomy based on the "Operational Risk Reporting Standards" made by the ORX Association, which classifies products by business lines. This taxonomy takes into account the particularities of the Peruvian's financial sector and regulation (We exclude products that institutions are not allowed to offer, for example, investment products that are exclusive to the capital market's institutions. And include products specific to our regulation, like e-money). Overall, the taxonomy comprises around 140 products for financial institutions. It is important to note that this section of the template is different for insurance companies which has 56 products, and for pension fund administrators which has just 3 products. Regarding each product, the institutions must disclose the following data (**See Annex 1b**):
 - a. The institution's risk assessment of each product they offer (From 1 to 5).
 - b. Number of customers for each product.
 - c. How many of those customers are subject to EDD.
 - d. Transactional volume for each product.
 - e. Number of SARs related to that product.
 - f. Amount of money reported in the SARs.
- 3. The characteristics of the **customers** they serve. First, we ask for the overall number of customers in EDD, General DD or Simplified DD, then we ask for the number of customers are (1) Politically Exposed People (PEP), (2) Trusts, (3) NGOs, (4) nationals or foreign customers, and (5) natural or legal persons. For the legal persons, we ask for their main (6) economic activity, using the ISIC standard. Customers are aggregated in those categories (they may share more than one of those characteristics). Regarding each customer characteristic, the institutions must disclose the following data (**See Annex 1c**):
 - a. The institution's risk assessment of each customer's (From 1 to 5).
 - b. How many of those customers are subject to EDD.
 - c. Transactional volume:

- i. By passive products (Deposits)
- ii. By active products (Loans)
- iii. By other services (Transfers, currency exchange, etc.)
- d. Number of Suspicious Activity Reports (SAR) reported for those customers.
- e. Amount of money reported in the SARs
- f. Criteria from (a) to (e) aggregated by economic activity.

Data consistency

To ensure data consistency, the templates have been programmed to validate certain information and to alert when some data does not add up. Institutions are asked to submit the template only if there are no inconsistencies. For example, we use the following validations:

- The total number of customers should be equal across the “Geographical Areas” and “Customer” sheets (We do not consider the “Products” sheet as one customer may have more than one product).
- The total number of EDD customers (Except on the “Products” sheet), transactional volume, number of SARs and amount of money reported in the SARs should be equal across all sheets.
- For every geographical area, product, or customer’s characteristic the number of clients should be higher or equal to the number of EDD clients.
- For every geographical area, product, or customer’s characteristic, if they have at least one customer, information regarding the risk assessment and transactional volume should be reported.

For further validation, the information submitted in the templates is contrasted with the financial statements which are reported through an electronic channel named “SUCAVE”; all products have a correlation with the SBS’s Accounting Manual, so the transactional volumes should match; furthermore, information relate to the SARs is reported in the ISOC (number and amount), which is also contrasted with the templates. As mentioned before, the data is gathered using Excel templates, though it is not the best alternative, we have made sure to stablish controls for data consistency.

Institutions are also instructed to only submit transactions made by the clients and not those where the institution itself is the beneficiary.

Other data considerations

Here, it is important that we address a significant limitation when using the data we have at hand, mostly, the Suspicious Activities Reports (SARs) as an indicator of ML/FT risks.

There is a duality when dealing with SARs, if an entity reports a high number of SARs, it could mean two different, and sometimes opposite, things: (1) the institution is highly exposed to ML/FT

risks and therefore it attracts a significant number of money-launderers, or (2) the entity is extremely efficient in detecting suspicious activities – while other institutions may not be.

In that sense, institutions may feel that they are being punished by over-reporting, as they would appear to be high-risk, when in fact, they should be encouraged to report suspicious activities – as long as they ensure the quality of said SARs (this means, not reporting just because, but those SARs to be well supported by relevant information).

III. Methodology

Before diving into the methodology, it is important to explain the terminology that we will be using:

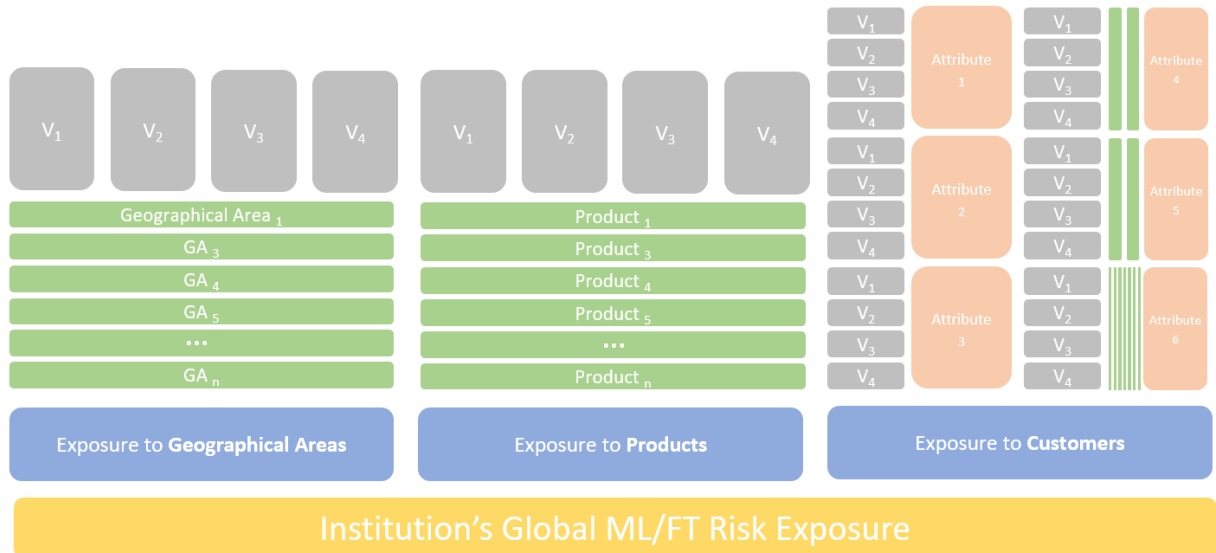
- **Variable:** one the four measures that, taken together and depending on their weight, determine the risk level of a component.
- **Component:** one of several parts that compose a risk factor; meaning, every geographical area, every product and every customer's characteristic.
- **Attribute:** a group of components specific to the Customer's factor⁷.
- **Factor:** one of the three risk factors (Geographical Area, Products and Customers) that compose the overall risk exposure of an institution.
- **Risk level:** how risky, in a scale from 1 to 5, a component, attribute, factor and institution are. The component's risk level is measured by the applicable variables. The attribute's risk level is measured by the applicable customer's components. The factor's risk level is measured by an aggregation of its components, or attributes in the case of the Customer's factor. The institution's risk level is measured by an aggregation of its three risk factors.
- **Sector:** the group of institutions under a specific type of license (e.g banks, insurance companies, rural saving banks).

This methodology serves two purposes, the first one is to obtain the ML/FT risk exposure level of a certain sector, as well as the risk exposure of each assessed institution in the context of said sector – information that, as it will be explained later in the paper, is used to prioritize supervisory actions in the higher risk institutions. And second, identify the drivers that generate those levels of risk in each institution – namely, which factors are riskier and which components, in turn, generate that risk, so that supervision efforts may be focused on those.

⁷ While the Geographical Area and Products factors are measured as: first the variables, then components, and then the factor; the Costumers factor is measured as: first the variables, then components, then attributes and finally the factor.

The following illustration summarizes the part of the methodology that is used to estimate one institution’s global ML/FT risk exposure – though, as will be explained later, the same process is applied when estimating the sector’s exposure.

Illustration 1: Methodology



In this section we will explain, step-by-step, how the institutions’ risk levels are obtained (First to Fifth steps); and how those results are then aggregated to obtain the overall risk exposure of the sector (Sixth step).

3.1. First Step: Calculate the four variables for each component

As seen in the data gathering templates (**Annexes 1a, 1b and 1c**), institutions report specific information regarding each component of the three risk factors. This information reflects the riskiness of each geographical area, product, and customer’s characteristic, which is measured by four variables. The variables can be regarded as the “building blocks” of the methodology, as they are the basis for all the following steps, and they are calculated for every single component.

V₁: Estimation of the component’s risk level

Description	Weighted average of (i) the risk appreciation by the Institution’s Compliance Officer and (ii) the risk level previously determined by the DSRLAFT ⁸ , of each geographical area, product, or customer’s characteristic.
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⁸ As mentioned before, the DSRLAFT is the specialized AML supervision team. This department has developed a couple other methodologies for assessing ML/FT risks, which outputs are used in this particular methodology.

One methodology assesses the risk of every geographical area using criteria like: reported cases of corruption, coca leave plantations, illegal mining, crime rates, informal economy, among others (around 15 variables). Another methodology assesses the risk of every financial product by its intrinsic characteristics, for example: cash convertibility, delivery channels, used currency (Peru is highly dollarized economy), among others (around 10 variables). As explained above, the outputs of those assessments

	The Compliance Officer reports, given its own risk assessment, the risk level of the corresponding component (in the context of the institution ⁹) in a scale from 1 to 5, being 1 “low risk” and 5 “very high risk” ¹⁰ .
Formula	$X_1 = \text{Institution's risk assessment of the component}$ $X_2 = \text{DSRLAFT's risk assessment of the component}$ $V_1 = 65\% \times \max \{X_1, X_2\} + 35\% \times \min \{X_1, X_2\}$

V₂: Ratio of the amount of money reported in the SARs in relation to the transactional volume

Description	Ratio of the amount of money reported in the SARs related to a specific component divided by that component’s transactional volume (In the case of the Geographical areas and Customers factors, the transactional volume is the sum of the passive products, active products, and other services).
Formula	$\frac{\text{Amount of money reported in the SARs for each component}}{\text{Component's transactional volume}}$

V₃: Ratio of the number of SARs in relation to total costumers

Description	Ratio of the number of reported SARs related to a specific component divided by the number of customers in that component.
Formula	$\frac{\text{Number of reported SARs for each component}}{\text{Number of customers in the component}}$

V₄: Ratio of the customers subject to EDD in relation to total customers

Description	Ratio of the number of customers subject to enhanced due diligence related to a specific component divided by the customers in that component.
Formula	$\frac{\text{Number of customers subject to EDD for each component}}{\text{Number of customers in the component}}$

3.2. Second Step: Calculate the sector’s quintiles for each component’s variables and assign them a risk level

In the previous step, we have calculated the four variables for each component of each institution in the sector we are assessing. As an example, the banking sector in Peru has 18

are aggregated with the institution’s own risk assessment. This way, the SBS does not impose a single “answer” for the risk level of a component, since the exposure of each entity may vary; thus, even if the intrinsic characteristics of a component are the same for two institutions, the risk in which each one concurs is different.

⁹ This means that the component is assessed by the risk it implies for the institution

¹⁰ It is worth noticing that the regulation does not state a particular way to assess ML/FT risk, which also means that Institutions do not necessarily have 1-to-5 risk scale.

institutions; if we are to assess the components of the Geographical Area factor, which is composed of 26 areas, then we would have calculated 1,872 variables (under the assumption that all the banks have at least one customer in those areas, and each area has at least one SAR related to them and one customer in EDD). This is replicated for the other two factors.

After this process, the results are grouped across each variable of all components of a factor (**See Illustration 2**). In the case of V_1 , its value will always fluctuate between 1 and 5, given the way it is calculated; however, V_2 , V_3 and V_4 are ratios whose values will always be less than 1; considering that ML/TF activities are exceptional cases in any financial institution and, therefore, do not comprise a high concentration of transactions, the values of the ratios will be quite small, especially for V_2 and V_3 .

Given that these values can be highly variable between institutions and sectors, it was not considered convenient to establish fixed ranges to determine if a variable is high-risk; for this reason, the level of risk is estimated relatively to its position in the sector, for which quintiles are used. Except for V_1 , whose value approximates the nearest integer from 1 to 5; the other variables will obtain their risk level according to the quintile in which they fall.

The quintiles are formed as follows: (i) the values of all the variables of the components of a factor in each entity of the sector are calculated, (ii) the values of said variables are ordered from highest to lowest – values equal to zero are omitted, (iii) five groups are formed, each one made up of 20% of the values, the first quintile being the bottom 20% and the fifth quintile the top 20%, that is, the most risky.¹¹

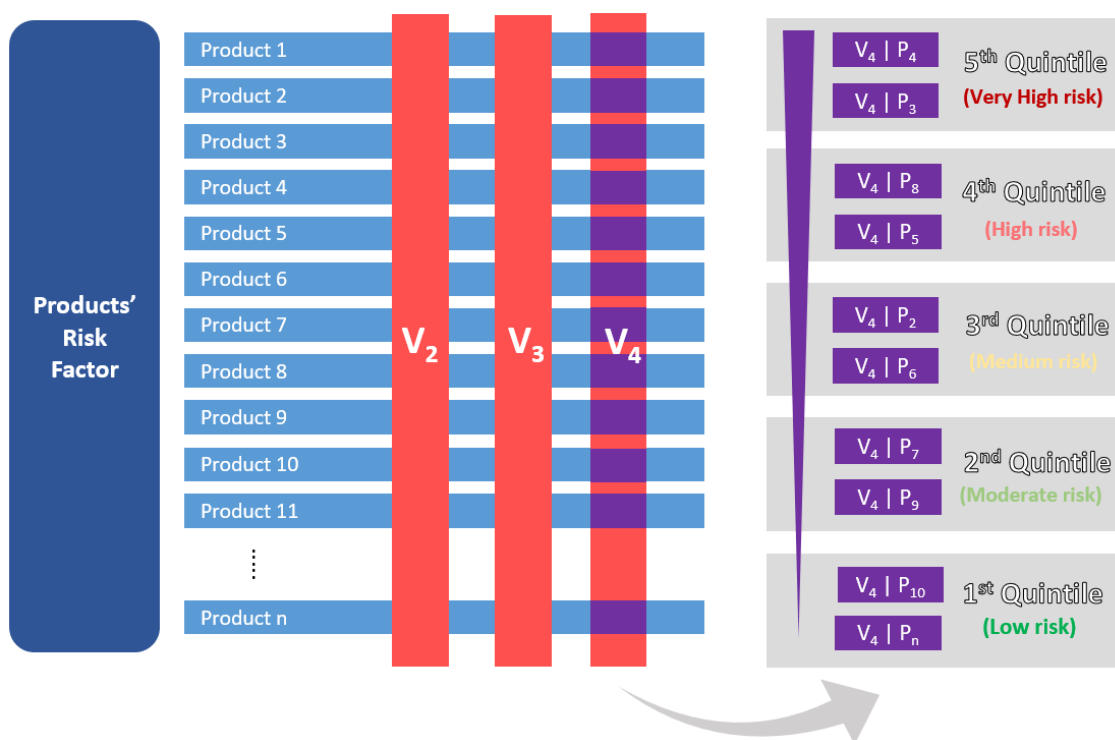
Quintiles	Assigned Risk Level	
5 th Quintile	5	Very High
4 th Quintile	4	High
3 rd Quintile	3	Medium
2 nd Quintile	2	Moderate
1 st Quintile	1	Low

¹¹ As mentioned before, establishing fixed ranges was considered as an alternative to the quintiles. However, the range of reported information is highly variable year to year, so a fixed range would give inconsistent results. Additionally, it would be highly complex to determine, for example, what percentage of suspicious transactions in relation to the total transactional volume is considered a high-risk factor. In a more concrete example, what would be an acceptable value for the risk to be low in “electronic transfers”? 0.00005% of all transactions or 0.00006%? At what point can that product be considered moderate or medium risk?

This would, in turn, bring other problems; what happens if the number of SARs in the sector increases or decreases significantly? We could be in a situation in which the risk level of all the components is either low or very high risk. If the results of each institution in the entire sector are very similar, that would be problematic for the supervisor who would not have relevant information to prioritize its supervisory actions. For this reason, from the supervisor’s perspective, it was determined that the quintiles are the best option, since they allow the results among risk levels to be heterogeneous, that is, that the levels of risk are distributed according to the relative risks of the sector.

The following graphs describes the process of forming the quintiles.

Illustration 2: Quintiles of the Products Factor



3.3. Third Step: Calculate the component's risk level

After assigning a risk level to each of the four variables, these must be added to obtain the risk level of the assessed component. For this, weights are used for each variable based on its importance, that is, the risk it contributes to the component. If one of the components does not have one of the variables, the weights are recalculated proportionally. In an extreme case, a component may lack the variables V_2 , V_3 , and V_4 , but never V_1 ; so, if the previous variables are missing, the risk level would be equal to V_1 .

The formula to calculate the risk level of the component is the following:

$$V_1 = V_1 \text{ rounded to the nearest integer}$$

$$RL_{V_n} = \text{Risk level of } V_2, V_3 \text{ and } V_4, \text{ after finding its quintiles}$$

$$RL_c = \text{Component's risk level}$$

$$RL_c = V_1 \times 30\% + RL_{V_2} \times 35\% + RL_{V_3} \times 20\% + RL_{V_4} \times 15\%$$

3.4. Fourth Step: Calculate the institution's risk exposure to each factor

After calculating the component's risk level, all the components of each factor are added to obtain the corresponding risk level of that risk factor. In the case of the Geographical Areas and Products factors, the risk level is calculated by weighting each of its components with its representativeness in the institution's portfolio, as follows:

$$\text{Institution's Portfolio} = P_i = \sum \text{Transactional volume of each product}$$

$$\text{Component's proportion in the portfolio} = P_c = \frac{\text{Transactional volume of the component}}{P_i}$$

$RL_{GA \text{ or } Pr}$ = Risk Level of the Geographical Areas or Products Factors

$$RL_{GA \text{ or } Pr} = \sum_{c=1}^N RL_c \times P_c$$

In the case of the Customers factor, as mentioned above, the risk level of the Attributes must first be calculated. For three of the six attributes, it is not necessary to do any calculation, since their risk level will be equal to the risk level of the component, this occurs in the cases of: PEP, Trusts, and NGOs¹², since these three characteristics are mutually exclusive, meaning the customer either has or does not has said characteristics. On the other hand, regarding the attributes Nationality and Type of Person, all customers have two possibilities for each characteristic, in the first case they are either National or Foreign, and in the second, they are either a Natural Person or Legal Person. In both cases, these two possibilities represent the components of the attribute, so they are calculated in the same way as the other components, weighted to their representativeness in the portfolio.

Regarding Economic Activity attribute, it has 21 components, one for each of sections in the ISIC standard. Again, the attribute will be calculated by its representativeness, in this case, calculated only by the portfolio of legal persons¹³.

After obtaining the risk level of each attribute, the risk level of the Customers factor is calculated using the following formula:

Customer's Attributes	
PEP	Atri ₁
Nationality	Atri ₂
Type of Person	Atri ₃
Economic Activity	Atri ₄
Trusts	Atri ₅
NGOs	Atri ₆

RL_{Cu} = Risk Level of the Customer's Factor

$$RL_{Cu} = Atri_1 \times 20\% + Atri_2 \times 15\% + Atri_3 \times 10\% + Atri_4 \times 15\% + Atri_5 \times 20\% + Atri_6 \times 20\%$$

¹² Given that all PEPs, Trusts, and NGOs customers are mandatorily subject to the enhanced due diligence, Variable 4 is not considered.

¹³ The Peruvian regulation contemplates that, within the due diligence process, institution's need to obtain the economic activity of the legal persons; while natural persons require to disclose their profession, which cannot be attributed to a particular economic activity of the ISIC standard or any other standard. Due to this, it is not possible to measure this characteristic to all the customers.

As in previous cases, if an institution does not have any of the attributes (the only possible cases being PEPs, Trusts, and NGOs), the weights are recalculated.

3.5. Fifth Step: Calculate the institution's overall risk exposure

Finally, based on the three risk factors, the Institution's overall ML/FT risk exposure is calculated based on the following formula:

$$RL_{Overall_i} = \text{Institution's overall risk exposure}$$

$$RL_{Overall_i} = RL_{Cu_i} \times 40\% + RL_{Pr_i} \times 25\% + RL_{GA_i} \times 35\%$$

The weights of the four variables needed to calculate the risk level of the components, the weights of the attributes needed to calculate the risk level of the Customers factor and the weights of the factors needed to calculate the institution's overall risk exposure, have been determined by expert judgement. We consider this to be one of the methodology weaknesses. Unfortunately, there is no precise mathematical way to assign the weights¹⁴. Notwithstanding this, the expert judgment is based on the experience of the supervision carried out by the DSRLAFT, which has identified where the sources of risk generally are.

3.6. Sixth Step: Calculate the sector's overall risk exposure

This step begins with the information obtained in the third step, that is, with the risk level of each component. Based on these values, the risk level of the component for the whole sector is calculated through a weighted average based on transactional volume of each institution in the corresponding component.

$$TV_c = \text{Component's Transactional Volume}$$

$$TV_{Sector_c} = \text{Sector's transactional volume for a Component } (c) = \sum_{c=1}^N TV_c$$

$$RL_{Sector_c} = \sum_{c=1}^N \frac{RL_c \times TV_c}{TV_{Sector_c}}$$

From this point, based on the risk level of the components at the sector level, the fourth and fifth steps can be replicated. This way, the components are aggregated to obtain the risk level of the risk factors at the sector level; so that later these factors can be added to obtain the sector's overall risk exposure.

The SBS does a sector-wide assessment for the following type of institutions that comprise over 100 entities: banks, financial institutions ("Financieras" in spanish), Municipal Saving

¹⁴ The use of the Hierarchical Analysis Process (AHP) was assessed; however, given that the variables to be assigned a weight are very few (ranging from 3 to 6), the results of said method would have lacked consistency.

Banks, Rural Saving Banks, credit institutions, deposit warehouses, e-money issuers, money transport companies, money remittances, fiduciaries, pension fund administrators and insurance companies.

IV. Application of the methodology

This section of the document seeks to present, in an illustrative manner, the results of applying the methodology, for this, the information reported by the 18 banking institutions in Peru for the 2020 period will be used as a basis. Some data has been modified and the names of the banks anonymized to avoid revealing sensitive information.

After having verified the validity of the reported information, any discrepancies or errors are discussed with the institutions prior to the application of the methodology. To process the data, we use the software STATA, where the methodology has been coded.

4.1. First Step: Calculate the four variables for each component

As seen in the following table, the first step is to calculate 3,205 variables, for a total of 1,370 components and 88 attributes (Customers factor). This means that some institutions do not operate in certain geographical areas, do not offer certain products, and do not serve certain type of customers. On top of that, not all components have the four variables.

Table 1: Number of variables, components, and attributes for each bank

Bank	Geographical Areas		Products		Customers		
	Components	Variables	Comp.	Var.	Comp.	Var.	Attributes
Bank 1	25	100	61	157	26	89	6
Bank 2	25	90	76	153	28	97	6
Bank 3	25	96	69	196	28	97	6
Bank 4	26	96	81	158	22	71	6
Bank 5	25	50	49	91	20	48	5
Bank 6	8	14	31	48	23	42	5
Bank 7	26	65	58	105	28	77	6
Bank 8	26	80	26	50	28	58	6
Bank 9	26	56	9	24	19	35	6
Bank 10	26	73	62	102	26	66	6
Bank 11	25	79	16	37	23	59	5
Bank 12	25	32	22	33	19	33	4
Bank 13	19	34	38	68	25	59	4
Bank 14	11	13	21	30	22	33	5
Bank 15	21	51	8	21	4	11	3
Bank 16	25	55	12	28	4	14	3
Bank 17	1	1	4	4	4	4	3
Bank 18	2	4	3	6	8	12	3
Total	367	989	646	1,311	357	905	88

4.2. Second Step: Calculate the sector's quintiles variables and assign each component a risk level

From the 3,205 variables, the variables of V_2 , V_3 and V_4 of all components, by factor, are ordered. After that, the quintiles are grouped into 5 groups. Each quintile has a minimum and a maximum value. The following table shows the result of calculating the quintiles for the Products factor.

Table 2: Quintile ranges for the variables in the Products factor

Products Factor	1Q	2Q	3Q	4Q	5Q
Variable 2	[7.13×10^{-10} ; 0.0008183[	[0.0008183; 0.0018721[	[0.0018721; 0.0059791[	[0.0059791; 0.0377977[	[0.0377977; 0.4534259]
Variable 3	[4.9×10^{-6} ; 0.0000449[	[0.0000449; 0.0003765[	[0.0003765; 0.0011692[	[0.0011692; 0.0044793[	[0.0044793; 1]
Variable 4	[0.0000703; 0.0144209[	[0.0144209; 0.0449373[	[0.0449373; 0.1036036[	[0.1036036; 0.2142857[	[0.2142857; 1]

Using the quintiles for each of the three risk factors, one of them being the previous table, the 3,205 variables are assigned a risk level. By assigning the risk levels, we give each variable a value of 1, 2, 3, 4 or 5, accordingly.

4.3. Third Step: Calculate the component's risk level

The 3,205 variables are aggregated, by using the corresponding weights, to calculate the risk level of the 1,370 components. The methodology uses the following color scale in order to represent the risk level:

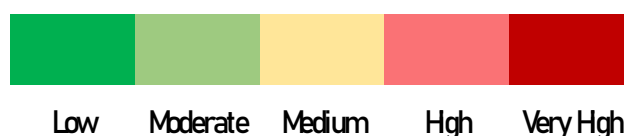


Table 3: Components by risk level for each risk factor

		Geographical Areas	Products	Customers	Total
Q1	Low	34	87	30	151
Q2	Moderate	108	208	130	446
Q3	Medium	81	107	60	248
Q4	High	22	52	45	119
Q5	Very High	122	192	92	406

4.4. Fourth Step: Calculate the institution's risk exposure to each factor

The 1,370 components are aggregated to calculate the risk level of the three risk factors, 367 for the Geographical Areas factor, 646 for the Products factor and 357 for the Customers factor.

Table 4: Risk level of each risk factor by bank

Banco	Geographical Area	Products	Customer
Bank 1	Red	Yellow	Red
Bank 2	Red	Red	Red
Bank 3	Red	Green	Red
Bank 4	Red	Green	Red
Bank 5	Red	Green	Red
Bank 6	Red	Green	Red
Bank 7	Red	Green	Red
Bank 8	Red	Green	Red
Bank 9	Red	Green	Red
Bank 10	Red	Yellow	Red
Bank 11	Red	Green	Red
Bank 12	Red	Green	Red
Bank 13	Red	Yellow	Red
Bank 14	Red	Green	Red
Bank 15	Red	Green	Red
Bank 16	Red	Green	Red
Bank 17	Yellow	Red	Yellow
Bank 18	Yellow	Red	Yellow

4.5. Fifth Step: Calculate the institution's overall risk exposure

The three risk factors are then aggregated to form the overall risk exposure of each institution.

Table 5: Overall ML/FT Risk Exposure by bank

Banco	Overall Risk Exposure
Bank 1	Red
Bank 2	Red
Bank 3	Red
Bank 4	Red
Bank 5	Red
Bank 6	Red
Bank 7	Red
Bank 8	Yellow
Bank 9	Yellow
Bank 10	Red
Bank 11	Yellow
Bank 12	Red
Bank 13	Red
Bank 14	Red
Bank 15	Yellow
Bank 16	Yellow
Bank 17	Yellow
Bank 18	Yellow

4.6. Sixth Step: Calculate the sector's overall risk exposure

Starting with the risk level of the components of each individual institution, the weighted average of the risk levels of the components across the sector is calculated. This way, we have estimated the risk of all 26 geographical areas, all 28 customers characteristic, and 111 products (meaning that not all products from the taxonomy are offered by the banks).

Table 6: Sector's Components by risk level for each risk factor

	Geographical Areas	Products	Customers
Low	3	14	3
Moderate	12	31	9
Medium	4	20	4
High	1	10	4
Very High	6	36	8

Finally, the sector's components are aggregated to calculate the risk level of the sector's risk factors, which, in turn, are aggregated to calculate the sector's overall ML/FT risk exposure.

Table 7: Sector's Risk Factors by risk level and Sector's overall ML/FT risk exposure

	Risk level
Geographical Areas	
Products	
Customers	
Overall Exposure	

To summarize the most critical outputs of the methodology, an executive report has been design, which includes two dashboards. The first dashboard shows the risk exposure for each factor and the riskiest area, product, or type of customer in the sector (**Annex 2a**). The second shows the overall risk exposure of each institution, its exposure for each factor, pointing the riskiest area, product, and type of customer of that specific entity (**Annex 2b**).

V. Application of the results

The results and information provided by the ML/FT Risks Exposure Assessment have been used not only to identify and gain a better understanding of the ML/FT phenomena within the financial sector, but also to apply a real RBA for supervising these risks, build a more accurate risk profile of FIs, share information with other competent authorities, help FIs to improve their own risks assessments and focus on riskier geographical areas, products and customers. The main uses we give to the outputs of the methodology are:

1. It helps to prioritize our supervisory efforts and to develop an RBA for planning on-site and off-site supervision.
2. Regarding on-site supervision:

- a. Focus on the riskier geographical areas, products, and customers of each FI, by reviewing related red flags, checking customers files, thematic assessments conducted by FI of these riskier products and geographical areas, as well as to review the measures adopted to improve their risk management.
 - b. Compare riskier products and geographical zones identified by the own FI's methodology with the results of the DSRLAFT methodology.
 - c. Assess the tools and measures – within the AML systems – used to reduce the exposure of riskier factors or components and see, in future supervision activities, if they are effective enough.
3. Regarding off-site supervision:
 - a. Plan and develop cross-wide assessments between FIs of the same kind, like banks or insurance companies, in order to obtain better knowledge of the features of riskier products and their treatment. For example, in 2022 we conducted an assessment on electronic transfers' technologies and if the systems helped to get all the regulatorily required information of the remitter and the beneficiary in the 4 mayor banks in the Peruvian financial system. This assessment had assistance of the IT Supervision Department of the SBS.
 - b. Provide training inside the SBS and FIU about the application of the methodology and the importance of its results.
 - c. Contributes to the construction of FI's risk profile and internal rating (process conducted by the SBS which includes other risk such as credit, market and operational).
 4. Help FI's to compare their own results with the SBS', the general results about riskier products and geographical areas are published annually in the SBS's Extranet, accessible only to supervised institutions. This is done not only to comply with FATF Recommendation 1, but to enhance the use of the RBA in the FI's AML System.
 5. Help other authorities develop a better understanding of how the financial system is exposed to ML/FT risks and in which areas we should emphasize our efforts. The reports, without the name of FI's, are shared with the authorities that are part of the National Commission Against ML/FT (CONTRALAFT in spanish).

There is some other data obtained in the questionnaires that is not directly used in the ML/FT Risks Exposure Assessment, that also helps to improve the supervision guides and procedures.

This methodology is the first component of the ML/FT Risks Assessment Methodology that is being developed by DSRLAFT, in our approach, there are two components to finally obtain the ML/FT Risks of each FI: (1) ML/FT Risks Exposure Assessment and (2) ML/FT Risks Management Assessment. This second component implies the assessment of all the parts of the

AML/CFT program of the FIs, it's a model that uses a mix of COSO ERM, Neozelandean/Australian Standard for risks management. The results of both components will provide an accurate idea of the ML/FT Risks level of each FI.

VI. Conclusions and recommendations

- Developing and applying this methodology has helped supervisors to obtain a better knowledge of the features that could cause that a product, geographical area or customers' characteristics become riskier, and to apply a better approach to help FIs to cope with these exposures and develop a more robust AML/CFT program.
- It also contributes to the development of a better RBA to supervise and analyze ML/FT Risks inside the DSRLAFT team.
- We are aware that these tools – the templates and the methodology – need to be improved, first of all, we are working in designing a new way, using a SupTech tool, to extract the information from the FI's and transfer the methodology criteria and parameters into a Data Science tool that could help us to obtain the results faster.
- There are some disadvantages that we nowadays face, that make it more difficult to change the way we obtain the information and process it, but the FIs' systems are working with us to reduce the validation time.
- We believe that it is not possible to apply a risk-based approach to combat ML/FT and other crimes that may use the financial system to try to hide or "clean" their profits, without knowing, in the most accurate way, how their products, geographical areas and customers are exposed to them.

VII. Annexes

Annex 1a: Geographical Areas information template

Geographical Areas	1. Risk Assessment (From 1 to 5)	2. Total customers in the area	3. Customers subject to EDD	4.1. Transactional volume by passive products	4.2. Transactional volume by active products	4.3. Transactional volume by other services	5. Suspicious Activity Reports	6. Money reported in the SARs	7. Number of locations	8. Complementary channels
Amazonas										
Ancash										
Apurimac										
Arequipa										
Ayacucho										
Cajamarca										
Callao										
Cusco										
Huancavelica										
Huánuco										
Ica										
Junin										
La Libertad										
Lambayeque										
Lima										
Loreto										
Madre de Dios										
Moquegua										
Pasco										
Piura										
Puno										
San Martín										
Tacna										
Tumbes										
Ucayali										
Abroad (Out of Peru)										

Annex 1b: Products and Services information template (Example of information requested)

Product	Type	1. Risk Assessment (From 1 to 5)	2. Total customers by product	3. Customers subject to EDD	4. Transactional volume by product	5. Suspicious Activity Reports	6. Money reported in the SARs
Corporate Finance							
Capital raising							
Bonds issuance	S						
Private placements	S						
Syndications	S						
Corporate finance services							
Corporate advisory services	S						
Trading & Sales							
Derivatives & Securities							
Fixed income	S						
Equities	S						
Foreign Exchange & Money Markets	S						
Repos	S						
Interest Rate Derivatives	S						
Credit Derivatives	S						
FX Derivatives	S						
Equity Derivatives	S						
Commodity Derivatives	S						
Retail Banking							
Small-enterprise credits							
Advances in current account	A						
Credit cards	A						
Current account overdrafts	A						
Discounting	A						
Revolving loans	A						
Non-revolving loans	A						
Real estate capitalization	A						
Factoring	A						
Leasing	A						
Leaseback	A						
Trade finance	A						
Real estate loans	A						
Guarantees / Bond letters / Letter of credit	A						
Other credits	A						

Annex 1b: Products and Services information template (List of all products in the template)

Corporate Finance	Micro-enterprise credits	Commercial Banking	Large companies credits
Capital rising	Advances in current account	Corporate credit	Advances in current account
Bonds issuance	Credit cards	Advances in current account	Credit cards
Private placements	Current account overdrafts	Credit cards	Current account overdrafts
Syndications	Discounting	Current account overdrafts	Discounting
Corporate finance services	Revolving loans	Discounting	Revolving loans
Corporate advisory services	Non-revolving loans	Revolving loans	Non-revolving loans
Trading & Sales	Real estate capitalization	Non-revolving loans	Real estate capitalization
Derivatives & Securities	Factoring	Real estate capitalization	Factoring
Fixed income	Leasing	Factoring	Leasing
Equities	Leaseback	Leasing	Leaseback
Foreign Exchange & Money Markets	Trade finance	Leaseback	Trade finance
Repos	Real estate loans	Trade finance	Real estate loans
Interest Rate Derivatives	Guarantees / Bond letters / Letter of credit	Real estate loans	Structured Lending
Credit Derivatives	Other credits	Structured Lending	Guarantees / Bond letters / Letter of credit
FX Derivatives	Consumer credit	Guarantees / Bond letters / Letter of credit	Other credits
Equity Derivatives	Advances in current account	Other credits	Clearing
Commodity Derivatives	Credit cards	Commercial deposits	Cash Management, Payments & Settlements
Retail Banking	Current account overdrafts	Current account deposits	Out-bound electronic transfers
Small-enterprise credits	Leasing	Savings deposits	In-bound electronic transfers
Advances in current account	Leaseback	Long-term deposits	Out-bound manual transfers
Credit cards	Pawn loans	Medium-sized enterprises credits	Other cash transactions
Current account overdrafts	Vehicle loans	Advances in current account	Foreign currency exchange
Discounting	Mortgage guaranteed loans	Credit cards	Electronic money issuance
Revolving loans	Revolving loans	Current account overdrafts	Electronic money conversion
Non-revolving loans	Non-revolving loans	Discounting	Electronic money transfers
Real estate capitalization	Guarantees / Bond letters / Letter of credit	Revolving loans	Other services
Factoring	Other credits	Non-revolving loans	Trust / Investment Management
Leasing	Retail mortgages	Real estate capitalization	Custody Services
Leaseback	Loans	Factoring	Flow management trusts
Trade finance	Mivivienda	Leasing	Guarantees trusts
Real estate loans	Real estate capitalization	Leaseback	Mixed trusts
Guarantees / Bond letters / Letter of credit	Reverse Mortgage	Trade finance	Securities registration and administration
Other credits	Other mortgage loans	Real estate loans	Financial advisory
Retail deposits		Structured Lending	Portfolio management
Current account deposits		Guarantees / Bond letters / Letter of credit	Cash transportation
Savings deposits		Other credits	Precious metals transportation
Long-term deposits			Other services
Progressive plans deposits			(Add rows)
Compensation for time of service deposits			

Annex 1c: Customers information template

Due Diligence Regime	# of Customers
Simplified DD	
General DD	
Enhanced DD	
Total customers	

Customers characteristics	1. Risk Assessment (From 1 to 5)	2. Total customers by customer's attribute	3. Customers subject to EDD	4.1. Transactional volume by passive products	4.2. Transactional volume by active products	4.3. Transactional volume by other services	5. Suspicious Activity Reports	6. Money reported in the SARs
Politically exposed persons (PEPs)								
Trusts								
Non-governmental organizations (NGOs)								
Nationality:								
National customers								
Foreign customers								
Type of person:								
Natural person								
Legal person								

ISIC	Economic Activity	1. Risk Assessment (From 1 to 5)	2. Total customers by customer's attribute	3. Customers subject to EDD	4.1. Transactional volume by passive products	4.2. Transactional volume by active products	4.3. Transactional volume by other services	5. Suspicious Activity Reports	6. Money reported in the SARs
A	Agriculture; forestry and fishing								
B	Mining and quarrying								
C	Manufacturing								
D	Electricity; gas, steam and air conditioning supply								
E	Water supply; sewerage, waste management and remediation activities								
F	Construction								
G	Wholesale and retail trade; repair of motor vehicles and motorcycles								
H	Transportation and storage								
I	Accommodation and food service activities								
J	Information and communication								
K	Financial and insurance activities								

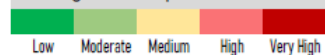
Annex 1c: Customers' information template (cont.)

ISIC	Economic Activity	1. Risk Assessment (From 1 to 5)	2. Total customers by customer's attribute	3. Customers subject to EDD	4.1. Transactional volume by passive products	4.2. Transactional volume by active products	4.3. Transactional volume by other services	5. Suspicious Activity Reports	6. Money reported in the SARs
L	Real estate activities								
M	Professional, scientific and technical activities								
N	Administrative and support service activities								
O	Public administration and defence; compulsory social security								
P	Education								
Q	Human health and social work activities								
R	Arts, entertainment and recreation								
S	Other service activities								
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use								
U	Activities of extraterritorial organizations and bodies								

Annex 2a: Sector's Dashboard

SECTOR-WIDE ML/FT RISK EXPOSURE ASSESSMENT REPORT - BANKING SECTOR (With information as of December 2020 in Peruvian Soles)

Banking Sector Exposures



Assessed Institutions	Total Portfolio	# of Customers
18	S/ 12,815,627,796,872	41,404,970
Offered Products	# of SARs	Amount of SARs
111	4,618	S/ 119,789,851,183

Sector's Overall Risk Exposure



Exposure by Geographical Areas:

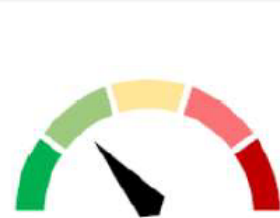


Abroad	Ancash	Cajamarca	Junín	Apurímac
Amazonas	Cusco	Arequipa	Puno	Pasco
Tumbes	Callao (2%)	Ica	Huancavelica	
Lima (84%)	Piura	Tacna	Moquegua	
Ayacucho	Huánuco	Madre de Dios	Loreto	
Ucayali	La Libertad (2%)	Lambayeque	San Martín	

Number of GA and Portfolio in millions, by risk level

6	11,085,105
1	89,991
4	542,549
12	988,978
3	109,004

Exposure by Products:



Active	Payments & services
Credit cards - Small enterprises	In-bound manual transfers
Credit Cards - Micro-enterprises	In-bound electronic transfers (30%)
Guarantees / Bond letters / Letter of credit - Small enterprises	Out-bound manual transfers
Non revolving loans - Small enterprises	Out-bound electronic transfers (27%)
Other credits - Small enterprises	Foreign currency exchange
Current account deposits - Commercial	
Current account deposits - Retail	
Long term deposits - Commercial	
Savings deposits - Retail (13%)	
Long term deposits - Retail	

Number of Products and Portfolio in millions, by risk level

36	966,446
10	437,906
20	154,702
31	9,768,656
14	1,899,227

Exposure by por Customers:



By Attribute	By Economic Activity
NGOs	Mining and quarrying
Trusts	Financial and insurance activities (16%)
Foreign Customers	Wholesale and retail trade
PEP	Real estate activities
Legal Persons	Agriculture, forestry and fishing
Nationals	Administrative and support service activities
Natural Persons	Manufacturing (6%)
	Other service activities (63%)
	Professional, scientific and technical activities
	Information and communication

	Total Customers	SARs
PEP	164,317	285
Nationals	40,831,639	119,639
Foreigners	573,331	151
Legal persons	1,181,363	108,546
Natural persons	40,223,607	11,243

Annex 2b: By institution Dashboard

Exposure by Institution

Overall Risk Exposure	● Bank 2	Bank 13	Bank 1	Bank 6	Bank 12	Bank 14	Bank 15	Bank 11	Bank 8
	● Bank 5	Bank 10	Bank 7	Bank 3	Bank 4	● Bank 9	Bank 16	Bank 18	Bank 17

Exposure by Geographical Areas:

	Most exposed Area	Most concentrated Area
● Bank 5	Piura 3%	● Arequipa 9%
Bank 12	Ayacucho 0%	● La Libertad 5%
Bank 7	Piura 0%	● La Libertad 0%
Bank 16	Amazonas 0%	● Callao 2%
Bank 9	Abroad 0%	● Callao 4%
Bank 2	Amazonas 0%	● Callao 2%
Bank 10	Abroad 3%	● Piura 4%
Bank 3	Amazonas 0%	● Arequipa 3%
Bank 1	Puno 0%	● Callao 2%
Bank 4	Abroad 0%	● Callao 2%
Bank 13	Piura 0%	● Callao 1%
Bank 6	Lima 84%	● Abroad 15%
Bank 11	Ucayali 1%	● Arequipa 6%
● Bank 8	Cusco 4%	● La Libertad 4%
Bank 15	Piura 4%	● La Libertad 5%
Bank 14	Lima 31%	● Ica 38%
● Bank 18	Lima 74%	● Abroad 26%
Bank 17	Lima 100%	

Exposure by Products:

	Most exposed product	Most concentrated product in the portfolio
● Bank 17	In-bound electronic transfers	56% ● In-bound electronic transfers 56%
Bank 18	Fixed Income	4% ● Foreign exchange & money markets 83%
● Bank 2	Trusts	0% ● In-bound electronic transfers 40%
● Bank 1	Other cash transactions	1% ● Savings deposits - Retail 13%
Bank 13	Other cash transactions	0% ● Foreign exchange & money markets 48%
Bank 10	Trusts	1% ● Savings deposits - Retail 16%
● Bank 6	Credit cards - Corporate	0% ● Foreign currency exchange 43%
Bank 5	Other cash transactions	7% ● In-bound electronic transfers 22%
Bank 3	Trusts	0% ● Savings deposits - Retail 16%
Bank 15	Out-bound manual transfers	4% ● Long term deposits - Retail 34%
Bank 14	Guarantees / Bond letters / Letter of Credit - Corporate	0% ● In-bound electronic transfers 44%
Bank 4	Trade Finance - Corporate	0% ● In-bound electronic transfers 39%
Bank 7	Leaseback - Large enterprises	0% ● Foreign currency exchange 55%
Bank 12	Out-bound electronic transfers	16% ● Long term deposits - Retail 32%
Bank 8	Trusts	0% ● Savings deposits - Retail 80%
Bank 9	Savings deposits - Retail	2% ● Credit cards - Micro-enterprises 34%
Bank 11	Other cash transactions	2% ● Non revolving loans - Small enterprises 43%
● Bank 16	Mortgage guaranteed loans - Consumer credit	0% ● Savings deposits - Retail 89%

Exposure by Customers:

	Total Customers	EDD						
● Bank 14	131	9	Bank 15	1,276,416	424	Bank 12	153,286	23
Bank 13	1,577	338	Bank 16	2,399,772	12,677	Bank 4	5,132,001	46,648
Bank 7	626,515	2,496	Bank 9	463,698	4,296	Bank 8	10,329,794	20,995
Bank 11	1,887,783	3,146	Bank 6	871	191	Bank 1	10,027,409	79,688
Bank 5	139,115	2,718	● Bank 2	5,004,670	94,997	● Bank 18	37	18
Bank 10	561,539	1,565	Bank 3	3,400,353	31,328	Bank 17	3	0