DOI: https://doi.org/10.30525/2256-0742/2024-10-3-207-214

REVENUE FORECASTING SCENARIOS FOR INTERNATIONAL HOTEL CHAINS

Anatolii Mazaraki[1], Mariia Kulyk[2], Tetiana Zubko[3]

Abstract. The *purpose* of the study is to develop a system of balanced scorecards for forecasting the income of hotels belonging to international chains. The subject of the study is the system processes of evaluating the effectiveness of the management analysis system, which are determined on the basis of calculating key performance indicators, and as a result of the integral indicator through the analysis and aggregation of individual functional criteria based on comparison with the reference values of the revenue management model for pricing, load planning and its redistribution between revenue centres. *Methodology.* The study uses the methods of theoretical and logical generalisation. The article describes a set of strategies and tactics used by international hotel chains to manage the demand for hotel services. The *results* of the article are to form a model for conducting a detailed operational and financial analysis of the hotel enterprise by revenue centres, which contributes to the development of a strategy. The authors have selected a set of indicators that are used to ensure a balanced approach to measuring performance through the indicator method and visual representation in a graphical representation. The paper analyses the performance of international hotel chains over twelve years in order to assess the impact of key factors on their revenues and develop forecasts; the estimated indicators were classified into seven groups: assessment of the average daily revenue per room, room cost, occupancy rate, market share, staff productivity, resource intensity and digitalisation costs. The publication uses the example of international hotel chains to clarify the content and importance of revenue forecasting in the revenue management system.

Keywords: revenue forecasting, balanced scorecard, international hotel chains, indicators, coefficients, enterprise financial analysis, enterprise operational analysis, revenue management, international business.

JEL Classification: C13, F23, O16, Z32

1. Introduction

In an unstable external environment, one of the reasons for the decline in the financial performance of enterprises is the lack of a unified system of revenue forecasting and failure to take into account the principles of revenue management. At present, it can be observed that the revenue management system of international hotel chains is developing as a set of strategies and tactics that business entities use to scientifically manage the demand for their goods and services. This practice originated in the aviation industry and has now become a core business practice in a wide range of industries, including hospitality, energy, clothing retail and manufacturing. The system functions in the process of finding optimal ways and directions of activity based on the use of forecasting models.

An enterprise's activities require the use of methods, rules, techniques and approaches that allow it to identify problems and new opportunities in order to optimise the expenditure of resources on the formation and implementation of goals. In order to make informed decisions and implement new methods, it is necessary to obtain timely and reliable information about the occupancy rate of a hotel company and its competitive market share. Therefore, analysing trends in indicators and forecasting revenues is extremely important. Currently, despite

[1] State University of Trade and Economics, Ukraine
E-mail: rector@knute.edu.ua
ORCID: https://orcid.org/0000-0003-1817-0510
[2] State University of Trade and Economics, Ukraine
E-mail: m.kulyk@knute.edu.ua
ORCID: https://orcid.org/0000-0001-8732-7441
[3] State University of Trade and Economics, Ukraine *(corresponding author)*
E-mail: t.zubko@knute.edu.ua
ORCID: https://orcid.org/0000-0002-8950-1797

the existing tools for managing hotel chains, there is a need to develop a unified methodological approach to managing the performance of international hotel chains.

2. Literature Review

Revenue forecasting represents a component of a management system that is founded upon established management laws and principles, as evidenced by numerous academic works (Cleophas, Kadatz, Vock, 2017; Georgiev, 2016; Campos, Gomes, Santos, 2020). Revenue management (RM) systems assist organisations in increasing their revenues by allocating capacity to those customers who value it most. Revenue growth is significantly influenced by factors such as demand, competition, seasonality, and other external factors. It is essential to isolate the impact of such external factors when measuring the effectiveness of RM systems.

There are several methods for determining the effectiveness of a revenue management system. The most common methodology is the use of the Uniform System of Accounting for the Lodging Industry (USALI), which is widely used in thousands of hotels around the world and helps to calculate key performance indicators (KPIs) of the enterprise. This methodology was proposed and first published in 1926 by the New York Hotel Association (Georgiev, 2016). Later, researchers at the American Hotel and Lodging Institute improved this methodology by identifying individual components of the USAR and USFRS standard (Campos, Gomes, Santos, 2020) for managers, as they, due to a greater degree of detail, allow for a deeper analysis of the operating and financial activities of the hotel company, as well as a clearer and more objective view of the revenue centres, which contributes to the development of the strategy. Despite the need to ensure a balanced approach to performance measurement, companies continue to focus on traditional financial indicators (gross revenue, profit before tax and cost reduction). On the marketing side, intangibles such as customer satisfaction are most often used. Other key performance indicators include service distribution and customer satisfaction. For example, Vinaysingh Chawan (2018) proposed an approach to create a dashboard for monitoring the performance of RM systems, where the assessment of revenue management (RM) systems is based on the calculation of performance measurement metrics. The interpretation of these metrics is done according to the revenue centres and the performance of RM systems at the stages of forecasting, inventory control and overbooking in revenue management. The only disadvantage of the proposed approach is the incomplete consideration of qualitative factors in measuring the performance of hotel chains.

It is worth considering the methodology proposed by Adrien Chia, which is also based on performance measurement and is a continuation of the improvement of the methodology of colleagues based on balancing supply chain measurement indicators (Chia, Goh, & Hum, 2009). Companies must recognise the importance of strategic performance drivers in the future. Managing the overall performance of a particular supply chain requires coordination between the various supply chain participants. And it often requires all participants to adopt a common, balanced perspective in performance management to contribute to the overall efficiency and competitiveness of the entire supply chain.

In an unstable external environment, the impact of quarantine and security restrictions, businesses' risks and the need to forecast revenues are increasing. Economists suggest using certain methods or applying various combinations of methods to forecast a company's revenue. For example, Dina Marisa Khairina suggests using double exponential smoothing and triple exponential smoothing methods to determine revenue targets, which will increase the accuracy and efficiency of forecasting (Khairina, Daniel, & Widagdo, 2021). Forecasting models using mathematical methods are necessary to predict future revenue targets so that progress can be tracked and taken into account in decision-making. Scientists Anthony Graham Bellotti and David Hand interpret forecasting in a crisis as options for assessing and solving problems associated with changes in the artificial intelligence system, which is a flowchart to facilitate the identification and selection of methods (Bellotti, Hand, & Khan, 2020).

The effectiveness of the revenue management system is assessed based on the calculation of key performance indicators and as a result of an integral indicator by analysing and aggregating individual functional criteria calculated by comparing them with the reference values of the revenue management model for pricing, occupancy planning and redistribution between revenue centres.

In a revenue management system, the allocation of activity costs (resource time) for scheduling activities requires trade-offs between time and revenue. Thus, resource planning and scheduling is a hierarchical problem for revenue managers. In addition, existing methods for assessing the effectiveness of a revenue management system do not take into account price elasticity issues, in particular, the issue of service differentiation and diversification of activities that generate more revenue (Pinder, 2005).

Shi-Woei Lin argues that through capacity planning and sales planning, a certain portion of the room stock should be reserved for customers who are willing to pay higher prices for urgent bookings, such as contract change bookings. The impact of the

estimates on the NPV of the programme is achieved through potential solutions to capacity planning and programme problems using revenue management techniques based on functional dependency calculations (Lin, Merdikawati, Wu, & Yeh, 2023). This authors' methodology is interesting, but it is unclear what functional dependencies or influence system the authors propose to use.

There are several areas of application of methods and models of system analysis, economic and mathematical methods and models as tools for managing income and expenses proposed by scientists:

– The use of indicator approaches (Tsyutsyura, Tsyutsyura, & Kharytonov, 2010; Pozhuev, 2011). Indicator approaches are often used in economics, but the disadvantage of this methodological approach is its non-unified nature and a certain subjectivity in the choice of indicators;

– mathematical modelling of quantitative indicators is used to develop forecasts and comparative assessment (Sviatnenko, 2021; Chupilko, 2023);

– the use of matrix methods, namely analysis using reservation matrices (Fiori & Foroni, 2020). These methods are easy to use and based on statistical measurements. However, these methods do not allow tracking the impact of factors;

– the method of determining strategic alternatives (the problem of optimising the assortment at each time step of the Bellman equation) (Strauss, Klein, & Steinhardt, 2018). This method is mainly used in light industry enterprises and is not common in the hotel business;

– combining the calculation of an absolute or relative indicator of the enterprise's sustainability performance with their transformation into a rating (Krause & Arora, 2019; Padhi & Aggarwal, 2011). The difficulty of applying this method lies in the subjectivity of justifying the system of sustainable development indicators;

– graphical (Chou & Parlar, 2006; Kunnumkal & Talluri, 2019);

– methods of fuzzy multi-objective programming (Gupta & Sharma, 2020);

– decomposition methods that combine aspects of mathematical programming and pure Markov decision-making (MDM) approaches by decomposing the problem in terms of time, state, or both (Cooper & Homem-de-Mello, 2007; Cooper W., Homem-de-Mello, & Kleywegt, 2006).

There are publications in the scientific periodicals describing various author's methods for assessing the effectiveness of the revenue management system within the framework of "time decomposition" using heuristics at the beginning of the booking horizon and moving to more detailed solutions according to the level of demand closer to the check-in.

The research **is aimed** at considering the methodology for conducting a comprehensive assessment of the status of income management and key performance indicators of international hotel enterprises, taking into account their industry specifics.

The methods of strategic planning and forecasting the development of economic systems according to various performance or development criteria considered in the scientific literature (Cleophas, Kadatz, & Vock 2017; Bellotti, Hand, & Khan, 2020; Lin, Merdikawati, Wu, & Yeh, 2023; Cooper & Homem-de-Mello, 2007; Cooper W., Homem-de-Mello, & Kleywegt, 2006) the disadvantage of which is the limited scope of diagnostics. Attempts to build an integral indicator (Strauss, Klein, & Steinhardt, 2018; Krause & Arora, 2019; Padhi & Aggarwal, 2011; Cho & Parlar, 2006; Kunnumkal & Talluri, 2019) do not take into account the sectoral boundaries of the parameters in the calculations and all possible evaluation indicators.

The goal of this article is to develop a methodology for assessing the profitability of international hotel enterprises. Achieving this goal involves solving the following tasks:

– Building a system of sustainable development goals on the example of the selected hotel industry, taking into account the principles of the rhubarb management system;

– development of a mechanism for diagnosing hotel performance;

– formation of a more complete system of evaluation indicators;

– clarifying the limits of parameter changes.

3. Materials and Methods

The basis of this article is a study of the results of research by domestic and foreign scholars on the formation of revenue management systems, determining the impact of the main factors on the formation of revenues of international hotel enterprises. The study of this issue was carried out using the methods of theoretical generalisation, analysis and synthesis.

The study included the processing of statistical materials and documentation of the International Business Centre LLC, where the revenue management system was implemented.

4. Results and Discussion

The use of stochastic optimisation methods based on sampling to solve a specific case is interrelated: without determining the relationship between components and income centres, their decomposition is impossible; without decomposition, their comparison is impossible; determining the

magnitude of the impact of factors is possible only with regard to their relationship, decomposition and balancing; the results of the determined assessments are generalised. The application of each indicator of the systemic assessment is achieved by selecting a set of certain techniques and methods. An analysis of the modern economic literature on this issue has led to the conclusion that numerical results for the binary problem indicate that multivariate methods work well. William Cooper and Tito Homem-de-Mello (2006), considering decision models as a large stochastic programme, derived some structural properties of binary problems. They showed that these properties cannot be extended to large hotel chains. For large international hotel chains, the 'state space decomposition' approach is used, which divides the network problem into two subtasks, each of which is solved separately. The solutions of these subproblems are then recombined to determine the reservation thresholds for the network problem. In the work of Anatolii Mazaraki (Mazaraki, Boiko, Okhrimenko, Melnychenko, & Zubko, 2019), econometric modelling techniques were used, which provided reasonable estimation results.

Revenue management is a management technology for forming a pricing policy based on forecasting consumer demand, which aims to achieve an optimal balance between demand for services and the corresponding supply, using the most efficient distribution channels as the main determinants of revenue growth. In a changing environment in the hotel services market, achieving this pragmatic goal requires demand segmentation, price elasticity modelling and the application of pricing policy optimisation methods.

The economic effect of revenue management is the main characteristic of the success of its application. It is clear that there is a clear feedback of the success of the hotel business entity from the adoption of the right marketing decisions. Domestic hotel business entities mostly use the "average daily rate" indicator in their activities. At the same time, it does not always adequately reflect the efficiency of the use of hotel resources. For example, two companies with similar functional characteristics and average daily rate may differ significantly in their operational efficiency. The results of using revenue management tools in international hotel chains such as Marriott, Courtyard, Residence Inn, etc. convincingly show that the revenue management system allows to increase the occupancy rate from 10 to 30 % (sales turnover increases by 7-10 %) and revenue per room; optimise the sales process, ensure annual growth of additional profit from 15 to 40 % (O'Connor, Piccoli, 2003). The above facts eloquently demonstrate the pragmatism of revenue management, which is based on taking into account the diversity of consumer demand and the need to develop different room rates to meet the demand of different segment groups. Despite the proven effectiveness of revenue management, it is not widely used in Ukrainian hotels. The main reasons for this are the lack of applied recommendations for its implementation in the revenue management system and the corresponding information support of revenue management processes.

Table 1 provides a generalised overview of methods for assessing the efficiency of the hotel enterprise revenue management system, their features, advantages and disadvantages (Table 1).

The use of a system of methods for evaluating the efficiency of the hotel enterprise revenue management system involves their selection among the existing alternatives. These shortcomings, according to the authors, can be eliminated by the modern method of management (BSC), which is widely used in foreign countries. The study develops a mathematical model for deriving the theoretical foundations of the balanced scorecard concept. The model consists of several parts that are integrated into the company model. This model includes a demand function, a production function and a firm's objective function, which are described by traditional microeconomic concepts. Demand is represented as a function of price and customer relationship management (CRM) costs. Production is assumed to depend on labour, capital and development and training (D&T) costs. Simple dynamics are included in both the demand and production functions. The firm's strategy is described by an objective function based on profit and net income. The output variables of the model are classified as six components of the BSC. The influence of goals (strategies) on the importance of price restrictions is analysed. It is shown that changing the goals can change the order of their importance. Thus, a change in strategy should be accompanied by a change in the BSC focus. In addition, non-financial and financial performance indicators can change in opposite directions when the strategy shifts towards profit maximisation. On the basis of the allocated methods and indicators of the BSC of hotel management, an algorithm of methodical approach to its evaluation in three successive stages has been formed. The first stage is to define a balanced scorecard for evaluation, which reflects the current status of the main components of the rhubarb of management of a hotel enterprise. The second stage of the assessment of revenue management is to determine the significance of the assessment criteria based on the scoring characteristics of the economic activity of business entities using the method of expert assessments, which will allow to reflect the main components and reduce them to a single integral indicator for each component. The third stage of the assessment consists in limiting

Table 1

Methods for assessing the effectiveness of the revenue management system of a hotel company

Method	Features	Advantages	Disadvantages
Indicative	It is characterised by a comparison of the actual efficiency of the revenue management system with the thresholds	It allows to evaluate individual results and identify reserves	Dependence of the result on the appropriate definition of indicators and thresholds
Mathematical modelling of quantitative indicators	Based on the use of discriminant multivariate models	Large information capacity	Absence or insufficient justification of normative values of indicators
Matrix	Based on the qualitative characterisation of the results in the dynamics and the factor influence	Calculation of block indicators and integrated performance assessment	Assessment requires identification of constraints, level of competition and scarcity
Decomposition	Takes into account the long-term trend of the series, allows to track the seasonal component	Analytical alignment to determine the trend for actual values	Alternative causal mechanisms and determinants of the behaviour of the forecast indicator
Fuzzy multi-objective programming	The following fuzzy numbers are used as model coefficients	Detection of linear interval regression models of a linear interval system	Absence of possibility to interpret as a pattern with a tendency to the centre
Graphical	Determination of the break-even point by building a dependence of income and total expenses on the volume of activity	Visual display of statistics and forecasts	Lengthy process of data collection and analysis, inefficient for assessing complex or dynamic indicators
Rating scores	Provides a holistic view of performance based on predefined criteria	Multidimensional approaches to evaluation using quantitative and qualitative indicators	Subjectivity and bias of experts, which leads to inaccurate assessments
Identification of strategic alternatives	An analytical model that ranks alternatives based on their expected effects	Combining qualitative and quantitative research methods	Limited use in certain contexts

the criteria (indicators) applicable to an individual business entity at the relevant stage of the life cycle. For each area, performance criteria are provided, according to which each indicator is assigned a score, which subsequently makes up a consolidated rating of the effectiveness of management of hotel enterprises based on scoring characteristics.

Thus, the article improves the methodology for assessing the efficiency of revenue management of a hotel enterprise, allocates its main components, which constitute integrity and interdependence, and defines a list of indicators for each component that can be used to assess the overall efficiency of revenue management of an accommodation facility.

Defining the etymological essence of the concept of 'indicators for assessing the components of revenue management", it should be noted that in the scientific literature the term 'revenue management indicators' is mostly used to reflect the centres and sources of revenue generation (Remy, Boo, & Tee, 2023; Queenan, Ferguson, & Stratman, 2011; Josephi & Melissen, 2017; Routledge, Michopoulou, & Moisa, 2019; Maier, 2012).

As part of the analysis of the level of revenue management, the profitability function of hotel complexes was selected. This function contains factor attributes selected from the list of the balanced scorecard. The following factors were selected from the balanced scorecard to analyse the hotel profitability:

X1 – average cost per room, USD,

X2 – the degree of occupancy of the room stock, $X2 \in [0; 1]$,

X3 – market share (MRI), %,

X4 – labour productivity, units per hour,

X5 – loss of resources, %,

X6 – digitalisation costs, %.

The table shows the time series of data for International Business Centre LLC (Table 2).

Using Excel functions, a multidimensional linear model was built (Figure 1).

The model has the following form:

$$\hat{Y} = 0,3X_1 + 4952,6X_2 - 2876,26X_3 + 997,51X_4 - \\ -8566,5X_5 + 2413,86X_6. \quad (1)$$

The adequacy of the model was tested using the t-test for parameter estimation. The critical value of t was found from the t-statistics table for the significance level α=0.05 and n-m=12-6=6 degrees of freedom, the t-test value for the two-sided test is 1.943, which is higher than the calculated values (Figure 1). Thus, all the model parameters are insignificant and there is a need to choose another model of the relationship with these factors.

Table 2
Initial data for determining the dependence of the hotel complex profitability

Year	Y	X_1	X_2	X_3	X_4	X_5	X_6
2014	225,191	641,471	0,478	1,05	0,079	0,05	0,0
2015	648,855	1400,902	0,431	1,05	0,048	0,02	0,1
2016	916,031	1415,050	0,468	1,04	0,097	0,06	0,0
2017	1145,038	1135,872	0,468	1,04	0,063	0,06	0,1
2018	1374,046	398,472	0,478	1,05	0,387	0,03	0,1
2019	1412,214	481,020	0,431	1,05	0,366	0,03	0,1
2020	543,897	793,596	0,306	0,89	0,416	0,04	0,1
2021	1445,359	788,280	0,306	0,89	0,254	0,03	0,0
2022	691,740	1493,493	0,306	0,89	0,511	0,05	0,1
2023	1489,985	2301,673	0,478	1,05	0,331	0,03	0,1

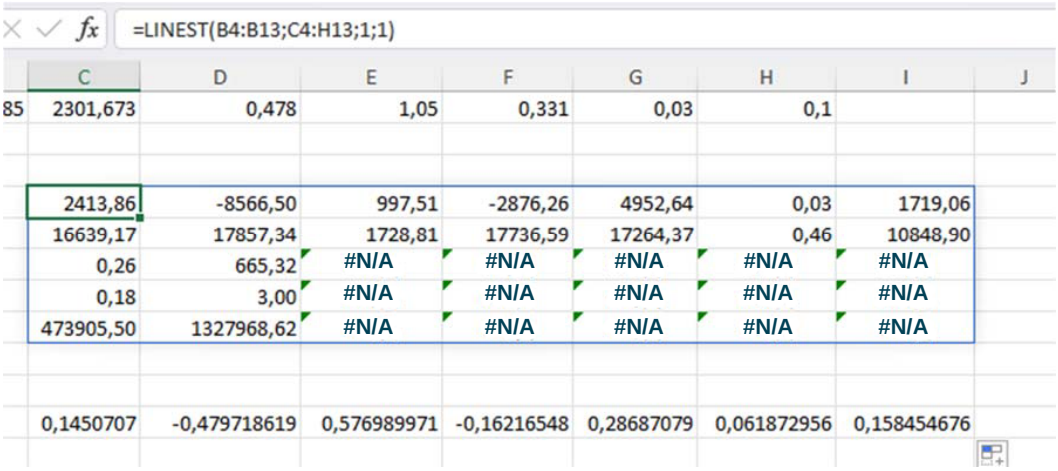

Figure 1. The result of calculating the linear dependence of volume on profitability of a hotel complex

The model is not accepted – it is assumed that there is a nonlinear dependence of a different form. An extended power function of the form

$$Y = a_0 \times X_1^{\alpha} \times X_2^{\beta} \times \cdots \times X_7^{\mu}. \quad (2)$$

The function is reduced to a linear form by logarithmisation.

$$lnY = lnA + \alpha \times \ln X_1 + \beta \times \ln X_2 + \gamma \times \ln X_3 + \delta \times \ln X_4 + \theta \times \ln X_5 + \vartheta \times \ln X_6. \quad (3)$$

Using Excel functions, a multidimensional power law model was built (Figure 2).

The result of the calculation is as follows:

A'=15,41, α=-0,13; β=4,4; γ=-8,28, δ=0,36, θ=- 0,01, υ= 1,1.

The power law model is as follows:

$$Y_{calc} = \exp(15,41) \times X_1^{-0,13} \times X_2^{4,4} \times \times X_3^{-8,28} \times X_4^{0,36} \times X_5^{-0,01} \times X_6^{1,1}, \quad (4)$$

$$Y = 4931435^* X_1^{-0,13} \times X_2^{4,4} \times X_3^{-8,28} \times \times X_4^{0,36} \times X_5^{-0,01} \times X_6^{1,1} \quad (5)$$

The coefficient of determination is 0.89, which confirms the relationship between the variables. In the power law model, the variance of the residuals of statistical information is less than in the linear additive model, so it is concluded that the power law form of dependence better describes the relationship between the variables.

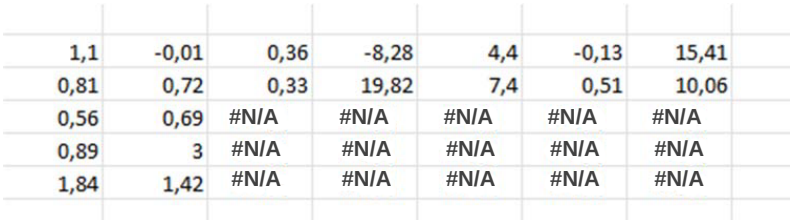

Figure 2. Calculation of the parameters of functional dependence of the volume of income of a hotel complex by a power law model

5. Conclusions

The application of methodological developments in revenue forecasting allows, on the basis of a preventive analysis of trends in the change of indicators of the current market equilibrium with the use of external factors, to select for further practical application forecasting methods that ensure the fullest possible consideration of the peculiarities of the functioning of various segments of hotel service providers and their impact on the formation of hotel revenues. To ensure the most effective and efficient forecasting analysis, the hotel manager should use the ranking of alternative functions that influence decision-making. In connection with the above, there is a need to choose the optimal forecasting method that would take into account all possible factors that influence decision-making.

In further scientific research, it is advisable to focus on substantiating the scientific and methodological provisions of the process of building an automated information system, which will allow to select the necessary criteria for the quality of models and evaluation of revenue forecasts of hotel enterprises. The argumentation is that due to the instability of the economic environment and the variability of market factors, there is a need to develop and implement an adaptive model of economic planning that would take into account possible processes and trends, logical interconnection and development to the maximum extent possible. This is achieved through the integrated implementation of forecasting approaches and methods.

References:

Cleophas, C., Kadatz, D., & Vock, S. (2017). Resilient revenue management: A literature survey of recent theoretical advances. *Journal of Revenue and Pricing Management*, Vol. 16, p. 483–498.

Georgiev, D. (2016). Applying The Uniform System of Accounts for the lodging industry (USALI) for the purposes of financial and management accounting. Izvestiya. *Journal of Varna University of Economics*, Vol. 60(2), p. 154–167.

Campos, F. Gomes, C. & Lima Santos, L. (2020). Análise comparativa do USALI, USAR e USFRS. *Tourism and Hospitality International Journal*, Vol. 14(1), p. 91–113. DOI: https://doi.org/10.57883/thij14(1)2020.30878

Chawan, V. (2018). Performance measurement of revenue management systems. *International Journal of Business Excellence*, Vol. 14(3), p. 380–392. DOI: https://doi.org/10.1504/IJBEX.2018.089798

Chia, A., Goh, M., & Hum, S. H. (2009). Performance measurement in supply chain entities: balanced scorecard perspective. Benchmarking: *An International Journal*, Vol. 16(5), p. 605–620. DOI: https://doi.org/10.1108/14635770910987832

Khairina, D. M., Daniel, Y., & Widagdo, P. P. (2021, July). Comparison of double exponential smoothing and triple exponential smoothing methods in predicting income of local water company. *In Journal of Physics: Conference Series* (Vol. 1943, No. 1, p. 012102). IOP Publishing. Advanced at: https://ui.adsabs.harvard.edu/abs/2021JPhCS1943a2102K/abstract

Bellotti, A., Hand, D. J., & Khan, S. (2020). Predicting Through a Crisis. *Second White Paper. Validate AI.*

Pinder, J. (2005). Using revenue management to improve pricing and capacity management in programme management. *Journal of the Operational Research Society*, Vol. 56, p. 75–87. Advanced at: http://www.jstor.org/stable/4102252

Lin, S. W., Merdikawati, S., Wu, S. F., & Yeh, R. H. (2023). Optimization and analysis of three-part tariff pricing strategies. *OR Spectrum*, Vol. 45(4), p. 1223–1262.

Tsyutsyura, S. V., Tsyutsyura, M. I., & Kharytonov, D. A. (2010). A study of the best world practice of some highly developed countries in programme management based on the programme and goal method. *Management of complex systems development,* Vol. 4, p. 23–29.

Pozhuev, O. V. (2011). Modern methods for assessing the competitiveness of enterprise potential. *Humanitarian Bulletin of Zaporizhzhya State Engineering Academy*, Vol. 44, p. 193–196.

Sviatnenko, M. D. (2021). Economic and mathematical modelling of the functioning of commercial banks (Bachelor's thesis, Igor Sikorsky Kyiv Polytechnic Institute).

Chupilko, T. A. (2019). Mathematical modeling of quantitative risk indicators in the management model of working capital of an enterprise. *Efektyvna ekonomika*, vol. 9. DOI: https://doi.org/10.32702/2307-2105-2019.9.39

Fiori, A. M., & Foroni, I. (2020). Prediction accuracy for reservation-based forecasting methods applied in revenue management. *International Journal of Hospitality Management*, 84, 102332.

Strauss, A. K., Klein, R., & Steinhardt, C. (2018). A review of choice-based revenue management: Theory and methods. *European journal of operational research*, Vol. 271(2), p. 375–387.

Krause, H. U., & Arora, D. (2019). Key Performance Indicators for Sustainable Management: A Compendium Based on the "Balanced Scorecard Approach". Walter de Gruyter GmbH & Co KG.

Padhi, S. S., & Aggarwal, V. (2011). Competitive revenue management for fixing quota and price of hotel commodities under uncertainty. *International journal of hospitality management*, Vol. 30(3), p. 725–734. DOI: https://doi.org/10.1016/j.ijhm.2010.12.007

Chou, F. S., & Parlar, M. (2006). Optimal control of a revenue management system with dynamic pricing facing linear demand. *Optimal Control Applications and Methods*, Vol. 27(6), p. 323–347.

Kunnumkal, S., & Talluri, K. (2019). Choice network revenue management based on new tractable approximations. *Transportation Science,* Vol. 53(6), p. 1591–1608.

Gupta, N., & Sharma, J. K. (2020). Fuzzy multi-objective programming problem for revenue management in food industry. *Journal of Revenue and Pricing Management*, Vol. 19(5), p. 349–354.

Cooper, W. L., & Homem-de-Mello, T. (2007). Some decomposition methods for revenue management. *Transportation Science*, Vol. 41(3), p. 332–353; Vol. 42; p. 50–52.

Cooper, W. L., Homem-de-Mello, T., & Kleywegt, A. J. (2006). Models of the spiral-down effect in revenue management. *Operations research*, Vol. *54*(5), p. 968–987.

Mazaraki, A., Boiko, M., Okhrimenko, A., Melnychenko, S., & Zubko T. (2019). The impact of the national tourism system on the economic growth in Ukraine. *Problems and Perspectives in Managemen*t, Vol. 17(4), p. 93–101. DOI: http://dx.doi.org/10.21511/ppm.17(4).2019.08

O'Connor, Peter; Piccoli, Gabriele (2003). Marketing hotels using global distribution systems. *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 44.5-6, p. 105–114.

Remy, D., Boo, H. C., & Tee, S. (2023). From traditional to new hotel revenue management metrics: An exploratory study on the potential of NRevPAR and RevPAC. *Tourism and hospitality management*, Vol. *29*(2), p. 221–233.

Queenan, C. C., Ferguson, M. E., & Stratman, J. K. (2011). Revenue management performance drivers: An exploratory analysis within the hotel industry. *Journal of Revenue and Pricing Management*, Vol. 10, p. 172–188.

Josephi, S., & Melissen, F. (2017). Hotel revenue management. In *Hotel accommodation management* (pp. 126–137).

Routledge., Michopoulou, E., & Moisa, D. G. (2019). Hotel social media metrics: The ROI dilemma. *International Journal of Hospitality Management*, Vol. *76*, p. 308–315.

Maier, T. A. (2012). International hotel revenue management: Web-performance effectiveness modelling – research comparative. *Journal of Hospitality and Tourism Technology*, Vol. *3*(2), p. 121–137.

Received on: 18th of June, 2024
Accepted on: 23th of August, 2024
Published on: 20th of September, 2024