

ANALYSIS AND EVALUATION BY THE INTERNAL AUDIT OF THE QUALITY OF THE BANK'S CUSTOMER PORTFOLIO

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Abstract. The speeding business operations and the necessity for strategically-oriented activities determine the relevance of research in the domain of business audit, including marketing. Given the feasibility of studying these aspects of internal control, the objective of this paper is to improve the existing methods of client portfolio analysis as well as theoretically justify new methods and ways of analysis and internal audit. According to the results of the study, the methods of ABC and XYZ analysis were amended and adapted for use in the banking sector, where ABC is based on ranking customers according to the operating and transaction income, and XYZ studies the frequency and regularity of transactions conducted by bank customers. The improved indicators applied to measure the profitable activity of a client's portfolio in general and in terms of profit centres (business lines) enable to promptly identify a decline in the profitability of certain groups of customers, reveal its causes and offer effective solutions. The reorganization of the analytical part for client portfolio management and the implementation of ABC and XYZ analysis as well as other methodological approaches allow to monitor the dynamics of a bank's client portfolio quality as quickly and effortlessly as possible. Analytical mechanisms for determining the quality of the bank's client portfolio is one of the basic elements of internal audit, and this study proposes the optimal form of the internal auditor's working document, which is best adapted to the needs of auditing business units, their quality and efficiency.

Keywords: ABC, XYZ, marketing, services, economy, banks, system, improvement.

JEL Classification: G21, M41, M42.

Introduction

The XXI banking system is characterized with the processes of automation and robotics, integration and intensification of competition, as a result of which the need for applying a customer-oriented approach to business in order to maintain its market position is relevant, so research becomes required in business analysis and internal audit which grant the possibility to monitor the quality dynamics of the bank's client portfolio and provide the necessary information for relevant management decisions. The customer-oriented strategy of the bank, which is quite popular now, is possible only if the company has data and information about the behavioural characteristics of the customer/user/consumer, and it does not matter whether it is an individual, legal entity or governmental/state institution. Customer retention is especially important for banks. These business needs cause the topicality of research in the domain of internal audit and business analysis, where a lot of attention is paid to the analysis of

clients, given their value and importance to the company. This analysis focuses on the following areas: profitability, profit per (unidentified) customer, number and amount of the banking products/services sold, etc., while a little attention is paid to non-financial indicators: customer profiling, customer satisfaction monitoring and customer value for companies. Thus, the objective of this study is to adapt and improve the ABC-XYZ methodology of client portfolio analysis, the methodology of client life cycle analysis for bank's customer portfolio analysis and internal audit.

1. Theoretical basis and review of literature

Research into the method and procedure of auditing a business topic is relatively new (Bivainis, 2010). Marketing audit is a tool in the application of which the main purpose of an organization is to verify its strategic approach. According to Kotler, a marketing audit should be conducted periodically and systematically, be a comprehensive

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and independent analysis of the marketing, business units of the company, objects, strategies and specific actions of the organization in order to identify opportunities and threats, as well as to provide recommendations for an action programme aimed to improve company performance efficiency (Kotler & Keller, 2009).

In Parmerlee's approach, a marketing audit is a tool that determines the value, risks and efficiency of marketing activities. It is accepted that the marketing audit provides data on the effectiveness of the organization and its future prospects in terms of past and current circumstances (Parmerlee, 2000).

In Michael Baker's opinion, a marketing audit can be considered as a method of evaluating the planning process (strategic) in order to obtain a number of recommendations based on the results of audit procedures (Baker, 2008).

A marketing audit is carried out due to the assessment and analysis of the main elements that form the basis of the justification and implementation of the organization's marketing strategy (Flesher, 1993). The main principles of marketing audit were proposed by Kotler, Gregor and Rogers in 1977. Marketing and audit specialists believe that the basis of a marketing audit is the company's activities in the market, changes that occur in this area, formulated thoughts and forecasts of opportunities and/or threats (Wilson, 1982). The activities of the marketing audit are aimed at the objects and strategies of the company, and the entire marketing in general (Kotler, 1984).

For analysis and control, Balan proposes to use customer profiling of the company, in terms of which he considers it expedient to carry out through the study of the following issues as (Balan, 2007): customer behavior, manner of life (for personal customers); customer value for the organization.

Radulescu and Cetina also suggest to analyze the value offered to the client, which is the difference between the total value offered to the client and the expenditure to the client. Namely, this is a kind of added value offered to the client, which depends on such elements as the cost of services, personnel expenses and reputation value (Radulescu et al., 2009).

2. Methodology

Radulescu and Cetina (2012) believe that customer value is expressed not only through their contribution to the organization of income or profit, but also through the potential of cross-selling, creating a positive reputation and recommendations of new customers. In their opinion, there are the following methods to evaluate customers:

1. The ABC method (by income) is a method that is based on past data, neglecting the potential of clients, so marketers often find it necessary to combine this method with other assessment methods, including the Customer Lifecycle method.

2. The method of Customer Profitability Analysis is based on the calculation of the difference between all

income received from a customer within a certain period and all costs associated with that income, such as the cost of development and distribution costs for attracting and retaining customers.

3. Customer Lifetime Value (CLV) (Levkiv, 2010) is the method provides for the calculation of the current value of the entire future profit stream, which theoretically can be generated by the client over a certain medium-term horizon period. Marketing specialist often consider the period for planning of two to five years. This method provides the basis for investment planning, and helps the company to adopt an optimal long-term strategy, the disadvantage of the method is the need to accurately assess the income from each client and their associated expenses (Parasii-Verhunencko, 2005).

Having studied the main areas of analysis, evaluation and internal audit of the business, namely marketing activities, cannot fail to note the scientific potential of Scholz-Reiter, the scientist proposes to cross-use of ABC and XYZ analysis for decision-making purposes to maintain the optimal value of stocks. Small stocks are the risk of untimely fulfillment of consumer orders, and as a result, consumer dissatisfaction. A high stock is heavy expenses for its maintenance (Levitt, 1983). To resolve this issue, the decisions should be made on the basis of the ABC-XYZ decision analysis, where the goods are divided into three groups according to the income generated, the demand for the goods and the establishment of different service standards for each group (Scholz-Reiter et al., 2012). This methodology can be used not only in stock management for the random selection of the most important types of goods, but also to identify products with a high level of profitability, suppliers and customers valuable to the company (Krychevskyi, 2009), cost elements, and effective capital investment (Písař, 2019).

Scholz-Reiter regards the ABC-XYZ analysis as a combination of two methods of analysis, namely ABC analysis and XYZ analysis. Where ABC analysis is "to identify and evaluate a small number of quantitative values that are valuable and have the highest proportion of the total aggregate value. ABC-analysis is a method of analysis, through which the totality of objects (goods, products (items), materials, customers, suppliers, employees, target markets) is distributed according to selected criteria (expenses, profits, goods turnover) in three groups: A, B, C in order to concentrate resources on a critical minority, leaving out the trivial majority" (Scholz-Reiter et al., 2012).

The analysis of the client's portfolio and expenses of the bank for marketing communications is described by Huz in her works (Huz, 2012). Analyzing the views of various authors, it could be made a conclusion that there is no single universal approach to disclosure of the essence of the concept of "marketing audit", its objectives and methods (Rothe et al., 1997). This concept exists to a greater extent only in theory and, very often, in the practice of auditing (especially external and mandatory), it is absolutely not agreed upon by the regulatory framework regarding the conduct (procedures) of an audit. As of today, the use of

such a term and conducting marketing audits in organizations is quite controversial and requires detailed study and research, especially in the direction of internal audit. Therefore, the methodology of analysis and internal audit procedures in the direction of assessing business activity (directly related to revenue-generating activities) have been studied, but the fluidity of time and the growing rate of technical development necessitate the constant revision and updating of the theoretical scientific achievements in accordance with the needs of audit and business practices (Parmerlee, 2000). Based on the above the purpose of the paper is to improve the already described methods, techniques and procedures for analysis and evaluation by the internal audit of the quality of the bank's client portfolio (Trebuss, 1976).

One of the best ways to identify problems in a bank's customer portfolio is to use the ABC vs. XYZ integrated methodology. Usually it is used to analyze the product range. ABC Analysis is a method that allows you to classify the organization's resources by their importance. This analysis is one of the methods of rationalization and can be applied in the field of activity of any enterprise. It is based on the Pareto principle for 20% of all goods give 80% of turnover. In relation to ABC analysis, the Pareto rule may sound like: reliable control of 20% of positions allows 80% control of the system, whether it is stocks of raw materials and components, or product line of the enterprise, etc. Essentially, ABC analysis is a ranking by various criteria. Consequently, you can rank procurement sources, stock reserves, buyers, extended periods of sales, that is, everything that has a sufficient amount of statistical data. The result of ABC analysis is the grouping of objects according to the degree of influence on the general result.

ABC analysis is based on the principle of imbalance during which built a dependency schedule of cumulative effect from the number of elements. Such a graph is called the Pareto curve, the Lorentz curve, or the ABC curve. According to the analysis, Stock Keeping Units (SKU) are ranked and grouped depending on the size of their contribution to the cumulative effect. In logistics, ABC analysis is usually used to track the quantity of shipments of certain product identification numbers and the frequency of calls to a particular Stock Keeping Units, as well as to rank customers by the number or volume of orders made by them.

There are about ten group selection methods, the most applicable of which are the empirical method, the sum method, and the tangent method. In the empirical method, separation occurs in the classic 80/15/5 ratio. In the sum method, the proportion of objects and their cumulative share are compiled as a result, thus the value of the sum is in the range from 0 to 200%. Groups are distinguished as follows: group A – 100%, B – 45%, C – other. The advantages of the method are its great flexibility. The most flexible method is the tangent method, in which the ABC curve is tangent, first separating group A and then C.

With ABC analysis only, it is difficult to obtain the most complete customer data and group them into quality

clusters for further work with them. ABC is classically paired with XYZ to complement and better visualization of analysis. XYZ analysis allows you to classify bank customers depending on the nature of their use of the bank's services and the accuracy of forecasting changes in their needs during a certain time cycle. Usually, the implementation algorithm can be represented in four stages: determination of coefficients of variation; customer grouping according to the increase in the coefficient of variation; distribution by categories X, Y, Z; graphical representation of analysis results.

The coefficient of variation is the relative value used to characterize the oscillation (variability of characteristics) and is calculated by the formula (Scholz-Reiter et al., 2012):

$$v = \frac{\sigma}{\bar{x}}, \quad (1)$$

where σ – standard deviation, calculated according to the formula:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}, \quad (2)$$

where \bar{x} – arithmetic mean calculated by formula:

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}, \quad (3)$$

where x_i – value of the statistical series (eg. sales volume of a product in a particular month); n – the number of values in the statistical series (eg. number of months analyzed).

XYZ analysis is a method that assesses the stability of certain objects or processes (for example, stability of sales of goods, stability of customer behavior, stability of employee efficiency, etc.) (Scholz-Reiter et al., 2012). It is based on the mathematical calculation of the coefficient of variation (frequency and regularity of conduct operations) and ranking of customers by it.

An important addition to the analytical methods described above is the use and coefficient analysis (Haidunko, 2001). Very common in practice and among scientists are the indicators of gaining and loss of clients, on the basis of which can be calculated the coefficient of Renewal rate and Churn rate (Chenhiz et al., 2007). The Churn rate is calculated as the number of customers lost during the analyzed period divided by the number of customers at the beginning of the period, expressed as a percentage (Hryshchenko, 2007).

3. Research results

3.1. Bank's customer portfolio analysis

According to results of theoretical basis investigation to identify ABC groups in banks is better on the basis of operating income. Where operating income means the

amount of interest and commission income that are related to the counterparty in the bank's databases (excluding the interchange). This method allows you to analyze clients on the bank like a holistic object. In research is used the standard proportionality described above – 5/15/80 for ranking and cut off classes based on the peculiarities of the banking sector by the income axis. That is, Class A is the TOP 5% of the best, most profitable customers who bring in, as practice shows, more than 80% of revenue (sometimes 100%).

Class B is a group of sufficiently profitable customers, the next 15% of the ranked list. Paradoxically, this group is very small and sometimes absent, especially when looking at short-term periods, such as months. Such deformation is associated with non-differentiation of banking services by the client. Typically, all the operating activities of an enterprise are tied to the cooperation of one bank, to which it accordingly generates revenue, in other banks, enterprises may create customer reserves “for a rainy day”, on demand accounts or deposits. Such clients do not generate direct operating income, but they are important for the formation of liabilities.

Class C – “everyone else”. Most of them are customers who do not bring any income to the bank, they use free services or do not use them at all (they stopped cooperation).

In our case, XYZ analysis allows to group bank clients according to the number of transactions performed over several equal intervals. Category X – customers who are characterized by stable usage of banking services, slight fluctuations from period to period and high accuracy of forecasting. The value of the coefficient of variation is in the range from 0 (not inclusive) to 10%. Category Y – clients are characterized by relatively stable usage of services (eg. seasonal variations) and average forecasting capabilities. The value of the coefficient of variation is from 10 to 25%. Category Z – the usage of banking services is irregular or equal to 0, there are no trends, the accuracy of forecasting is low. The coefficient of variation is more than 25% and 0%.

To systematize and structure data it is advisable to bring the primary data for the ABC/XYZ analysis into a consolidated data table (Table 1) with the following columns: customer code, operating revenue, class ABC, number of operations, arithmetic mean, standard deviation (σ), coefficient of variation (v), class XYZ.

1. The key field, in our example in Table 1, this is the client code for linking to database tables of other bank systems or a single data warehouse.

2. Operating income is the sum of interest and commission income.
3. ABC class. Customers is ranked according to the indicator “Operating revenue”. The top 5% of customers (who generate the highest revenue) are in category A, the next 15% are in category B, the rest are in category C.
4. The Number of operations. Necessary to take into account all transactions of the client on Dt and Kt accounting accounts (operations in which the same client appears on Dt and Kt must be counted as 1 operation) (Shchybyvolok, 2006).
5. The arithmetic mean deviation is calculated for each client according to the number of transactions performed within the past 3 months.
6. The coefficient of variation (V). Calculated by dividing the standard deviation by the arithmetic mean deviation (%).
7. According to the indicator of the coefficient of variation defines the XYZ class, where (0–10%] – X, (10%–25%] – Y, 0 and (25% > – Z].

Analyzing each block separately it is possible to make the following statements (Figure 1):

A) class AX is the smallest, these are clients on whom operations are regularly conducted and they are in the TOP 5% of the most profitable for the bank, also often this block of clients generates the majority of bank's profit (within the limits of 80%). For these clients, the analyzed bank is the main servicing banking structure. These customers need only good quality service and a timely Cross-sell;

B) Classes BX, AY are customers who have a high frequency of operations (high level of cooperation) or are in

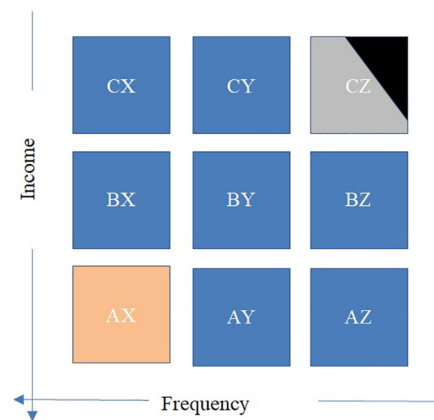


Figure 1. Customer classification matrix according to ABC vs XYZ analysis (source: Scholz-Reiter et al., 2012)

Table 1. ABC/XYZ research report (source: developed by the author/APPENDIX A, Table A1)

Customer code	Operating revenue	Class ABC	Number of operations	Arithmetic mean	Standard deviation (σ)	Coefficient of variation (v)	Class XYZ
1	2	3	4	5	6	7	8
111	59558.22	A	305	102	36.6	0.36	X

Note: *the data in the table are for visualization and are not real.

the TOP 5% of the level of operating income generated for the bank. These are the two classes of most profitable and loyal customers. Within these two clusters, clients can move. Work with these clients should be done in the same direction as with AX. Important to understand only that AY are clients in the risk zone and to determine the reason for the irregularity of transactions;

C) AZ and BZ classes are clients whose cooperation with the bank is very profitable but low regularity of operating business indicates that bulk of the client's transactions take place at another bank and client generates that revenue through one or more profitable for him products, and when client no longer need them he will stop cooperating with the bank. With these clients it is necessary to work on the activation of operating activities apply Cross-sell and Upsell techniques, as they are potentially profitable customers;

D) BY class – clients who are in the middle of our analytical matrix, and not without reason, the income they bring to the bank is relatively low and the regularity of transactions is also far from ideal. However, this unit should be analyzed very carefully. Given that, for example, in the annual basis of ABC analysis, agricultural enterprises can be classified as B, but for a quarterly, such as 1 and 2 quarters, when field preparation is active and sowing is active, they can be classified as Class A by income level, in Q4, such customers are valuable from the standpoint of a passive-forming cluster. This is the case with clients whose activities are characterized by seasonality. Another part of this class is small and medium-sized businesses, especially if they are actively restructuring and growing (with steady growth from period to period, the average number of transactions will differ, so XYZ will show this as an unstable connection with the bank);

E) CX and CY are very low or lack income groups for the bank, but they are active and regular users of its products and services, obviously free of charge. These include microbusiness (which is characterized by economizing on such services) and businesses whose activity is frozen. Through the bank, they regularly make compulsory government payments. In view of this classification, with the second part of the clients, the bank can only provide high quality services in order not to lose them (this is important in case of restarting the activity of such an enterprise). The first part is quite promising, using the basic service packages it does not generate income for the bank, but that does not mean that it cannot. This group should be analyzed for their accumulated liabilities and average amounts of incoming/outgoing payments. Thus, it is possible to determine if the client really belongs to CX and CY, or could potentially become BY/BX (and maybe even higher) by comparing it to top-of-the-range characteristics. If the result of the analysis is positive, the Upsell technique should be applied, this will help the bank to make more profit, and also to increase the customer's satisfaction with services which he did not use before (probably because of fear for the new, or was sure of their uselessness).

F) CZ class – these are customers with low number of transactions and low level of operating income brought to the bank. Most of which have no operations and the amount of operating income on them was equal to zero. These are customers who only occasionally use the services of the bank, most of them are of nominal price or free of charge. For these clients, the other bank is the main one. Such clients should analyze transactions and find correspondent banks. There is a high probability that one of these banks has become the main one for the client. Such an analysis will allow us to further determine what benefits a client could receive there. If it is a prospective client, then it is possible to offer him the conditions of service that he wants (if such are profitable to the bank).

For a better visualization of the quality of the client portfolio, it is necessary to calculate the average income over the analyzed period for each of the ABC/XYZ cross-classes and to place on the plane relative to the averages of the variations (Figure 2 (data selected for illustration)). If divide the resulting plane into four squares. In the lower right corner – regular and most profitable customers. In the center of the plane (in the area of contact of all four conditional squares) – clients in the risk envelope. Clients with irregular operations and low average profitability for the bank will be located in the upper left square; for them, the analyzed bank is not the main one. In the lower left corner – low-profit clients with a high frequency of transactions. It should also be highlighted coordinates [0; 0], where part of the CZ class is actually lost customers, activity and average profitability are zero.

ABC/XYZ analysis is not enough to fully evaluate the quality of a bank's client portfolio. It is also advisable to analyze the dynamics of the number of customer base and the Customer Lifetime Value.

The Customer Lifetime Value should be understood as the time when the client uses the bank's services. From the conclusion of the first agreement (or the first consultation, such data can be obtained only when actively using CRM systems) until the last agreement is closed. At each stage, the client should be treated differently, where in the

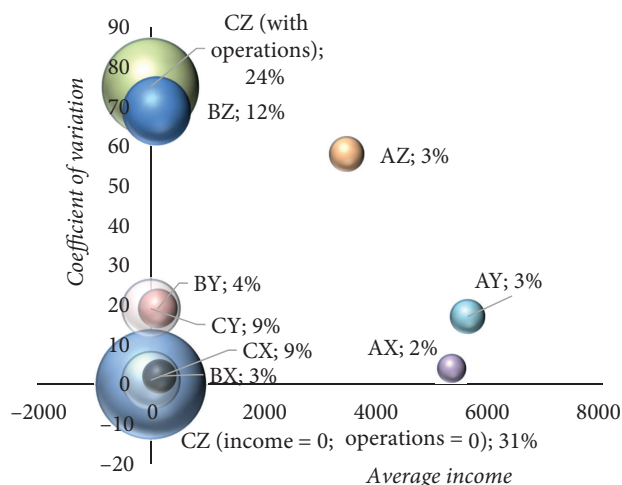


Figure 2. The plane of "quality" of the client (source: developed by the author/APPENDIX B, Table B1)

Table 2. Research report Customer Lifetime Value (CLV) (grouped)* (source: developed by the author)

Gender	Age	Average period from 1 to 3 contracts (months)	Average operating profit for the period from 1 to 3 contracts (UAH)	Number of clients with the number of contracts from 1 to 3	Average period from 3 to 4 contracts (months)	Average operating profit for the period from 3 to 4 contracts (UAH)	Number of clients with 4 contracts	Number of clients with more than 4 contracts	Average period from 1 contract to closing (months)	Average period Profit per 1 contract before closing (UAH)
1	2	3	4	5	6	7	8	9	10	11
Male	20–29	3	525	5000	6	959	59 846	896 589	40	398 785

Note: *the data in the table are for visualization and are not real.

initial stages it is necessary to apply onboarding, and in the last stages retention, but in our version, focus is not on the models used in management and marketing, but on a financially oriented model, where is data about customer base returns and the number of clients in the most profitable stage of the Customer Lifetime Value. To represent the tabular version of the information it could be used the sample presented in Table 2.

Columns 1 and 2 is recommend to you use the standard grouping fields as “Gender” and “Age”. Column 3 “Average period from 3 to 4 contracts (months)” – into account is taken the average incomes for the 6th class of the plan of accounts for banks of Ukraine (interest and commissions) under the client’s agreements, if the client has from 1 to 3 contracts. Column 3 – “Average operating profit for the period from 1 to 3 contracts (UAH)”. Average operating profit is determined for the period from the beginning of the 1st contract of the client to the beginning of the 3rd contract, if the client has less than 3 contracts, then such client is not included in the calculation. This number of contracts is optimal for a new client actively cooperating with the bank. Whereas it is likely that he already has a current account, a deposit account or an account with a higher interest (%) and a credit line (credit card) or salary project. “Number of clients with the number of contracts from 1 to 3” is the number of clients having from 1 to 3 contracts. In column 6 “Average period from 3 to 4 contracts (months)” – analyzing the third point of the Customer Lifetime Value. It is defined it on the verge of the 3rd and 4th contracts, since the client has already had the opportunity to use the basic services of the bank and is ready to use additional ones. To calculate the figure in the column “Average operating profit for the period from 3 to 4 contracts (UAH)” – calculate the average income for the 6th class of accounts plan for banks of Ukraine (interest and fees) under the client’s agreements, if the client has 3–4 contracts. “Number of clients with 4 contracts” and “Number of clients with more than 4 contracts” columns in which is determined the number of clients with the number of contracts 4 and strictly more than 4. Separately in column 10 “Average period from 1 contract to termination of relations (months)” it is necessary to calculate the period from the beginning of the 1st contract of the client

to the closing date of the last for a complete understanding of the customer average terms service situation. In column 11 “Average operating profit for the period from 1 contract to termination of relations” – it is calculation of the income brought for the entire period of service in the bank, the calculation is made on the turnover of accounts of the 6th class of the account plan for banks of Ukraine (interest and commissions) under the client’s agreements from the 1st contract until the closing date of the client last contract.

One of the most popular analytical indicators is Churn rate, but it gives limited information to make conclusions therefore it is suggested additional factor to analyze the dynamics of the number of customers. The Renewal rate, necessary to calculate the net growth of the client portfolio, the metric is calculated as the difference between the number of attracted customers and the number of lost customers at the period divided by the number of clients in the portfolio at the beginning of the analyzed period. The value of the ratio can be both negative (client portfolio decreased) and positive (client portfolio increased). These metrics are important for monitoring the size of the client’s portfolio and for tracking critical points and for detecting non-natural decline or increase in the portfolio.

It is important to emphasize an indicator that is simple to calculate but important for managing and controlling the business, namely, the profitable activity of the client’s portfolio. For the calculation of which the total number of revenues generating clients should be divided by the total number of clients in the portfolio and expressed as a percentage. Such an indicator will give an understanding of what proportion of the client’s portfolio brings income for the bank. This analysis should be carried out in cross sections of specific customer groups (this is gender and age by default, but others such as region, city, etc.).

The last, but no less important indicators is should be mentioned in this paper is the number of services provided per customer. This is the number of active contracts per client and overall contracts (including those that have expired or lost their validity) per client. These metrics will allow to track the dynamics of work productivity level with clients. For example, if the organization had 4 customer contracts as standard and the indicator dropped to

Table 3. Audit working paper (source: developed by the author)

No.	The name of the performance benchmark	Details (item / identifier) of methodological recommendations	Benchmarkable metrics	The value of the past period	The value of the analyzed period	Δ (4-6)	Auditor's conclusion
1	2	3	4	5	6	7	8
1	Profitable activity of the client's portfolio	5.25.32/C52	35% +-5%	33%	39%	+4%	During the period under review, the benchmark was met. The indicator had a positive trend (+6%) compared to the previous period

3.5 in the analyzed period, this means that there have been structural changes in the products offered by the bank, if not, then the quality of customer service has decreased, customer did not receive the service they needed in time.

It is important to emphasize that all of the above indicators and techniques should be calculated, not so much for the bank as a whole, but for each of the profit centers (Kiiko, 2016). It will qualitatively allow to monitor changes in the structure and profitability of the client portfolio.

3.2. Bank's customer portfolio internal audit evaluation

The first and main part of our article was about analyzing client portfolio quality, the next part will focus on the control mechanisms of the bank's internal audit using as a tool the analytical approaches described above, so the assessment method which is described above and there is only one task left – to complete the organizational part.

An internal audit can be performed as part of a separate audit or an audit of profit, cost, responsibilities or business units. This area will receive one of the highest risks indicator according to risk-oriented planning, as evidenced by our previous studies (Kiiko, 2017).

To organize the work of the auditor is recommended to use a research working document, which is presented in the Table 3.

In general, controlling the metrics described above is outside the scope of the traditional audit concept, but business needs for a long time ago expanded the internal audit function and provided it the power to evaluate not only financial performance and financial accounting, but also management accounting and efficiency of operations (individual operations, expenses, orders and actions of responsible persons).

4. Discussion

ABC-analysis is also effective for the banking structure in the process of analyzing the customer database, for ranking customers and determining the group of the most profitable. The most important thing is not so much the awareness and the list of the most profitable clients as their further analysis and definition of their characteristics, building a profile of such clients. This will allow in future to target marketing activities towards the same or similar clients for their involvement for banking services.

For the purposes of management accounting (analysis and comparison of the quality of the client portfolio of business units) and internal control, including internal audit, profitability of profit centers of the bank is recommended to rank not only on the net operating profit received by the center, but also with the addition (by summation) of transfer profit. This will allow the Bank's business units to be more accurately valued, as some of them may be valuable in terms of non-operating profit, rather, they play the role of accumulating liabilities.

ABC/XYZ analysis itself is quite informative but not sufficient to base it on measures to improve customer base quality. Such a conclusion can be done from the analysis of its cross-classes described above. Additionally, each of the cross-classes should be analyzed not only in section individuals and legal entities. For individuals, it is additionally necessary to analyze the products they use, time spent by a bank customer, regional distribution, use of online/offline channels, age, marital status, gender, profitability for the bank, total balance on demand and deposits accounts (transaction income). For legal entities organizations it is additionally necessary to analyze the products they use, time spent by a client of the bank, regional distribution, use of online/offline channels, type of industry, size of enterprise, profitability for the bank, total balance on demand accounts and deposits (transaction income).

ABC/XYZ analysis is not new: it is traditionally used to rank goods/products/services and less often applied to identify key customer segments. Our adaptation of this methodology for bank's client portfolio analysis, which is based on the analysis of operating income that customers bring to the bank and the number of transactions they perform (independently or automatically), provided the opportunity to identify the most active, loyal and profitable customers.

An important aspect in the process of analysing the client portfolio is its ratio analysis where the important indicators are the ratios which reflect the movement (decrease/acquisition) of the number of customers and the ratios which reflect the qualitative component of the customer base (activity/profitability) (Mohammad, 2020). It is especially important to track the number of customers who brought at least one-hryvnia profit in relation to the entire customer base or a specific group of customers. The use of such an indicator as the income activity of clients is necessary to monitor the quality of work with clients and

well-timed response to falling profitability of a particular segment of clients in the portfolio. The designed method of the improved calculation of Customer Lifetime Value (CLV) focuses on the profitability of customers at different stages and gives the understanding of future income.

The suggestions voiced on the methodology of internal audit and client portfolio analysis as its tool help systematize the evidence collected by the internal auditor for further use in analysis and interpretation and for making conclusions and offering recommendations.

Conclusions

According to the theoretical analysis and research results, it could be concluded that the above methodological approaches are relevant and allow banks to track the dynamics of the quality of their client portfolio as quickly as possible and without undue effort. The main reason for this is the banking system XXI is characterized by processes of centralization of management, integration and aggravation of competition, and as a result, the client-oriented approach to doing business is intensified to maintain their position in the market. The first and the main paper proposal, which represents its scientific novelty, is the client-oriented adaptation of the ABC/XYZ for banking institutions, where the key points are the operating income brought to the bank by customers and the number of operations performed by them (independently or automatically). That allows to identify the most active, loyal and profitable customers. An important aspect in the process of client portfolio analysis is the coefficient analysis. In which important indicators are the coefficients that reflect the movement (decrease/acquisition) of the number of customers and coefficients that reflect the qualitative component of the customer base (activity/profitability). Using in-depth client portfolio analysis allow to collected data by the internal auditor to further use it in analysis and interpretation, and to provide conclusions and recommendations.

Thus, the conditions for doing business with a large number of customers, is a standard and complex phenomenon for all large organizations with a wide range of services. The banking business is also complicated by specific and complex products. Such a business requires a quality approach to the organization of product selection and the formation of a proposal to a particular group of customers (or even an individual customer). The main tool here is in-depth analysis and further research should focus on the development of complex proposals models and a methodology for estimating future revenues that clients can generate.

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APPENDIX A

Table A1. ABC/XYZ research report (source: improved by the author)

Custo-mer code	Operating revenue	Class ABC	Number of operations	Arithmetic mean	Standard deviation (σ)	Coefficient of variation (υ)	Class XYZ
1	2	3	4	5	6	7	8
111	59 558.22	A	305	102	36.6	0.36	X
Calculations	–	–	1 month – 50 2 month – 130 3 month – 125	$(50+130+125)/3$	$\frac{((50-102)^2 + (130-102)^2 + (125-102)^2)}{3} = 1339$	36.6/102	–

Note: * the data in the table are for visualization and are not real.

APPENDIX B

Table B1. ABC/XYZ research report by ABC/XYZ classes (source: improved by the author)

Value X/Average operating revenue	Value Y/Average value of the coefficient of variation	Size/% of the number of clients in the portfolio	Class ABC/XYZ
0	0	31%	CZ (income = 0; operations = 0)
0.5	75	24%	CZ (with operations)
5319	4	2%	AX
5601	17	3%	AY
3462	58	3%	AZ
148	2	3%	BX
122	19	4%	BY
108	69	12%	BZ
3	1	9%	CX
2	19	9%	CY

Note: *the data in the table are for visualization and are not real.