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Impact of Risk Budgeting on Enhancing the Projected Growth of the Hotel Industry under the Conditions of Enduring Uncertainty Related to the COVID-19 Pandemic. Case Study by Republic of Kazakhstan

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Abstract:

The article considers the possibility of using a risk budgeting approach in forecasting the development of the hotel business in the Republic of Kazakhstan. This study aims at elaborating three budget scenarios for the sales of services provided by accommodations with due regard to the possible risks associated with COVID-19. To attain this end, the authors used a set of budget planning methods, including expert assessments, scenario analysis, and Monte Carlo simulation. The results obtained allow the authors to determine the ranges of probable values and the most probable indicators for the budget items of hotel enterprises in the Republic of Kazakhstan. At the same time, the resulting model does not assess the simultaneous impact of other risks that the hotel industry is exposed to. The authors of the article believe that the construction of multi-factor risk budgeting models for the hotel business is the subject of further scientific research.

Keywords: risk budgeting; risk-based budgeting; planning; probability; uncertainty.

JEL Classification: Z32; L83; G32; D81.

Introduction

In 2020, the COVID-19 pandemic caused an unprecedented level of disruption to the global hospitality industry. The combination of lockdowns and international travel restrictions meant that many hotel businesses had to close or operate at minimal capacity. Earlier, the development of the industry had been influenced only by local events, such as eruptions, hurricanes, and military conflicts in a certain territory. In 2020, we saw a massive reduction in tourist flows in many countries of the world.

The Republic of Kazakhstan is no exception: the occupancy rate of accommodations in the country decreased from 23.7% to 17.3% in the period between 2019 and 2020 (Agency for strategic planning and reforms of the Republic of Kazakhstan 2022). A direct result of the decline in business and leisure travel is a sharp drop in accommodation revenues.

In 2021, the industry dealt with many challenges, including the resurgence of COVID-19, new strains of the coronavirus, and the low rate of vaccination of the population. With ongoing uncertainty, a further recovery in demand for accommodation services and the development of the hotel industry needs to be assessed due to the possibility of changing external conditions, including a new surge in the COVID-19 pandemic.

The most "volatile" items in the budget of hotel enterprises, which are more subject to a high degree of uncertainty, are sales volumes of accommodation services in quantitative terms. Therefore, this study is based on the development of a sales budget model for the hotel sector of the Republic of Kazakhstan.

It is worth mentioning that most enterprises use traditional budgeting approaches and adopt budgets that set one-dimensional targets not justified and difficult to achieve. Such targets do not reflect the probability of obtaining this indicator and the likelihood that it will be less or higher than the projected index (Kuzmishchev 2020).

Most companies do not connect their business decisions to risks, and the budgeting processes and risk management system are not integrated into the overall forecasting system, which leads to significant deviations between planned and actual indicators.

Although most companies use special software for developing budgets, the accuracy of the planned financial results is quite low.

Due to the high uncertainty of the COVID-19 situation, in order to increase the predictability of the planned indicators of the hotel industry in the Republic of Kazakhstan, it is relevant to consider new forms of risk-based budgeting. Thus, we put forward a research hypothesis that the introduction of risk-based budgeting will allow more accurate planning of financial results and increase their predictability.

1. Literature Review

The issues of organizing and improving budgetary processes have been considered by scientists since the middle of the 20th century. Thus, S. Kenno, M. Lau, and B. Sainty (2018) proved that budgeting was mentioned in 251 articles indexed in the ABI Inform and ProQuest databases in the period between 1972 and 2016, which indicates the continued popularity and relevance of research in this area.

Many literary sources (Biryukov *et al.* 2020, 1779; Zhilenko *et al.* 2021, 1236) regard budgeting as one of the most popular research subjects related to management and accounting (Bindra and Kaur 2022, 337; Olson and Westra 2022, 272). Traditionally, budgeting has been seen as part of the planning system that encompasses the company's financial performance (Caldwell and Spinks 2021; Koplowitz 2022; Neuman 2021).

Studies demonstrate that traditional budgeting and planning methods are widely used in organizations of various types (Asogwa and Etim 2017, 111). Traditional budgeting is often understood as static budgeting, in which, regardless of any fluctuations or changes in the business activity of an enterprise, the financial plan remains unchanged (Jasim 2020).

The company's fixed budget is based on the previous year's budget and depends on the set amount of revenues, expenses, and production levels (Alexander 2018, 267). This approach to budgeting is characterized by the relative ease of planning since it has a fixed amount of income and expenses.

The main methods of traditional budgeting are balance, normative, index, and program-target methods.

The balance method is easy to understand and is widely used in operational and current planning. This method allows for balancing the company's resource needs and developing a budget for income and expenses, cash receipts, and payments (Dogadaylo 2016, 52).

The normative method utilizes a number of standards and norms to predict the expenditure of basic resources (labor, energy, fixed assets, etc.) and provides a feasibility study for such plans (Klosterman 2017, 51).

The expert budgeting method studies the opinions of specialists or groups of specialists who have the necessary scientific knowledge, professional competence, and sufficient experience in a particular area (Gombitová and Dokupilová 2022, 90).

The index method is used to analyze trends and compare indicators (that cannot be compared with each other naturally), turning them into a comparable form (Dekina 2018, 50; Kamaletdinov and Ksenofontov 2019, 82).

The program-target method of budgeting is a new one and not as widespread as the balance or normative methods. This method is applicable if the company has created targeted programs under which funds are allocated to solve priority issues (Radionov 2018, 21).

At the same time, there is many literary sources criticizing traditional budgeting (Libby and Lindsay 2010, 56; Uyar 2009, 113). Accordingly, traditional budgeting methods lack flexibility and adaptability (Popesko *et al.* 2015, 373).

The preparation of such budgets requires a significant amount of time and resources. They do not comply with the requirements of business development, *i.e.* they are flexible and adaptable, which makes them out-of-date (Goode and Malik 2011, 207).

A critical approach to traditional budgeting has been the driving force behind a shift in focus from traditional detailed budgeting to the development of new, more efficient forms and methods of budgeting.

In a dynamically changing environment and with growing uncertainty, many scholars emphasize scenario planning as one of the most effective approaches to budgeting (Sardesai *et al.* 2021, 35). It allows companies to test their financial models in different conditions with due regard to uncertainty and manage them to make better decisions.

In recent years, the theory of "risk-based budgeting" has become widespread, which is similar to scenario planning and focuses on incorporating risks into the budgeting process (Kibor and Maina 2019, 147). A risk-based budgeting approach was developed by Maillard, Roncalli, and Tailetche in 2010 (Maillard *et al.* 2010, 60).

This technology involves close interaction of the budgeting system with the risk management system, taking into account possible risks that might have a significant impact on the financial and economic position of the company (Engels-Lindemann and Sihn 2002, 162).

A significant part of scientific literature is concerned with risk-budgeting approaches to portfolio management (Bruder and Roncalli 2012; Costa *et al.* 2022) and project management (Xenidis and Stavrakas 2013, 478).

Methods for assessing and modeling risks in capital expenditure budgeting are sufficiently studied. The analysis of empirical studies shows that the main methods in risk assessment are simple quantitative methods and the Monte Carlo simulation (Mauro 2021, 443; Toma *et al.* 2022, 38).

Based on the analysis of the corresponding literature, it can be concluded that there are not enough studies of risk-based budgeting tools despite the sufficient number of publications on budgeting and risk management.

At the same time, many analysts highlight that the use of alternative approaches to risk modeling and the use of mixed methods will increase the value of risk budgeting and reduce the effort required to achieve a realistic budget scenario (Abbati *et al.* 2020, 19).

2. Methodology

Within the framework of this research, we consider a risk-budgeting model as exemplified by a sales budget for accommodation services. In our model, the input parameter for the sales budget is given not by a single figure but by a range of three values and an expert assessment of their probability.

At the first stage, we set the range of input parameters for the sales budget for three possible scenarios: pessimistic, optimistic, and realistic. The input parameters of the pessimistic scenario are the statistical indicators of 2020, which has become the worst year for the hotel industry in the history of observation. The input parameters of the optimistic scenario are the statistical indicators of the pre-pandemic period, *i.e.* the year 2019.

The input parameters for the realistic scenario are determined through the peer review method. An individual survey of experts was conducted in one round in writing during the period from February 12 and February 28, 2021. The sampling included 67 respondents, whose competence is confirmed by the corresponding degree and professional experience in the field of the hotel business. The expert information obtained was verified by studying “parallel sources” predicting the development of the COVID-19 pandemic and the possibility of limiting international movements.

The first stage resulted in three basic scenarios for the development of the industry, taking into account the risks of COVID-19 return.

The second stage of the study included the construction of a continuous probability distribution for three input parameters. The model was built using Excel with a Monte Carlo simulation Excel add-in called ModelRisk. As a modeling tool, we used a triangular distribution to build a continuous probability distribution for three input parameters (minimum, most probable, and maximum) with a density function in the form of a triangle.

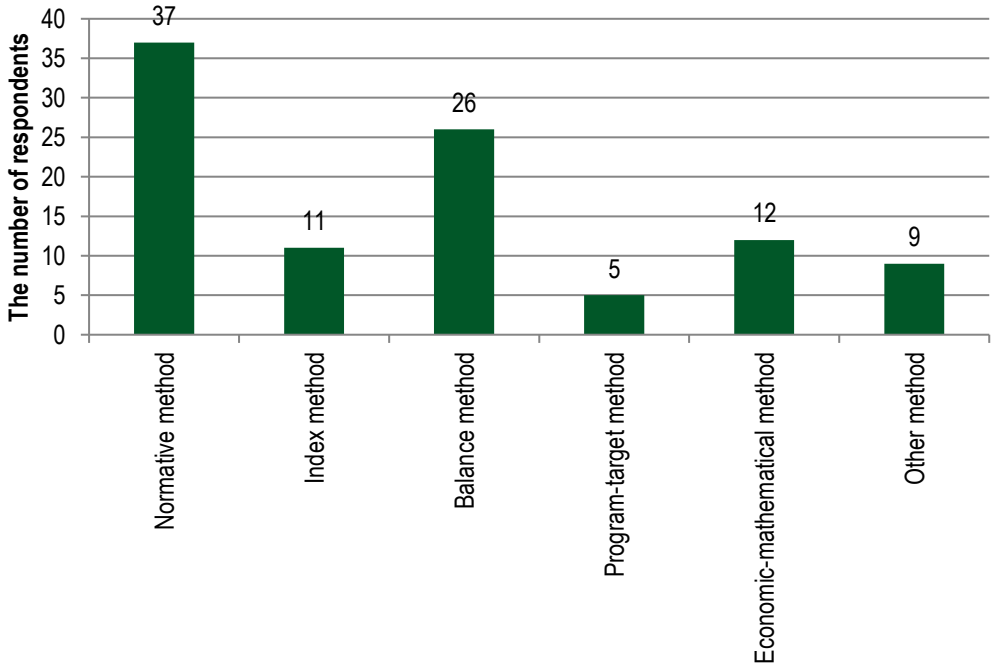
As a result, we have obtained statistics to check whether the distribution complies with our input parameters which we used as refined input data for the Monte Carlo simulation. Using the ModelRisk add-in, we calculated 10,000 sample options and presented the simulation results in the form of a histogram, whose peak is at the level that reflects the most probable indicator.

At the final stage, the probability distributions were presented in the form of an increasing cumulative graph, where the Y-axis reflects the probability that it is less than or equal to the discrete variable of the value along the X-axis. Since we analyze indicators, whose maximization is regarded as a positive trend (the volume of bed days, volume of additional services, and average cost), we applied an increasing cumulative graph in our study.

3. Results

The results of the expert survey have revealed that most Kazakh enterprises use traditional budgeting. The most common methods of traditional budgeting among hotel enterprises in the Republic of Kazakhstan are the normative and index methods (Figure 1).

Figure 1. The distribution of respondents' answers about the budgeting methods used, people



The total number of responses exceeds the number of respondents since many companies whose representatives participated in the survey use combined methods when developing their budgets. The economic-mathematical modeling of budget indicators is used only by 12 out of 67 companies.

At the same time, the plans prepared are of low quality. Thus, almost a third of the companies noted that the actual indicators of the sales of services turned out to be 30%-49% lower than the planned values (Figure 2).

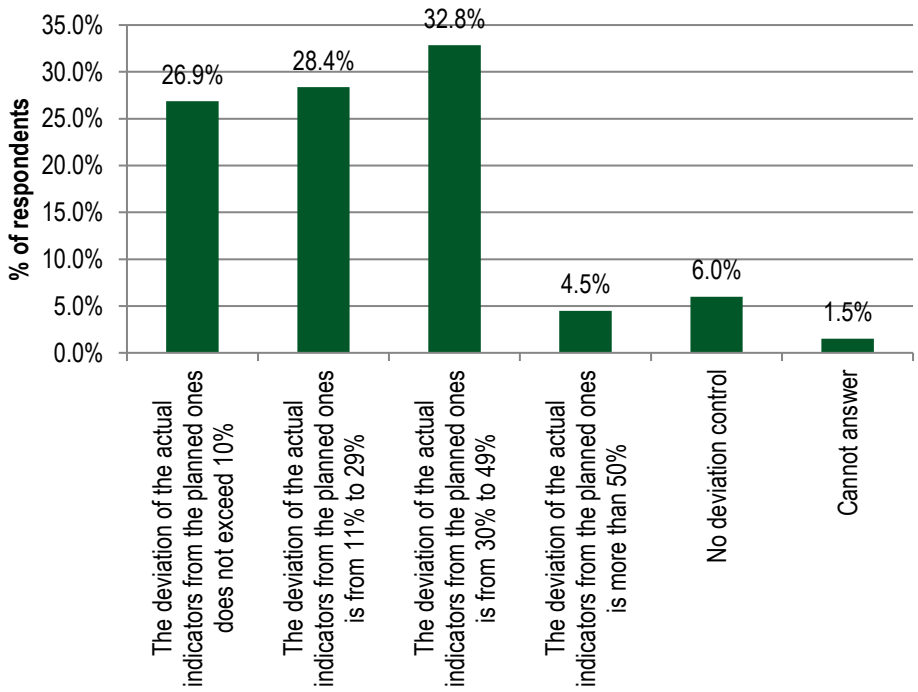
In 2022, the dynamics of operating indicators will largely depend on the current restrictions in the industry.

The input parameters of the model are two variables: the number and the average cost of a bed day which are uncertain. To describe them, the minimum, maximum and realistic values are defined that depend on the current restrictions in the industry and correspond to pessimistic, optimistic, and realistic forecasts for the development of the hotel market.

Forecast No. 1: pessimistic. This scenario assumes a 100% chance of a new COVID-19 pandemic. The emergence of a more harmful strain of coronavirus and the slow introduction of a vaccine can provoke another wave of the pandemic, which will lead to a new lockdown and border closures. Average hotel occupancy will drop to the indicators of 2020.

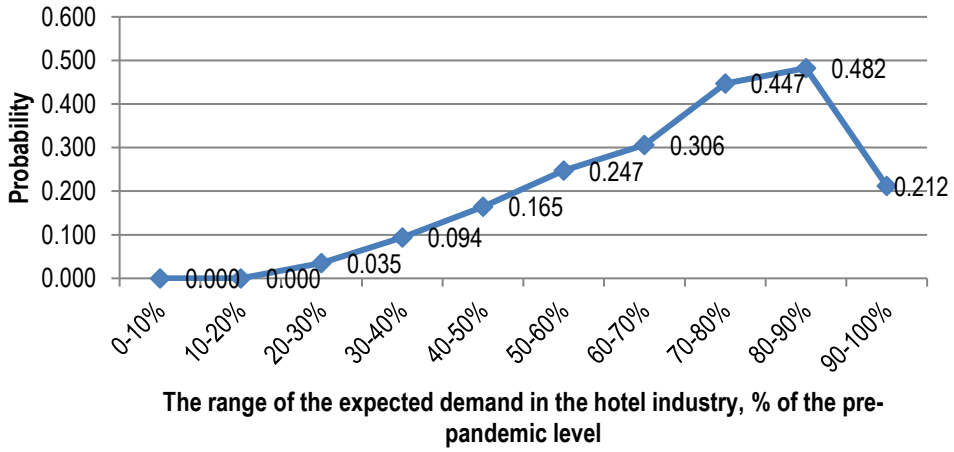
Forecast No. 2: basic. The risks and uncertainties associated with the COVID-19 pandemic prevail but travel restrictions are gradually easing and demand for hotel services is gradually recovering. However, they will not reach the pre-pandemic levels.

Figure 2. The deviation of the actual sales of accommodation services from the planned ones, % of respondents



At the same time, market growth will be driven by occupancy growth rates, which, according to experts, will amount to 80-90% if compared to the pandemic year of 2020. The expert assessment of the probability of the hotel industry recovery is presented in Figure 3.

Figure 3. The expert assessment of the probability of the hotel industry recovery, % of the pre-pandemic level



An increase in the average cost of a bed day is projected in line with an 8.5% increase in inflation if compared to 2020 (Ministry of National Economy of the Republic of Kazakhstan 2020). The volume of additional services provided by hotel enterprises and the number of bed days sold are assumed to be at the level of 85% of the optimistic scenario.

Forecast No. 3: optimistic. It assumes minimum risks of the COVID-19 return and a full recovery of the industry, with travel back to the level of 2019 and a 10% increase in average cost per bed day to the level of 2020.

The initial data for the analysis are presented in Table 1. It shows that the revenue of the hotel industry in the Republic of Kazakhstan can range from 66,860.9 to 135,110.1 million tenges. In order to generate the maximum income, it is necessary to sell the maximum possible number of bed days at the highest possible price, which seems unlikely.

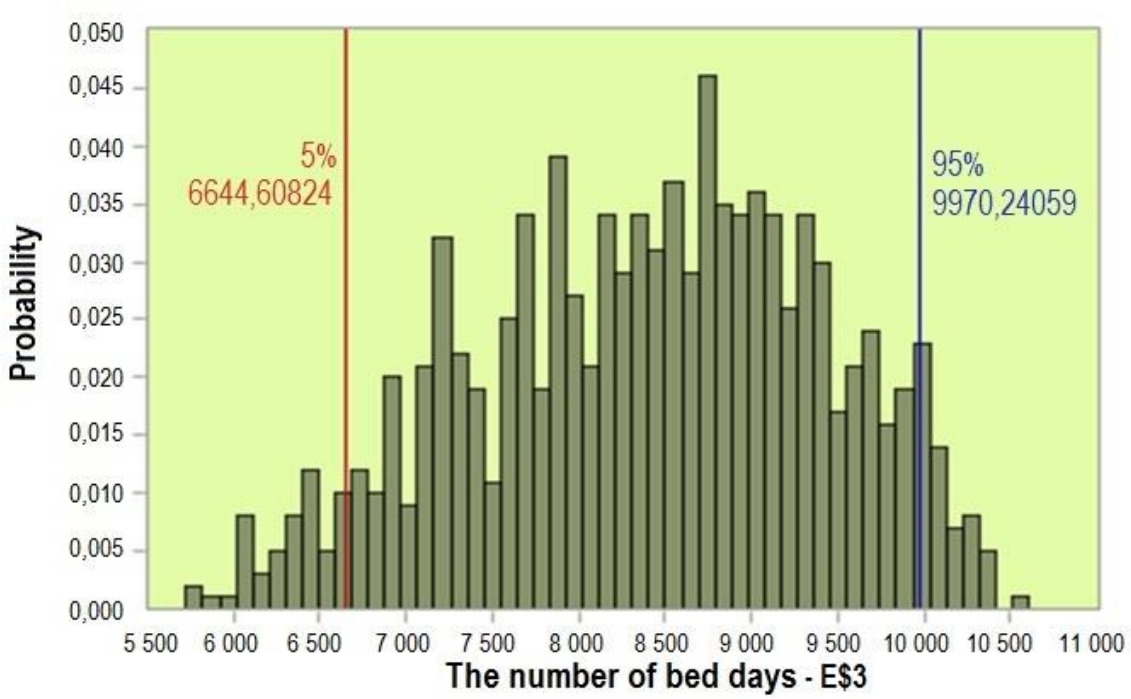
To obtain a high level of distribution accuracy and a clear definition of statistical data, 10,000 samples were run in the model and a distribution model of independent variables was built using the Monte Carlo simulation.

Table 1. The initial data for making a model

	Optimistic	Basic	Pessimistic
The number of bed days, thousand units	10,520.1	8,942.1	5,679.7
The average cost of a bed day, tenge	9,350	9,220	8,500
Additional services, tenge per one bed day	3,493.0	3,320.0	3,272.0
Revenue from accommodation services, million tenges	135,110.1	112,134.1	66,860.9

Figure 4 demonstrates the distribution of uncertainty, where the horizontal axis represents the possible number of bed days, and the vertical axis stands for the relative probability of these values.

Figure 4. The uncertainty distribution histogram for the variable "the sale of bed days"



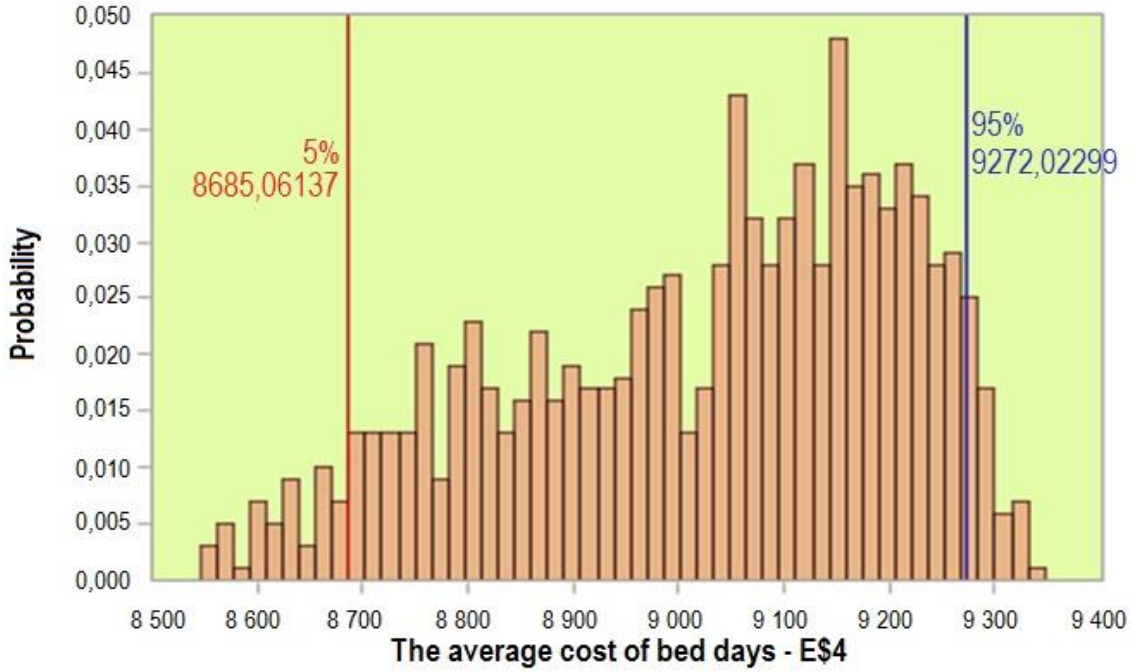
The simulation results show that the initially assumed minimum bed days (5,679.7 thousand bed days) are much lower than the range of possible values depicted in the histogram, and the maximum sales volume (10,520.1 thousand bed-days) is much higher. The histogram allows determining the most realistic low and high indicators, *i.e.* the probability that the sale of bed days in the hotel sector of the Republic of Kazakhstan will be below 5,679.7 thousand units or above 10,520.1 thousand units is only 5%, which is a definition of extremes. The most probable indicator lies in the range from 6,644.6 to 9,970.24 thousand units. As a result of modeling, the most probable indicator (peak) was determined, which is at the level of 8,788.8 thousand bed-days.

A similar uncertainty distribution model is constructed for the variable "the cost of a bed day" (Figure 5).

Figure 5 shows that there is only a 5% chance that the cost of a bed day will be below 8,685.06 tenges or above 9,272.02 tenge per unit, which is a definition of extremes.

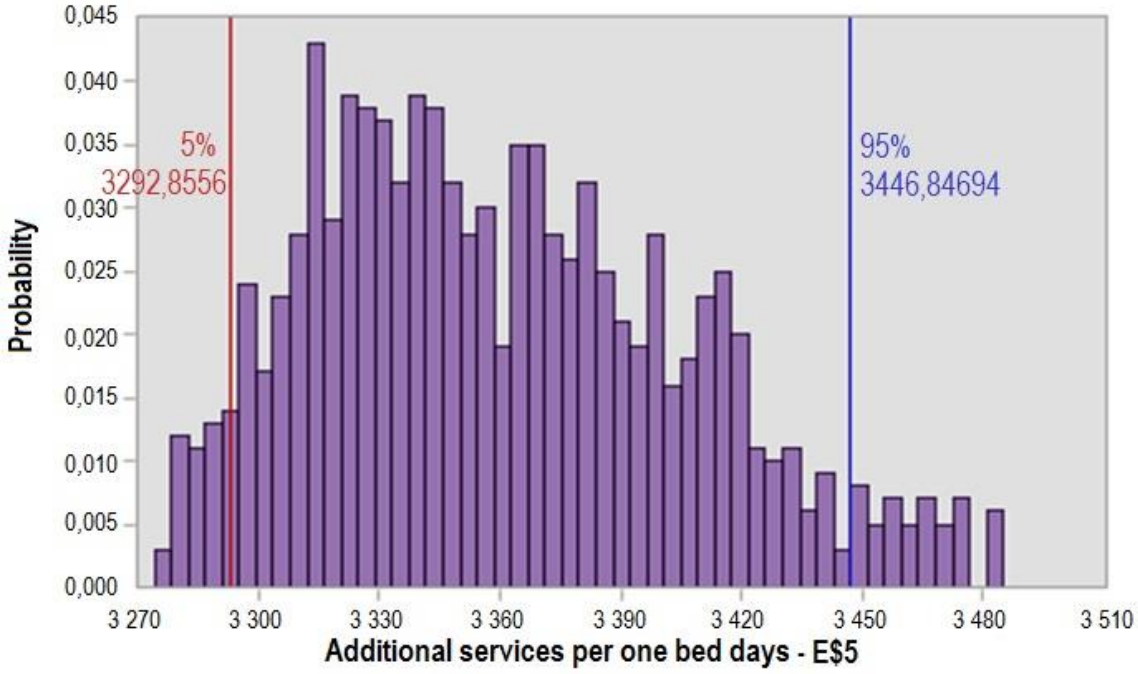
As a result of modeling, the most realistic indicator of the average cost of a bed day was defined at the level of 9,143.06 tenges per unit.

Figure 5. The uncertainty distribution histogram for the variable "the cost of a bed day"



The probability distribution for additional services provided by hotels is shown in Figure 6.

Figure 6. The uncertainty distribution histogram for the variable "additional services"



The ranges of possible values and most probable results obtained as a result of modeling for each of the sales budget items are summarized in Table 2.

Table 2. The ranges of possible values and most probable indicators by sales budget items

Indicator	The range of possible values		The most probable result
	5%	95%	
The number of bed days, units	6,644.60	9,970.20	8,693.06
The average cost of a bed day, tenge	8,685.06	9,272.02	9,143.06
Additional services, tenge per one bed day	3,292.86	3,446.85	3,312.20

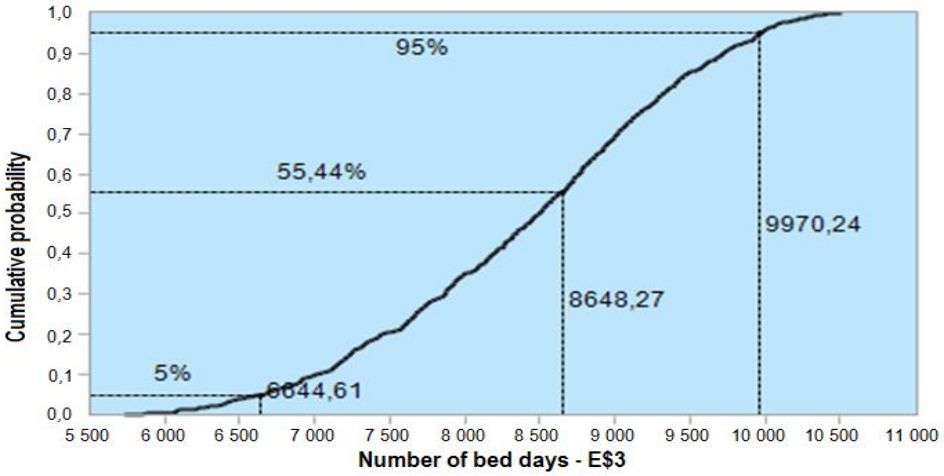
The indicators we obtained allow to develop three scenarios for the sales budget of hotel enterprises, taking into account the possible risks associated with the COVID-19 return (Table 3).

Table 3. The forecast of the sales of accommodation services in the Republic of Kazakhstan

Indicator	Pessimistic scenario	The most probable scenario	Optimistic scenario
The number of bed days, thousand units	6,644.60	8,693.1	9,970.20
The average cost of a bed day, tenge	8,685.06	9,143.06	9,272.02
Revenue from accommodation services, million tenge	57,708.75	79,481.17	92,443.89
Additional services, tenge per one bed day	3,292.86	3,312.20	3,446.85
Revenue from additional services, million tenge	21,879.73756	28,793.15333	34,365.78387
The total revenue of the hotel industry, million tenges	79,588.49	108,274.32	126,809.68

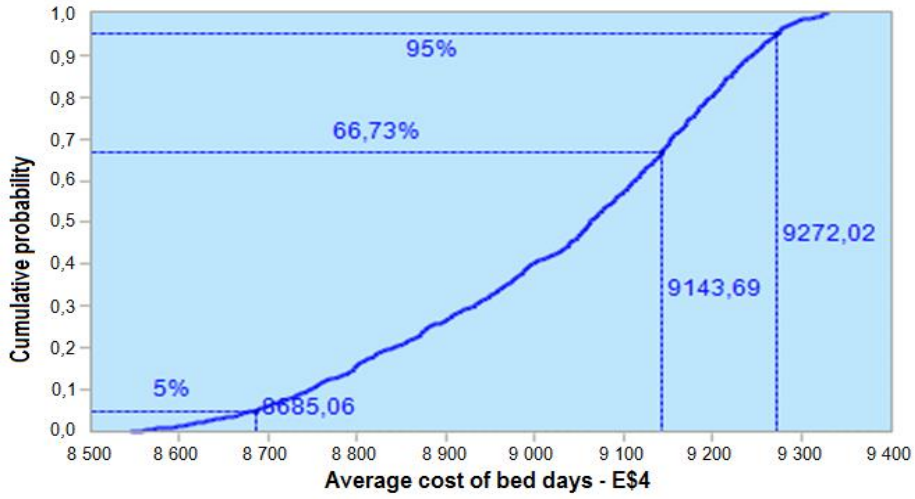
Thus, the values obtained as a result of modeling are significantly lower than the indicators forecasted by experts. Given the uncertainties associated with the COVID-19 pandemic, the volume of bed day sales will reach the pre-pandemic levels (82.6%). However, the probability that the number of bed days will be equal to or less than the most realistic value obtained during the simulation (8942.1 units) is quite high and amounts to 55.44% (Figure 7).

Figure 7. The ascending cumulative graph for the variable "the number of bed days"



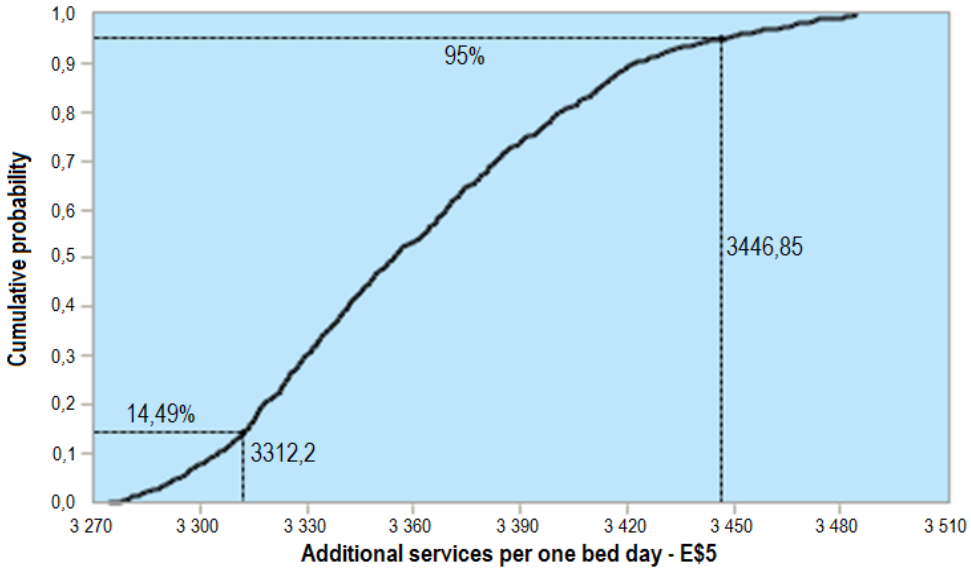
The average cost of a bed day will also be lower than the values forecasted by experts (9,143.69<9,220 tenges). In addition, the probability that the average cost of a bed day will be lower than the obtained value is quite high and amounts to 66.73% (Figure 8).

Figure 8. The ascending cumulative graph for the variable "the average cost of a bed day"



The probability that the volume of additional services per one bed day will be lower than the target value is quite low and amounts to only 14.5% (Figure 9). In other words, the probability of achieving or exceeding the declared volume of additional services is 85.5%.

Figure 9. The ascending cumulative graph for the variable "the average cost of a bed day"



Thus, the budgeting method allows to predict possible scenarios and form the most realistic forecast for the sale of services by hotel enterprises more accurately.

Discussion

Traditional planning is based on facts and figures, with many uncertainties, including the risk of a return of the COVID-19 pandemic, left unaccounted in final business budgets (Stefanov and Andrianov 2018).

The research we conducted confirms the following conclusions: in the conditions of volatility associated with the COVID-19 pandemic, risk analysis should become an obligatory step in the process of developing the budget of income and expenses of enterprises.

We agree with the opinion of experts that the use of complex risk forecasting methods allows for obtaining quantitative parameters of the budget with the required level of reliability (Gasparian *et al.* 2021, 1388).

The combination of peer review, scenario analysis, and multivariate Monte Carlo simulation helps adequately estimate potential revenue in the hotel industry in the Republic of Kazakhstan in accordance with three scenarios that assume varying degrees of risk of an extreme pandemic.

We have come up with the most realistic revenue budget scenario that would increase bed capacity by approximately 53% if compared to a pessimistic scenario that assumes a 100% pandemic risk and a return to the levels of 2020. The study results confirm the opinions of experts that this scenario is unlikely for the industry, as the increasing rates of vaccination lead to a decrease in the burden of disease and easing of travel restrictions.

With a high degree of probability, these results prove that the volume of services provided will not reach the pre-pandemic level.

Obviously, the easing of pandemic-related restrictions will lead to an increase in inbound and domestic tourist flows and a gradual recovery in demand for accommodation services, which will have a direct impact on their cost.

During the pandemic, the average cost of a bed day in the Republic of Kazakhstan amounted to 8,500 tenge, which is 536 tenges more than the previous year. Some enterprises partially compensated for the decrease in the number of guests by increasing prices for accommodation services. Nevertheless, this did not allow them to fully restore sales volumes to the pre-pandemic levels.

Our forecast coincides with the opinion of experts about a slight increase in the average cost of bed days. At the same time, this indicator can vary in different regions of the Republic of Kazakhstan. New accommodation facilities emerge in the country and offer services in various price segments. Our results confirm the experts' forecasts regarding the average cost of a bed day. According to our realistic scenario, this indicator will amount to or be less than 9,143 tenges with a probability of 66.7%, which is 7.6% more than last year.

Under a realistic market scenario, our study shows that value-added services will increase by 1.2% if compared to the levels of 2020. With a high degree of probability, it can be argued that this indicator will exceed the value we modeled, which will lead to additional revenue for the hotel industry.

Based on the realistic scenario and integrated research methods, we project a 61.9% increase in services (in value terms) if compared to the pandemic year. The results obtained do not fully confirm the expert assessment since the revenue of hotel enterprises will not reach the indicator expected in the amount of 3859.8 million tenges.

In general, we expected the hotel industry of the Republic of Kazakhstan to decline by 19.9% in 2021 if compared to 2019. The dynamics depended on the region, time of year, and category of accommodations.

For a more objective assessment of financial results, it is necessary to consider the impact of the pandemic on the costs associated with the core activities of the hotel sector. The possibility of using complex methods to develop a risk-based budget for the expenditures of the hotel sector is an important area for further research.

The methodology we have developed helps to make active decisions in the development of the hotel industry with due regard to the uncertainties associated with the COVID-19 return and the target indicators for creating the necessary reserves and determining a business development strategy.

Conclusion

The study makes a theoretical contribution to the knowledge base of the risk-budgeting approach. Unlike the traditional approach, this one allows forming a budget in which the targets are not presented in a one-dimensional form but rather in the form of a probability distribution in the range of 5-95%, which helps to set realistic goals.

In the course of the research, we used a combination of peer review, scenario analysis, and multivariate Monte Carlo stimulation to create three forecasts for the hotel industry with due regard to the risks of extreme pandemics.

Based on the analysis of such quantitative indicators as the volume and average cost of services provided by accommodations in the Republic of Kazakhstan, we have obtained a reliable cumulative distribution function of these indicators, determined the most likely targets, and established the probability of their achievement.

Thus, the probability that the number of bed days sold will be equal to or less than the indicator obtained during the simulation is 55.4%, and vice versa, *i.e.* the probability that this indicator will exceed the most probable result is 44.6%.

At the same time, the probability that the volume of additional services per one bed day will be lower than the target value is quite low and amounts to 14.5%.

It is worth mentioning that significant limitations of this model are the lack of confirmed forecasts about the spread or suppression of the coronavirus infection.

In addition, the above-mentioned risk-budgeting approach assesses the impact of the most significant risk for the hotel industry, namely a new wave of the pandemic and related restrictions on business and tourist travel. Other types of risks also affect the financial performance of hotel enterprises, such as rising inflation and exchange rates, taxation amendments, etc. Based on a triangular distribution, our model does not allow to realistically assess the simultaneous impact of a large number of risks on the performance of such enterprises.

As a result, a promising scientific task is to develop methodological tools for building multi-factor models of risk budgeting in the hotel business.

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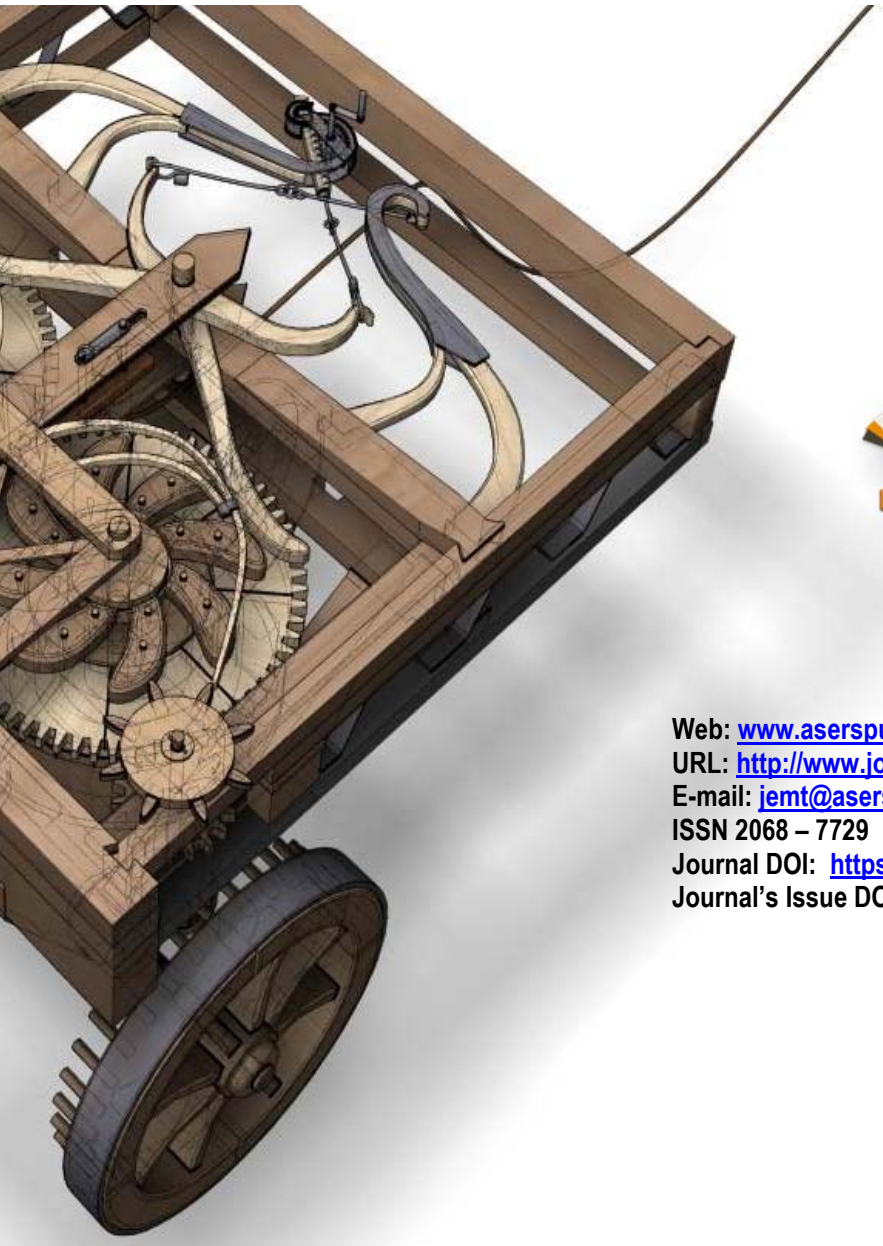

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