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DEVELOPMENT OF A SYSTEM OF KEY PERFORMANCE INDICATORS IN THE MANAGEMENT SYSTEM OF AVIATION TRAINING COMPLEX

Fuad Mirzayev Fuad, Kovsar Dadashova, Dmytro Bugayko. "Development of a system of key performance indicators in the management system of aviation training complex". *The relevance of the research topic is due to the fact that Air Training Complexes (ATC) are systems of many interconnected business processes, where the violation of one of the processes can hinder the achievement of the company's goals. Modern approaches to managing the commercial activities of companies define key performance indicators (KPIs) as a system of indicators that assess the degree of achievement of certain business objectives. Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of key performance indicators is not used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results. In addition, the authors propose the use of Dupond's analysis as a tool for comprehensive assessment of the efficiency of the commercial activity of the ATC in order to identify the weaknesses of the ATC and timely development of measures to improve and increase the efficiency of its commercial activity. The purpose of this study is to develop a system of KPI indicators for a comprehensive assessment of the effectiveness of the management of the commercial activities of aviation training complexes, taking into account the specifics of the airline and the main areas of activity, using the tools of strategic management and marketing. Research methods - in the process of research the authors used both empirical and theoretical research methods,*

qualitative methods of interpretation and explanation of the characteristics of the studied economic object, methods of system analysis and decomposition. Significance of the study - the theoretical and practical results obtained can be used by ATC management as a tool for assessing and improving the efficiency of business activities. Results of the research - as a result of the research conducted on the basis of the analysis of the commercial activity of AZAL "Flight Training Centre" ATC, a system of key performance indicators of commercial activity in the following main areas has been developed: financial, production, customer relations and development indicators.

***Keywords**:* flight training centre; Key Performance Indicators; Dupond analysis; financial indicators; production indicators; customer relationship indicators; development indicators

Фуад Мірзоєв, Кевсар Дадашова Кевсар, Дмитро Бугайко. «Розробка системи ключових показників продуктивності у системі менеджменту авіаційних тренажерних комплексів». *Актуальність теми дослідження зумовлена тим, що авіаційні тренажерні комплекси (АТК) є системами з багатьох пов'язаних між собою бізнес-процесів, де порушення одного з процесів може перешкоджати досягненню цілей компанії. Сучасні підходи до управління комерційною діяльністю підприємств визначають ключові показники ефективності або KPI як систему показників, що оцінюють рівень досягнення певних бізнес-цілей. Проведене дослідження комерційної діяльності AZAL «Flight Training Centre» показує, що для оцінки ефективності комерційної діяльності система ключових бізнес-показників не застосовується, хоча сфера послуг АТК вимагає підвищеної уваги до побудови ефективного менеджменту з можливістю оцінки результатів. Також, авторами як інструмент комплексної оцінки ефективності комерційної діяльності АТК запропоновано використання аналізу Дюпонда для виявлення слабких місць АТК та своєчасної розробки заходів щодо покращення та підвищення ефективності його комерційної діяльності. Метою даного дослідження є розробка системи показників KPI для комплексної оцінки ефективності управління комерційної діяльності авіаційних тренажерних комплексів з урахуванням специфіки авіапідприємства та основних напрямів діяльності, використовуючи при цьому інструменти стратегічного менеджменту та маркетингу. Методи дослідження - у процесі проведення дослідження авторами були використані як емпіричні, так і теоретичні методи дослідження, якісні методи для інтерпретації та пояснення властивостей економічного об'єкта, що вивчається, методи системного аналізу та декомпозиції. Значимість дослідження – отримані теоретичні та практичні результати можна використовувати менеджментом АТК як інструмент оцінки та підвищення ефективності комерційної діяльності. Результат дослідження – в результаті проведеного дослідження на основі аналізу комерційної діяльності АТК AZAL «Flight Training Centre» розроблено систему ключових показників ефективності комерційної діяльності за такими основними напрямками: фінансові, виробничі, робота з клієнтом та показники розвитку.*

Ключові слова: авіаційний тренажерний комплекс; ключові показники ефективності; аналіз Дюпонда; фінансові показники; виробничі показники; показники роботи із клієнтом; показники розвитку..

The relevance of the research topic is due to the fact that Air Training Complexes (ATC) are systems of many interconnected business processes, where the violation of one of the processes can hinder the achievement of the company's goals. Modern approaches to managing the commercial activities of companies define key performance indicators (KPIs) as a system of indicators that assess the degree of achievement of certain business objectives.

Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of key performance indicators is not

used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results.

In addition, the authors propose the use of Dupond's analysis as a tool for comprehensive assessment of the efficiency of the commercial activity of the ATC in order to identify the weaknesses of the ATC and timely development of measures to improve and increase the efficiency of its commercial activity.

The purpose of this study is to develop a system of KPI indicators for a comprehensive assessment of the effectiveness of the management of the commercial activities of aviation training complexes, taking into account the specifics of the airline and the main areas of activity, using the tools of strategic management and marketing.

Research methods. In the process of research the authors used both empirical and theoretical research methods, qualitative methods of interpretation and explanation of the characteristics of the studied economic object, methods of system analysis and decomposition.

Significance of the study. The theoretical and practical results obtained can be used by ATC management as a tool for assessing and improving the efficiency of business activities.

Presentation of the main results. As a result of the research conducted on the basis of the analysis of the commercial activity of AZAL "Flight Training Centre" ATC, a system of key performance indicators of commercial activity in the following main areas has been developed: financial, production, customer relations and development indicators.

Today, ATC is trying to develop its business in the current market environment and improve its efficiency. Among the main factors that have a significant impact on ATC's commercial activities are:

– changes in the preferences of airline customers, who are becoming increasingly demanding in terms of the quality of service provided;

– internationalization trends of ATC's partners (e.g. travel agencies);

– digitalization of the industry (digital training and microlearning of aviation specialists).

The conditions created are contributing to the intensification of competition between ATC, which are operating more and more freely on the services market. In this context, it is important for each ATC to continuously monitor its performance in relation to other participants in the market of training services for aviation professionals.

To this end, it is necessary to analyze the indicators of commercial activity in order to understand the trends and possible directions of ATC growth.

ATC's commercial activity is a set of business processes and operations for the production and realization of services on the ATC market, taking into account the interests of each market participant.

The main goal of a commercial organization, regardless of the chosen development strategy and methods of implementing this strategy, is to conduct commercial operations that lead to a positive financial result. Therefore, continuous assessment of the efficiency of commercial activities not only helps the company to achieve its strategic goals, but also enables it to identify ATC's weaknesses and develop timely measures to improve and increase the efficiency of commercial activities. Assessing commercial performance requires a thorough analysis of operations, sales and financial results. This is achieved by tracking relevant key performance indicators.

Key Performance Indicators or KPIs - are business indicators that form the culture of business success and reflect the completeness of achievement of certain goals within a particular job or the indicator of solving a particular task.

KPIs have proven their effectiveness in the management system and have found wide application in most companies of

different industries. Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of business indicators is not used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results.

As our research into the aviation training centre market shows, key performance indicators typically include:

1) obtaining an EASA Certificate (for simulator training). EASA sets safety standards and regulations for aviation in Europe and the EASA certificate enables ATCs to provide training that meets these standards. The process of obtaining an EASA certificate can be complex and requires strict adherence to standards and regulations and involves several steps and requirements:

– Registration and Training: The ATC should be registered as a legal entity and have the necessary structure and resources for training in accordance with EASA requirements;

– Compliance with Standards: The ATC should develop and implement training programmes and standards that comply with EASA regulations. This includes the preparation of training materials, instructors and infrastructure;

– Application for certification: The ATC shall submit an application for certification to EASA. The application usually includes information on the training centre structure, training programmes and other documents;

– Audit and verification: Upon receipt of the application, EASA will audit and verify the ATC to ensure that all requirements are met. This includes checking the infrastructure, the qualifications of the instructors and the quality of the training;

– Certification: If the ATC meets all requirements, EASA will issue a certificate allowing the training centre to provide training in accordance with EASA standards;

– Update and maintenance: The ATC must regularly update its training programmes and continue to comply with EASA standards to maintain its certificate.

2) increase in the number of trainees; increase in the percentage of certified trainees;

3) achievement of a certain volume of services provided (number of programmes and courses);

4) acquisition of a certain level of material and technical support.

Although there is a strong link between commercial activity and end results, positive financial outcomes alone do not confirm the effectiveness of ATC's commercial activity. To conduct a thorough evaluation of ATC's commercial activity effectiveness, we have developed a range of indicators in key areas such as financial, production, client relationships and development (see Fig. 1).

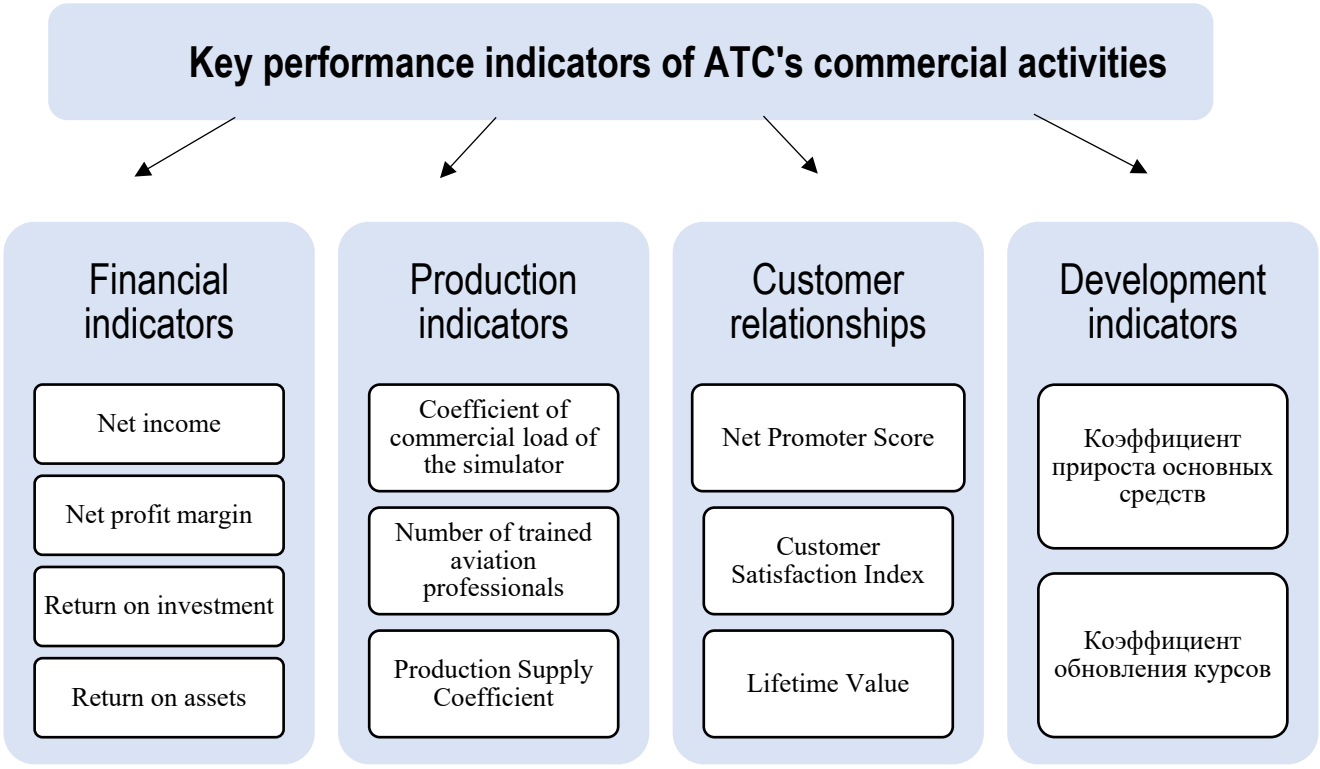

Figure 1 – System of key performance indicators of ATC commercial activity
Source: compiled by the authors

Our proposed system of key performance indicators of ATC commercial activity includes:

1. Financial indicators:

1.1. *Net income* – the final financial result of the enterprise's activity, numerically reflecting the capital growth for the reporting period and is calculated as the difference of revenue (Formula 1).

$$\text{Net income} = \text{Profit} - \text{Costs} \quad (1)$$

For a thorough analysis of ATC's commercial activity, it is necessary to compare the indicator results for the same period as the previous year (quarter, month). The net profit indicator alone does not provide a comprehensive picture of current conditions or future business prospects. This comparison identifies and analyses deviations. It should be considered in correlation with other financial and production indicators.

1.2. *Net profit margin* – is a measure of a business's net profitability, revealing the efficacy of a company's cost management. Technical terms will be explained when first used. Regular academic sections, consistent citation, and formatting features will be followed. The tone will be passive and grammatically correct with clear, concise, and objective language. It is defined as the ratio of net profit to ATC revenue (Formula 2):

$$\text{NPM} = (\text{Net Profit}/\text{Revenue}) \times 100\% \quad (2)$$

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A high net profit margin signifies ATC's resilience to external changes, such as declining service prices or escalating spare part production costs.

1.3. *Return on investment (ROI)* – is a measure of the efficiency or profitability of an investment that determines the amount of return on a particular investment relative to its cost. It is a tool for assessing the potential investment of funds, for example, this business metric can be used when making a decision to invest in the purchase of a new flight simulator or the construction of a new building of a training complex (Formula 3):

$$\mathbf{ROI} = \frac{\mathbf{investment\ income - costs}}{\mathbf{investment\ costs}} \times \mathbf{100\%} \quad \mathbf{(3)}$$

1.4. *Return on assets (ROA)* – is an indicator of the efficiency of use of all ATC assets (flight simulators and their spare parts, which are stored to ensure the continuity of the service provision process; buildings and production facilities, which are used to produce services; rights, licences, certificates and other intangible assets that ATC can use for its business, i.e. it indicates the extent to which ATC's business processes are fine-tuned. Return on assets is calculated as the ratio of ATC's net profit to total assets and is usually expressed as a percentage (Formula 4):

$$\mathbf{ROA} = \frac{\mathbf{Net\ profit\ for\ the\ reporting\ period}}{\mathbf{Amount\ of\ assets\ for\ the\ reporting\ period}} \times \mathbf{100\%} \quad \mathbf{(4)}$$

1.5. *Break-even point (BEP)* – is a financial indicator that defines the threshold of profitability of ATC services and shows the level of price, sales volume and cost of service at which all costs of ATC will be equal to the revenue from sales. This business metric is calculated by formula 5:

$$\mathbf{BEP} = \frac{\mathbf{Fixed\ costs}}{\mathbf{Unit\ selling\ price - Variable\ unit\ costs}} \quad \mathbf{(5)}$$

Calculation of the break-even point will help ATC to determine its desired volume of production of services, to decide on the range of services and pricing by type of training and to determine the strategy of investment and innovation projects.

2. Production indicators:

2.1. *Coefficient of commercial load of the simulator*:

2.1.1. *Maximum commercial load factor of the simulator* – determines the maximum possibility of utilization of each flight simulator, taking into account maintenance;

2.1.2. *Coefficient of planned commercial load of the simulator* – determined for each type of aviation simulator, taking into account the maximum load standard, the actual achieved load level for the previous period, as well as industry forecasts;

2.1.3. *Coefficient of actual commercial load of the simulator* – determines the efficiency of actual utilization of each flight simulator;

2.1.4 *Coefficients of threshold commercial load of the simulator* – determines the break-even point of production, and in combination with actual coefficients - characterizes the real situation of ATC.

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2.2. *Number of trained aviation professionals*:

2.2.1 *Number of aviation specialists who have undergone simulator training* – this figure determines the total number of aviation specialists who have received simulator training (by aircraft type) at a specific time.

2.2.2 *The number of aviation specialists who have undergone theoretical training* – this figure determines the total number of aviation specialists who have received theoretical training (by course type) at ATC at a specific time.

2.3. *Production supply coefficient*:

2.3.1. *The spare parts supply coefficient* – determines the quantity of spare parts necessary to maintain the readiness level of each flight simulator.

2.3.2. *The teaching staff supply coefficient* – including instructors, determines the number of instructors necessary to deliver a specified number of courses by course type.

3. Customer relationship indicators:

3.1 *Net Promoter Score (NPS)* – reflects the willingness of the customer (aviation professionals who have used ATC's services) to recommend the course;

3.2. *Customer Satisfaction Index (CSI)* – usually measured in tandem with NPS and allows tracking the relationship between customer satisfaction and their loyalty to ATC's product (theoretical or simulator training and retraining of aviation specialists);

3.3 *Lifetime Value (LTV)* – determines the length of time a customer is an active user of ATC service. This is the profit that the client brings for the entire time of interaction with the brand (since airlines use ATC services more than once). Analysis of this business metric provides the following benefits: identifying the most loyal customers, optimizing retention efforts, understanding customer behavior when making a purchase.

4. Development indicators:

4.1. *Fixed assets growth coefficient* – characterizes the process of fixed assets renewal, determining both acquisition of new fixed assets and retirement of existing fixed assets of ATC (the complex building, aircraft simulators, long-term spare parts, etc.) for the reporting period. This business metric is calculated as the ratio of the growth of fixed assets for the reporting period to the value of the organization's fixed assets at the end of the reporting period (Formula 6):

$$GC_{FA} = FA_{RP} / FA_{E} \qquad (6)$$

4.2. *Course renewal coefficient* – characterizes the share of new types of courses or individual courses in the total range of educational services provided in the reporting period. Since the main product of ATC activity is an educational service, the dynamics of updating the range of services, which in turn indicates their compliance with the requirements of industry standards, is one of the key indicators of ATC competitiveness. This business metric is calculated as the ratio of the number of courses (types of courses) developed during the reporting period to the total number of courses (types of courses) at the end of the reporting period (Formula 7):

$$C_{CR} = C_{B} / C_{E} \qquad (7)$$

Based on the results of assessing the effectiveness of ATC's commercial activities in all the selected areas, it is necessary to work continuously on their improvement and to develop measures to improve ATC's commercial activities that will contribute to maximising their effectiveness. Dupond's analysis can be a useful tool for identifying ATC's strengths and weaknesses and developing strategies to improve ATC's effectiveness.

Conclusions. The Dupond analysis method is a financial tool that breaks down profit performance into several components and assesses which aspects of the business affect overall profitability. It consists of three key components: return on assets (ROA), return on equity (ROE) and price/earnings (P/E) multiple. In order to assess the efficiency

of ATC's commercial operations using Dupond's analysis, it is necessary to:

1. Break down profit into its components: return on assets (ROA), return on equity (ROE), and P/E (price/earnings) multiple (defined as the ratio of market value of stock (or company value) to earnings) and evaluate each of the components for ATC, using financial statements and company data to calculate these measures.

2 Identify the aspects of the business that affect each component. For example, increased profits or efficient use of assets may increase ROA, and increased equity may improve ROE.

3. Develop strategies to improve each component. For example, this may include optimizing ATC's asset management, increasing training efficiency or increasing profit.

4. assess the impact of the current strategy on ATC's overall profitability and consider what changes can be made to improve commercial performance.

Based on the practices of advanced enterprises, the use of a KPI system will enable ATC to manage its operations more effectively, identify areas for improvement and respond quickly to changes in the environment or intra-organizational challenges.

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