CHAPTER VIII. ECONOMIC SECURITY AND TOURISM RISK MANAGEMENT

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Abstract. *Monitoring, analyzing, and forecasting the risks that lead to threats are key elements of economic security. To achieve economic security, it is necessary to minimize the risks and factors that have a negative impact on the economic sphere by making optimal use of the potential of various sectors of the economy. The use of tourism as an economic tool will have a positive impact on society, enterprises, and territorial associations through the diversification of risks, the development of infrastructure, the improvement of the image of regions, and other aspects. At the same time, there is a risk of various externalities due to environmental and social problems linked to the specific nature of tourism activities.* ***The subject of this article is*** *economic security and tourism risk management.* ***The aim of the paper*** *is to analyze the significance of tourism at all levels in the context of economic security and to develop a mechanism for managing the risks involved.*

Study objectives:

- *to set levels of economic security for tourism;*
- *to analyze the contribution of tourism to economic development;*
- *to carry out a tourism risk assessment on the basis of the main risks identified*

by experts, group them by means of factor analysis, carry out a survey of tourism service suppliers, and assess the identified risks – both external and internal – in terms of the negative impact they have and the likelihood of their occurrence for individual types of tourism activities;

- *to calculate an integrated risk index for the tourism complex;*
- *to perform a multi-criteria assessment of the inbound tourism complex.*

Research methods: *analysis of scientific literature, expert evaluation, factor analysis, COPRAS method.*

A survey of experts and the application of the multi-criteria COPRAS method led to the identification of the significance of risk factors. This method was then used to perform an integrated risk assessment. Studies have shown that the COPRAS method can be used to carry out risk assessments based on both quantitative and qualitative indicators. The results of a literature review show that in an economic risk assessment, 68 risk factors or risk assessment criteria have the highest significance in relation to external environmental factors. When comparing the significance of risk assessments in terms of the external and internal environment and personal risks faced by tourism service users, the results of an expert survey show that the most important risks are external environment risks and internal business risks. In contrast, the personal risk faced by tourism service users is rated at only 0.16, which means that the tourist's exposure to risks depends primarily on external risk factors and the internal risks related to business service providers.

The integrated risk index of the tourism complex by type of tourism is calculated, showing that the riskiest type of tourism is extreme sports tourism. The lowest risk in Lithuania's inbound tourism sector is accounted for by winter wellness and medical tourism. This is due to low risk probability estimates for infrastructure, transport, and health. Extreme sports tourism has high risk ratings due to higher probabilities of economic losses related to health or injury, and other higher risks in the operational, infrastructure, and transport risk groups.

The multi-criteria assessment of the inbound tourism complex allows risks to be

analyzed according to the main categories and permits their comparison between the different areas of the tourism complex. This model is not only valuable for the assessment of risk in tourism complexes, but also for economic risk assessments of specific enterprises operating in the tourism sector.

Keywords: *economic security, tourism risk assessment, tourism risk management, expert evaluation, COPRAS method*

Introduction

Economic security is a significant component of overall national security, which directly affects the successful development of the state. To achieve economic security, it is necessary to minimize the risks and factors that have a negative impact on the economic sphere by making optimal use of the potential of various sectors of the national economy.

In today's context of international integration and globalization, tourism and related industries are becoming increasingly important for economic security. Tourism has a qualitative impact on the socio-economic stability of territories, and ensuring economic security allows tourism operators to have a comprehensive impact on reducing both potential and actual threats.

The tourism industry not only brings economic stability to the islands and resort countries of the South, as is commonly assumed. It has also has led to significant development in many European countries, including Austria, Croatia, Iceland, Italy, and Spain (which is currently experiencing increasing resentment from its permanent residents over the huge numbers of tourists).

8.1. Levels of tourism-related economic security

Each destination has a life-cycle, from discovery to the necessity of relaunching. The environmental debate in tourism recognizes the (negative) impacts of the

travel and tourism industry on the environment. An analysis of scientific articles on the interlinkages between economic security and tourism shows a diversity of views among scholars. Padrilan et al. (2023), for example, suggest focusing on identifying the different tourism activities offered in selected tourist attractions, focusing on the different tourism management practices used by selected tourist attractions which help to maintain their businesses in the long run, and understanding whether there is a significant relationship between tourism activities and management practices. By conducting a study in Guiuan, Padrilan et al. (2023) indicate that environmental safety and risk management practices are extensively utilized by tourism destination owners, demonstrating that risk-awareness and environmental management are employed. In this case, the latter are used to assure visitors that they should feel secure enough to visit any tourist destination in Guiuan. Furthermore, cultural and human rights practices are highly observed. It is clear that tourism destination owners place value and emphasis on cultural and human rights practices, which strive to build a safe environment for tourist destinations at the aforesaid location. Operators also place a strong emphasis on constant improvement to draw in more visitors, which significantly contributes to the municipality's ability to maintain its economic stability. Based on the findings of their study, Padrilan et al. (2023) indicate that environmental safety, risk management, and continuous improvement were found to be significant for a range of different activities.

Edirisinghe et al. (2021) indicates that management in destinations can play a vital role in helping to unlock the many benefits that are associated with tourism, while also ensuring that a destination delivers something unique for travelers. This is a coordinated process, where almost all aspects of a destination are managed, including marketing efforts, local resources, accommodation, activities, events, environmental concerns, tourist attractions, and transportation. Korstanje and Seraphim (2020) provide an insightful guide for policy-makers, specialists,

and social scientists interested in the future of tourism in a society where uncertainty, anxiety and fear prevail.

Safety and security are among the most basic needs in life and are essential in tourism as in other research areas; thus, researchers need to focus on the topic. Since the 1970s, when the first scientific paper on tourism safety was published, the amount of research in this field has significantly increased. Toker and Emir (2023) carried out a bibliometric analysis on tourism safety and security research conducted over the past 45 years. The literature on the subject includes 597 studies obtained from the Scopus database. The VOSviewer scientific mapping software was used to perform the analysis. The results contribute to: tourism literature and the development of the tourism safety field; the study and development of tourism safety literature in the historical context; identifying the leading researchers, resources, journals, and countries that contribute to the field; and the analysis and visualization of relational network structures for the key concepts of the research. The results are expected to encourage researchers to focus more on tourism safety and security issues and become catalysts for raising awareness in this context. Toker and Emir (2023) indicate that studies on tourism safety and security have concentrated on terrorism, crime, COVID-19, and risk perception. However, it is striking that studies related to ecology, climate change, food and beverage safety, fear, violence, and accidents are less emphasized. In addition, security issues concerning alternative tourism, including adventure tourism, activity tourism, medical tourism, and dark tourism, have been only partially covered. In this regard, future research can investigate potential safety and security issues within the scope of emerging tourism types in order to contribute to the scientific development of the field. In addition, ecological security threats and natural disasters due to climate change may also be examined within the framework of tourism security. Considering the role of the tourism industry in climate change, the social costs of security problems are among the other vital subjects worth

examining. Therefore, it is critical to address the issue of tourism security from the perspective of sustainability, marketing, management, and alternative tourism types. On the other hand, for tourism-specific incidents on tourism safety and security, further research may concentrate on comparative content analysis of the topic. Finally, the current study utilized the VOSviewer program to map and analyze the data.

Other scholars (Akamavi et al., 2023) argue that literature on the effects of security threats such as terrorism, political instability, and geopolitical power-plays on travel and tourism has produced mixed results with scant attention paid to the spillover effects on the tourism economy (e.g., employment, leisure expenditure, travel, and tourism services' contribution to gross domestic product). In Akamavi et al.'s view, travelers and tourists react to insecurity, which leads to the suspension, cancellation, or substitution of their travel plans. This inherent reaction to insecurity is not dissimilar to the traveler's reaction to the COVID-19 pandemic – for instance, international tourism may give way to domestic tourism or staycations.

Ghaderi et al. (2016) investigated the relationship between security and international tourist arrivals. The system Generalized Method of Moments technique is applied in two panels of 29 developed and 45 developing countries over the period 2006–2012. Employing social, economic and political security indexes beside other control variables, the results show that the relationship among all the three sub-indexes of security and tourism is positive and significant in developed nations while it is negative and significant in developing countries.

A group of researchers (Ghaderi et al, 2024) identify the main threats to tourism at the turn of the century. They indicate that security threats are not new to the world travel and tourism, and they have existed for a long time. Concurrent with the development of mass tourism after the Second World War, the tourism industry has been the target of terrorists to achieve strategic or ideological

objectives, and has been affected by security incidents. The twentieth century observed two world wars, many regional conflicts and civil wars, and the threat of nuclear annihilation during the Cold War between the two big powers, the USA and the Soviet Union. However, the twenty-first century is also characterized by intensifying security concerns for tourism – from natural and environmental threats to human-induced concerns such as the 2004 Indian Ocean tsunami, European volcanic eruptions, climate change, the Japan earthquake and tsunami in 2011, the Bali bombing in Indonesia, the 9/11 attacks in the USA, the Mumbai attacks in 2008, the SARS, H1N1, and Avian influenza diseases, the global economic crisis, the US-led war against Iraq, and the Palestine and Israel conflict. The characteristics of these security concerns mean that not only has the tourism industry directly been the soft target of threats, but also the frequency and severity of these incidents has dramatically increased and become more organized. Furthermore, the geographical dimension of security incidents has been expanding (Pizam & Mansfeld, 2006), and the ripple effects encompassing the wider region (Hall et al., 2004) due to extensive media coverage of the events has grown. Media exposure sometimes adds fuel to the flame and exaggerates the magnitude and severity of security issues, especially when these incidents are considered by the media as important news generators (Pizam & Mansfeld, 2006). Hence, when incidents occur, the media become preoccupied in providing their audiences with the most vivid information and analyses of these issues.

Events in the current period (2020–2024) show that threats to tourism are only increasing – Russian attacks on Ukraine, escalating tensions with Iran, the Israeli-Hamas war, piracy by the Yemeni Houthis, and the escalation of Sino-Taiwan relations. Therefore, studies on tourism security are constantly needed, as the strengthening of a country's international authority and economic sovereignty is influenced by both the intensification of existing threats to economic security and radically new challenges to national interests. Measures taken at the national

level do not sufficiently increase the receptivity of most sectors of the economy to innovative development and the move away from foreign technologies. In this context, it is possible to look for ways to ensure greater economic security by developing industries that are less dependent on foreign technology, as well as on the global market for resources such as oil and gas. Tourism is such an industry, as it is able to diversify economic risks and create an economic cushion by realizing the potential of territories with a minimum amount of innovative technologies and without depleting natural resources. Tourism is designed to meet people's needs and to improve their quality of life by creating social and economic infrastructure and increasing revenues for budgets at all levels. It is export-oriented, and therefore more stable than other industries in unstable global markets. The consideration of the role of tourism in the context of economic security is proposed on the basis of the levels of economic security of tourism, taking into account the main interrelated and interdependent elements.

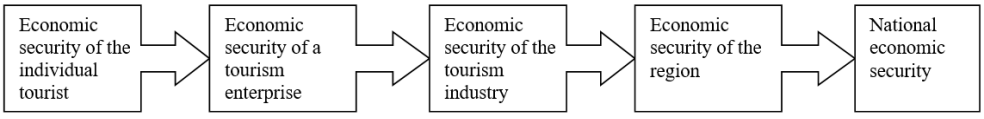


Figure 1. Levels of economic security in tourism

Source: compiled by the authors

The lowest level is the economic security of the individual tourist, which consists of the provision of a guarantee of protection of the individual's vital interests and their social and economic protection. This level influences the number of tourist arrivals in a given area or the number of customers an undertaking has, depending on the quality of the services it provides. Thus, the provision of higher-quality socio-economic services will increase tourist arrivals and have a positive impact on a higher level of economic security.

The second level analyzes the economic security of an entity operating in the tourism industry. At this stage, the rational use of the company's existing

resources and potential is the key issue. Intellectual potential is of great importance for a tourism industry enterprise. It is necessary to maximize the use of the intellectual resources of enterprises and to develop intellectual capital to attract new flows of tourists. Research shows that the economic security of a tourism enterprise enables it to develop in a sustainable way through stable, productive, and efficient operations in the face of the external environment, and covers three areas: ensuring economic security for the individual tourist (related to the first level); ensuring the functioning of the enterprise and protecting it from adverse environmental conditions (legal protection, maintaining financial and economic stability, marketing, personnel policy, etc.); and preventing the negative effects of tourist flows (prevention of environmental and social conflict).

At the enterprise level, the need to incorporate modern technologies into production processes, especially lean technologies, should be taken into account. While it is assumed that such technologies can only be used in manufacturing companies, the use of lean management in the tourism industry will allow organizations to be better prepared for increasing customer demands, as well as to reduce costs through the better and faster delivery of services. Improving the efficiency of tourism businesses will reduce economic risks and have a positive impact on both the industry's economic performance and the quality of life of the inhabitants of the relevant areas. The industry is thus an effective tool for diversifying macroeconomic risks.

The third level highlights the economic security of the tourism industry, which combines the existing situation and the development of individual interrelated economic activities, such as a hotel business, the transport network, catering establishments, medical and recreational complexes, sports and entertainment centers, etc. Thus, tourism development has a significant impact on many areas of the downstream sector, which allows us to talk not only about the generation of additional budget revenue, but also about the creation of social effects. It is this

impact that allows human potential to be realized more effectively and reduces the negative impact on the population. There is no doubt that, in this context, information flows play a major role in the development of the tourism industry. From the tourism industry's point of view, informal sources of information are the most important in this respect for management decision-making.

At the fourth level, the economic security of the territorial association in which the organizations providing tourism services operate must be taken into account, as well as the potential for attracting tourist flows. At this level, it is necessary to identify a number of factors that reflect the stability of the region in terms of the provision of tourism services. These factors include the geographical location of the region, the availability of information flows, environmental conditions, the socio-economic situation, etc. Tourism is an important element in terms of economic growth and strategic national development priorities.

The fifth level (the highest) considers tourism in the context of a country's economic security. This level describes the many macroeconomic factors influencing tourism. For example, the share of tourism in a country's GDP, the impact on the quality and standard of living of the population, the number of people employed in the tourism industry, the impact on related industries, the total cost of tourist arrivals, etc.

8.2. The development of the tourism sector

The role of the tourism industry in the economy can be examined by identifying the dynamics of individual indicators.

Between 2012 and 2023, the tourism industry in Lithuania has been steadily expanding. Tourism value added has increased from €372.6 million in 2012 to €707.0 million in 2023 (Turizmas, 2024). A new national tourism brand, structural changes in the organization responsible for the implementation of tourism marketing, a consistent increase in the competitiveness of Lithuania's tourism

opportunities in the regions, and other factors have helped to create the conditions for this period to be characterized by a strong increase in both inbound and outbound tourism flows. As can be seen in the chart below (Figure 2), tourism receipts grew at a fairly rapid pace during the period under analysis, largely driven by strong growth in inbound tourist expenditure.

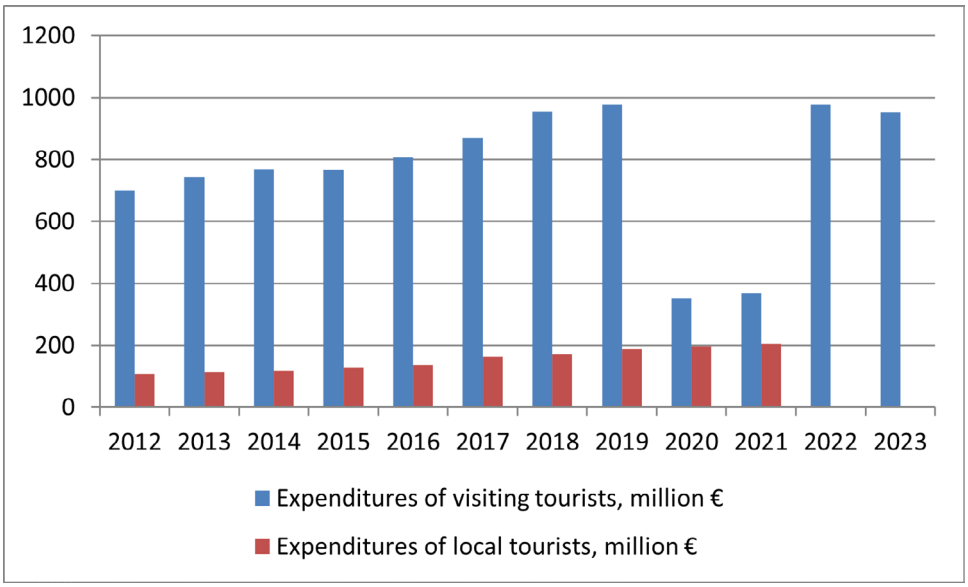


Figure 2. Expenditures of visitors and domestic tourists in Lithuania, 2012–2023

Source: Turizmas (2024)

It can also be noted that the COVID-19 pandemic period was characterized by a strong drop in tourist arrivals, so the negative impact of the pandemic is undeniable. It is not possible to assess the impact of COVID-19 (for the 2020–2021 period) on domestic tourist expenditure as no data is yet available.

Domestic tourism in Lithuania is growing, but its value creation is much lower than that of inbound tourism. In 2022, each foreign tourist spent on average around €374 per trip in Lithuania, while each domestic tourist spent €103 (Turizmas, 2024. Although the share of tourism in the country's economy depends on the performance of other sectors, before the COVID-19 pandemic it reached and even exceeded the value of the agriculture and forestry sector, which

is particularly important for Lithuania. The tourism sector has a huge potential for service exports. Before the pandemic, it employed over 51,000 people, and in some regions tourism is the most important employer.

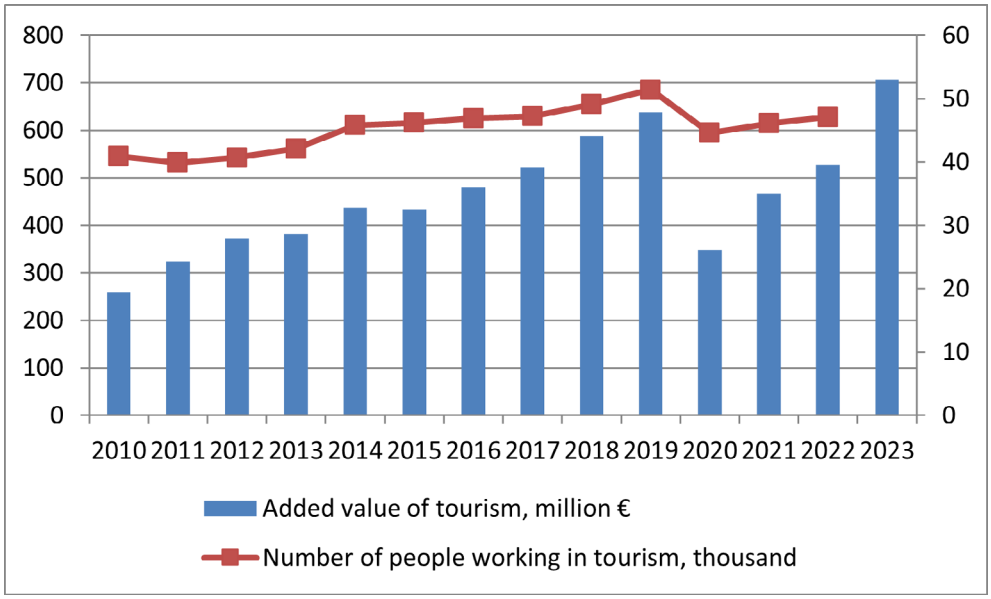


Figure 3. Tourism value added (million €) and number of people employed (thousands) in tourism in Lithuania, 2010–2023

Source: Department of Statistics (2024)

Tourism's added value and share of GDP, while increasing year on year, remain negligible, but the country's economy is large and many other industries are also growing. It would therefore be appropriate to look not only at the relative share of GDP, but also at the quantitative volumes of revenue and tourist arrivals.

The tourism industry is underperforming due to the industry's weak competitiveness and lack of incentives from the authorities. This problem is particularly acute in times of domestic economic crisis. In order to ensure a better level of economic security, it is necessary to create the conditions for developing the competitiveness of the industry's operators, as tourist flows can protect regions from risk situations in the event of an economic downturn in the manufacturing sector. The tourism industry is a high-risk business, which is highly influenced by both

external and internal factors and conditions. The increased interest of foreign tourists in Lithuanian tourism products needs to be maintained and developed, as inbound tourism not only benefits tourism businesses, but also has a multiplier effect on the related economic sectors that sell goods and services to foreign tourists during their trips. Significant changes in the external environment of the tourism industry affect the economic security of the tourism business and the possibilities of ensuring it in Lithuania.

Tourism safety is a key challenge for all those involved in tourism. The occurrence of hazards during travel not only causes direct damage from the incident, but also economic consequences such as a reduction in demand for the tourism product. Depending on the level of the emergency, the economic damage and the cost of restoring the confidence of tourists can be so high that it can lead to the collapse of the entire tourism industry.

The concept of security is defined in scientific literature and state legislation as a state of protection of the vital interests of the individual, society and the state against internal and external threats. Tourism security is a complex of interrelated factors and phenomena resulting from the interaction of three main tourism agents – the territory with its individual configuration and the correlation of conditions and resources, the persons initiating tourism development in a given territory (territory owners and tour operators), and, in fact, tourists.

The economic security of the tourism sector is understood as the most effective use of available resources to prevent threats, successfully counteract emerging negative impacts, and ensure stable functioning and development. Thus, tourism economic security is a complex concept consisting of many interrelated and interdependent factors. Based on the approaches to the definition of economic security that exist in the scientific literature, it is possible to distinguish a number of tourism economic security and development objects and to divide them into levels.

Current methods of tourism security research only allow for tourism-based economic security to be assessed as a separate component, without taking into account other levels. This raises the problem of the lack of a comprehensive approach to assessing economic security. Developing a comprehensive assessment of all components of tourism-based economic security will provide objective information on the state of tourism in the country. On the basis of such an assessment, it will be possible to develop a tourism-based economic security monitoring system that will significantly increase the attractiveness of the tourism industry.

Tourism services are provided by a large number of independent businesses offering different activities (tour operators, travel agencies, restaurants, hotels, tourist information centers, etc.), all working towards their own objectives. This study will analyze tour operators, who are defined by the World Tourism Organisation as businesses that combine two or more travel services (e.g., transport, accommodation, catering, entertainment, excursions) and sell them, either through travel agencies or directly as a single product to end-users (known as a package), at competitive prices (Frechtling, 2010). These activities can be analyzed from two perspectives: producers of the tourism product, and sellers of the tourism product. In the first case, from the point of view of the producers of the tourism product, the activities of tour operators are similar to those of manufacturing companies: there are resources and reserves, suppliers and consumers, costs and investments. In the second case, the tour operator acts as a wholesaler of tourism services. In this respect, the tour operator sells its product to a travel agent rather than to the final consumer. The tour operator becomes the link between tourism enterprises and the final sellers of tourism services. The main risk in this link lies with the tour operator, who is responsible for the quality of the product and for avoiding failures. This situation increases the need to look for points of contact between the company's risk policy and the tour operator. The tour operator, as a specific economic entity, is involved in various relationships.

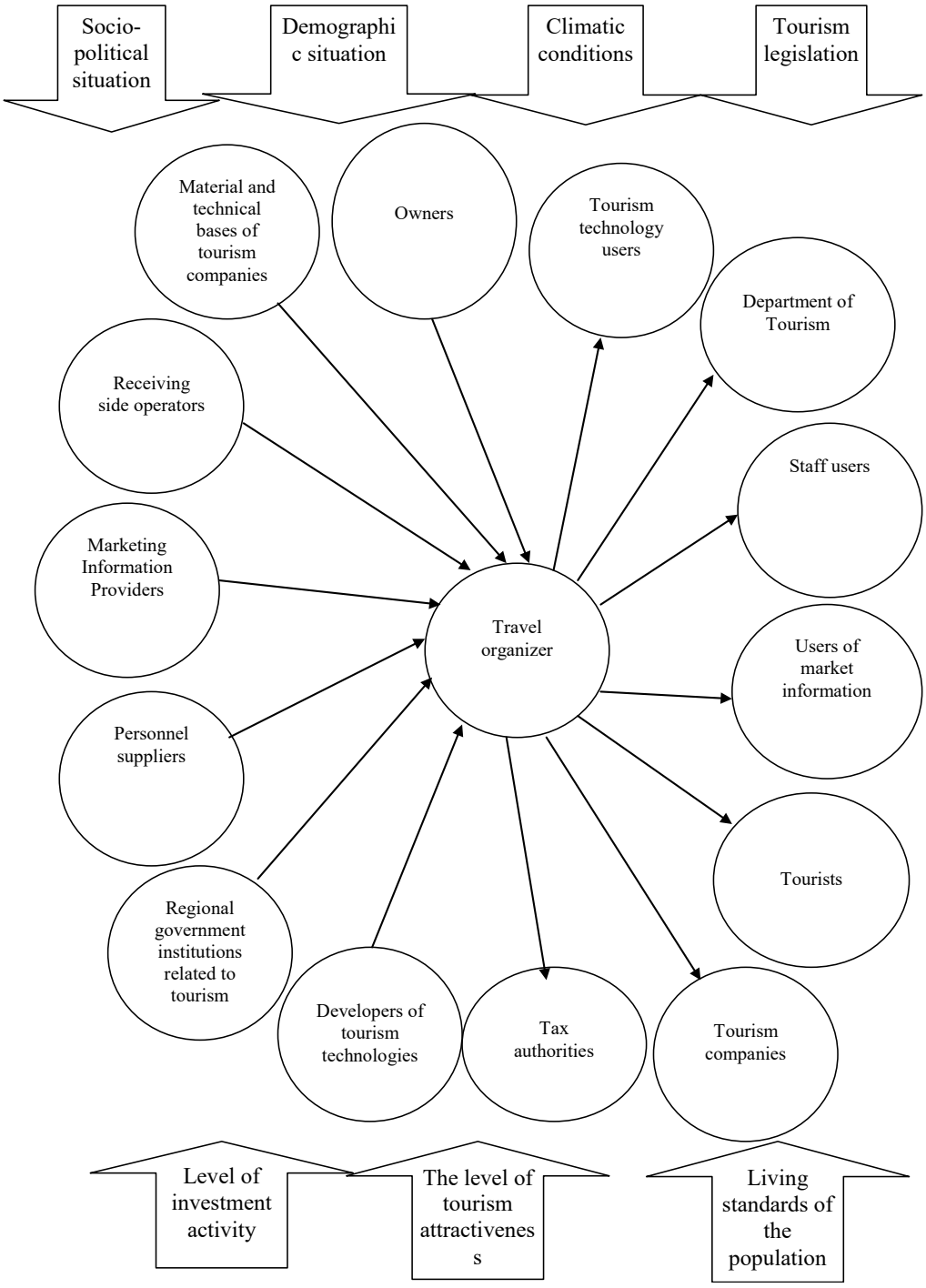


Figure 4. Tour operators' economic relationships

Risk factors include only the random processes of the tour operator. This approach is based on the stochastic nature of risk, which makes it impossible to predict or forecast many economic events in advance. Risk factors differ in their heterogeneous expression, the discreteness of their measurement, and their abrupt termination.

The variety of risk factors leads to the emergence of risks associated with virtually all activities of tour operators. The scientific literature is rich in risk classification criteria (Raval & Fichadia, 2007; Kerzner, 2013; Assael, 1995; Engel et al., 1995; Mowen & Minor, 1998; Schiffman & Kanuk, 1991; Fuchs & Reichel, 2006; Shaw, 2010; Sönmez et al., 1999; Aziz, 1995; Bar-On, 1996; Leslie, 1999; Richter & Waugh, 1986; Enders et al., 1992; Sönmez, 1998; Gartner & Shen, 1992; Hollier, 1991; Ioannides & Apostolopoulos, 1999; Pizam, 1999; Pizam et al., 2002; Richter, 1992; Seddighi et al., 2001; Teye, 1986; Wall, 1996; Carter, 1998; Cossens & Gin, 1994; Lawton & Page, 1997; Brunt et al., 2000; Dimanche & Leptic, 1999; Ellis, 1995; Garcia & Nicholls, 1995; Hall et al., 1995; Moore & Berno, 1995; Pizam et al., 1997; Navickas, 2010; Mačerinskienė & Sakhanova, 2011; Pridotkienė, 2009). Based on the work of the authors listed above, a classification of tour operators' risk has been developed, which is presented in Figure 5.

In related studies, the vast majority of authors focus on the risk perceptions of tourists, especially after the 9/11 attacks in the USA (Fuchs & Reichel, 2011; Kim et al., 2015; Wolff et al., 2019), providing a reliable reference for tourism service optimization and tourist risk management. In contrast, relatively few studies have focused on identifying risks for tourism companies. Among the few studies that take companies as research samples, the topics are more concerned with risk management, assessing a specific risk related to an event, or the influence of company characteristics (such as corporate social responsibility and advertising spending) on their risk status (Kim et al., 2015; Lee & Jang, 2011; Paraskevas & Quek, 2019; Park et al., 2017). While these studies provide specific recommendations

for business management, they still lack a theoretical framework, resulting in a fragmented understanding of company risks in general. Li et al. (2020) analyzed 51,008 risk headings from 255 public companies' financial statements, where 30 risk exposures for tourism companies can be observed. From the internal perspective, each sub-industry has unique business characteristics, and the risk exposures it faces are also different: high debt risk, funding risk, and credit risk can reflect the economic attributes of casinos and the gaming industry; partnership risk is the representative risk of the hotels, resorts, and cruise lines industry; high investment risk and catastrophe risk is due to the many outdoor activities and the larger floor space in the leisure facilities industry; and supply risk, potential/ongoing lawsuits, and demand fluctuation risk reflect the characteristics of the restaurant industry. From the time perspective, most risk exposures maintain a relatively stable disclosure proportion. Risk exposures with an average fluctuation rate exceeding 5% include tax risk (5.98%), epidemic risk (5.86%), asset impairment risk (5.25%), information technology risk (4.98%), food safety risk (4.36%), and seasonal risk (–4.47%).

However, it should be borne in mind that tourism risks are local in nature, i.e., risks are defined by the chronological order of certain events. Further down the line, the consequences of the risk may arise, which may vary in severity and form a trend. It is therefore necessary to distinguish between the content of the risk as a potential threat and the outcome of the risk as potential damage.

The variety and scope of risk exposures makes it necessary for tour operators to seek effective regulatory approaches and instruments. Two trends can be identified: macroeconomic regulation of tourism risk problems, which is part of the state regulation of the tourism economy, where the main thrust is to improve market conditions with third countries; and the use of internal reserves of insurance against operating losses (micro level).

There are two ways of assessing the risk of tour operators:

- Investigating and classifying potential counterparty issues.
- Carrying out a risk assessment by analyzing the financial stability of the tour operator.

The two are linked, as the stability of a tour operator is linked to the reliability of tourism providers and the quality of business diagnostics.

The risk analysis of third parties (with whom the tour operator enters into a contract) should include an expert assessment of the counterparty's performance. It is appropriate to analyze the weaknesses of the counterparty that may influence unexpected and negative events.

Financial soundness analysis should be carried out by examining specific indicators on the company's balance sheet.

All risk analysis methods for tourism entities are based on the internal stability test. Stability in this context is understood as the strength of a company's internal and external links. Instability is seen as an inadequate response to the impact of risk factors, the absence of strong links between the tour operator and the economic environment, and the inability to withstand negative changes in the competitive environment.

The risks of tourism service providers are linked to the risks of demand for their services, which in turn depend on the personal risks of the tourism service users, as well as on external environmental factors: natural, political, and economic factors, which also affect personal risks. Thus, the risks to the tourism consumer depend not only on external environmental factors, but also on the internal risks to the tourism supplier. Therefore, when assessing the risks of an inbound tourism complex, some of the risks on the sides of the supplier and consumer overlap, and it is thus necessary to take into account the interrelationship between the risks and their factors on each side when assessing the risks of a tourism complex.

Another important aspect in assessing the risks of an inbound tourism complex is the assessment of these risks in relation to the types of inbound tourism activities: therapeutic; summer/health and winter/health; extreme sports; and sightseeing. This is because these inbound tourism business risks are characterized by different risks, both in terms of the certainty of the risk and the potential for losses. Therefore, in the tourism supply sector, risks will be assessed by type of tourism activity.

Thus, when assessing the risks of tourism service providers, it is important to conduct a survey of tourism business service providers based on the main risks identified by experts and grouped by factor analysis, and to assess external and internal risks in terms of the negative impact they have and the likelihood of their occurrence for individual tourism activities. In order to carry out such a survey, it is necessary to draw up a questionnaire allowing for a qualitative assessment of these risks by means of a 5-point Likert scale for both the probability and potential impact of individual risks. The results obtained will allow for an assessment of the external and internal risks for each type of tourism and a final assessment of the significance of each risk.

In order to uncover and evaluate the economic processes under study, researchers are confronted with confusing patterns of observed variation, unclear interrelationships, a huge number of qualitative and quantitative variables, and unreliable data. The search for the most appropriate methods then often turns to factor analysis, whose methods allow hundreds of variables to be handled simultaneously, compensating for random errors, unraveling complex interrelationships, and identifying patterns and periodicities in their evolution.

Factor analysis helps to analyze and identify patterns and structure in a phenomenon. All phenomena occurring at a given place and time have patterns of variation, and many of these patterns are linked by interdependent relationships. Factor analysis is special in that it does not have a single solution. The correlation

matrix can be represented by factors in an infinite number of ways. Moreover, factor analysis is not a single method. The SPSS software offers the following methods: the principal components method, the maximum likelihood method, general factor analysis, the unweighted least squares method, the alpha method, and image factors. The choice of the best method is usually determined by the convenience of the calculation, as well as by the preference or attachment of the researcher, who may find one or another method more adequate to their perception of the generalities.

Factor analysis methods solve two types of problems: exploratory and confirmatory. According to these objectives, factor analysis is also called exploratory and confirmatory. Confirmatory factor analysis is used when theoretical or empirical research is known in advance and it is required to confirm or extend existing knowledge. In addition, factor analysis reduces the amount of data, which often complicates the analysis of market processes. Factor analysis techniques identify a number of general patterns in which concentrated information can be substituted without loss for information captured in dozens of attributes.

Factor analysis is one of the tools used to construct an empirical typology. Interrelated attributes are grouped into distinct categories, which can be used to form groups of objects with similar characteristics, to assess relationships, and to make comparisons.

Thus, the task of factor analysis is to categorize observable variables into groups that are united by some factor that is not directly observable, based on correlations (Shrestha, 2021). Moving from a large number of variables to factors can concentrate information. The factors themselves often do not have a quantitative measure – e.g., aggression or altruism cannot be measured directly – but these concepts can be imagined as categories that unite groups of attributes. Factor analysis aims to:

- reduce the large number of variables by moving towards fewer common

factors;
- validate the scale used by showing that the components of the scale fall within the same factor and at the same time remove those components that fall within multiple factors;
- create orthogonal (uncorrelated) factors that can be used in regression analysis, avoiding the problem of multicollinearity of variables.

Factor analysis belongs to the General Linear Model (GLM) category and relies on assumptions similar to those of multivariate linear regression (Garson, 2013), the main examples being: linear dependence of the variables, interval data or data close to it, appropriate choice of knits, and no multicollinearity of variables. The condition of multivariate normality is imposed when the maximum likelihood method is used for factor extraction. In general, the condition of a normal distribution of variables is not critical for factor analysis. Factor analysis is also applicable to rank variables with a consistent, close-to-interval scale of measurement. However, in the case of binary data, too many factors are extracted, with many variables being assigned to them. For ordinal Likert scale data, interval scale analysis methods (including factor analysis) are widely used, where the scale is composed of at least 5, and preferably 7, values. The following steps take place in factor analysis:

– data is checked for suitability for factor analysis;
– factor extraction – determining the number of factors;
– factor rotation and interpretation;
– calculating estimates of factor values.

Factor analysis does not make sense for uncorrelated variables. Therefore, it is first necessary to ascertain whether the observed variables are correlated with each other. This helps to establish Bartlett's sphericity criterion, which tests the hypothesis that the correlation matrix of the variables is unitary, i.e., that all the observed variables are uncorrelated. If Bartlett's sphericity criterion results in a *p-value* greater than the chosen significance level α, i.e., the hypothesis is accepted,

then factor analysis is not applicable to the data. The linear factor analysis model is applied to a set of variables that are linearly correlated. This means that the partial correlation coefficients between two variables should be small compared to the correlation coefficients between those variables. The Kaiser–Meyer–Olkin (KMO) measure assesses whether the data are suitable for factor analysis in this respect. The KMO is an index of comparison between the empirical values of the correlation coefficients and the values of the partial correlation coefficients. If the KMO measure has a low value, the factor analysis of the variables under consideration is not successful. A low KMO value indicates that the correlation between pairs of variables is not explained by other variables. The KMO is assumed to be at least 0.7, and in the limiting case at least 0.6 (Shrestha, 2021). SPSS automatically calculates the *p*-values and KMOs of Bartlett's sphericity criteria.

A risk assessment of a tourism complex needs to be carried out from the perspective of both tourism service user and tourism service, as their risks are interrelated. When assessing the risks of a tourism service complex, it is appropriate to apply an integral approach, which would allow for the assessment of the risks of tourism entities, objects, processes, and phenomena at various levels. A flowchart for the risk assessment of tourism services is presented in Figure 5 below.

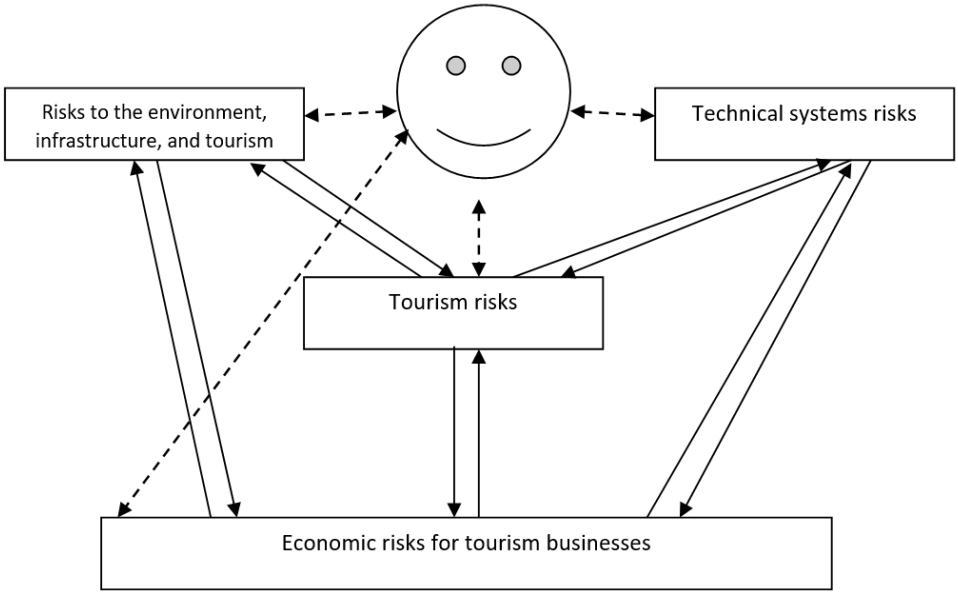


Figure 5. Risk assessment for consumers of tourist services

As can be seen from Figure 5, the risks for the inbound tourism consumer depend on the risks of the tourism providers and the environmental, infrastructural, technical, and personal risks of the consumer. In contrast, the risks of the tourism supplier depend on both the risks of the external environment and the personal risk factors of the tourism consumer, so that a risk assessment of the tourism complex needs to take into account all risks.

All existing negative risk factors are concentrated at the base level. Negative risk factors are grouped into different clusters (Wilks & Moore, 2003; Reichel et al., 2007; Li et al., 2020). Using previously studied risk assessment methodologies (Wilks & Moore, 2003; Reichel et al., 2007; Hotia et al., 2007; Sun et al., 2008; Šakienė & Zovytė, 2009; Shaw, 2010; Labanauskaitė, 2011; Oroian, 2011; Demir et al., 2020; Caldara et al., 2021), an integrated risk assessment on the consumer side of the tourism service may be depicted as follows:

$$R_b = \sum_{i=1}^{3} \propto_1 \cdot R_i \qquad (1)$$

where: R_b is the general risk assessment; is the weighting of the risk indicator at the i-th baseline level; is the risk assessment of the i-th baseline risk (i = 1 is personal risk; i = 2 is external environmental risk; and i = 3 is the internal risk of the tourism service provider). The baseline risk assessment is based on the m^1 indicator assessment of , with the lower order differential equation set as follows:

$$R_i = \sum_{j=1}^{m_i^1} \beta_{ij}^1 \cdot R_{ij}^1 \qquad (2)$$

where: β_{ij}^1 is the weighting of the j-th risk indicator of the first differentiated level; R_{ij}^1 is the risk assessment of the j-th group of the first differentiated level; and m_i^1 is the number of risk indicators at the first differentiated level.

The second and nth differentiated levels are calculated by means of a recurrence relation:

$$R_{ij}^{p-1} = \sum_{i=1}^{k_{ij}^p} \gamma_{ijl}^p \cdot R_{ijl}^p \qquad (3)$$

where: γ_{ijl}^p is the weighting of the third risk indicator at the differentiated level l; R_{ijl}^p is the risk assessment for the l-th group of the differentiated level p; k_{ij}^p is the number of risk indicators at the differentiated level; and p is the number of the differentiated level (p = 2,3.....n).

For a practical risk assessment, we will use two levels of assessment, i.e., p = 2. Each level is characterized by a corresponding number of risk indicators. The assessment of the base level can be presented as follows:

$$R_b = \alpha_1 R_1 + \alpha_2 R_2 + \alpha_3 R_3 \qquad (4)$$

The weightings are determined by the relative role of the relevant baseline indicator. The sum of the weightings shall be equal to 1; α_1, α_2, and α_3 shall be determined by an expert survey.

Accordingly, risk assessment must be carried out at all levels.

Each valuation parameter must be represented in a summative multiplicative model. For the first parameter (personal risk) at level 1, this would be:

$$R_1 = \beta_{11}^1 R_{11}^1 + \beta_{12}^1 R_{12}^1 + \beta_{13}^1 R_{13}^1 \qquad (5)$$

where: R_{11}^1 is the risk of psychological and educational problems; R_{12}^1 is age and health risks; R_{13}^1 is financial risk; and β_{ij}^1 is a risk-weighted indicator.

Thus, the assessment of personal risk (R_1) consists of the risk of psychological and educational problems (R_{11}^1), age and health risks (R_{12}^1), and financial risks (R_{13}^1). Each of these components forms a differentiated level 2.

Thus, the risk of psychological and educational problems can be presented as follows:

$$R_{11}^1 = \gamma_{111}^2 R_{111}^2 + \gamma_{112}^2 R_{112}^2 + \gamma_{113}^2 R_{113}^2 \qquad (6)$$

where: R_{111}^2 is the risk of insufficient language skills; R_{111}^2 is the risk of cultural differences; and R_{113}^2 is the risk of insufficient skills.

Financial risks include: the risk of running out of cash while travelling; the risk of credit card payment problems; the risk of currency exchange problems, etc. Health risks in turn consist of the risk of health problems and accidents, the risk of not receiving medical services on time, the risk of a lack of adequate medicines, etc.

The results of the risk assessment should show the localization of the risk. The risk assessment approach applied from the point of view of the consumer of tourism services will enable the risk profile of modern inbound tourism to be identified by tourism businesses. Further implementation of the risk model is linked to the development of compensation measures, the neutralization of negative risk phenomena, and insurance.

Both the personal risks of the consumer of the tourism service and the internal risks of the tourism service provider, as well as the risks of environmental factors, will be assessed through the calculation of integrated risk indicators. The risk

assessment will be carried out using qualitative risk assessment indicators based on an assessment of the likelihood of the risk and the resulting impact. A survey of experts will be carried out to assess the risk indicators. This expert assessment will also allow for the determination of the significance of the individual risk level indicators based on the risk estimates provided by experts.

Classical methods of analysis and assessment are not sufficient to fully analyze the risks of a tourism complex, their main drivers, and their impact. In the context of a comprehensive risk assessment of tourism facilities, it is rational to combine quantitative and qualitative assessment. It is the multi-criteria methods of analysis that allow for a more comprehensive study of an object, linking quantitative and qualitative criteria and integrating the results of economic evaluation methods into the analysis. On the basis of multi-criteria analysis methods, tourism complexes or their components, such as tourism service providers, service companies, and tour operators, can be analyzed comprehensively, taking into account the quantitative and qualitative parameters of the market conjuncture characterizing the object (e.g., the objective is to identify the quantitative – e.g., area served, number of facilities, cost of production or service, production capacity, cost of restoration – and qualitative – e.g., legislative and regulatory constraints, technological novelty, environmental compliance, level of innovation, influence of interest groups, etc. – criteria characterizing the market). All of these important criteria have an impact on the assessment of business risk in the tourism sector.

Methods for determining the values and significance of criteria for environmental factors can be broadly divided into two groups:

- methods that allow criteria to be expressed in quantitative units (e.g., monetary, technical parameters, other units of measurement);
- methods by which criteria are expressed/described in relative, qualitative units (scores, percentages).

While quantitative criteria can be expressed in monetary terms or in terms of

technical parameters that characterize objects, the determination of the values and significance of qualitative criteria is more complex. The significance of qualitative criteria can be determined by analyses, scientific studies, databases, and articles, by comparing analogous objects with the objects under consideration, or by analyzing the macro, meso, and micro environments of regions with similar development trends. The values and significance of qualitative criteria are usually determined by means of expert or sociological surveys. Using expert methods, the values of qualitative criteria can be determined as follows:

- determining the best value for a given criterion;
- giving the best value of the criterion in question a value of, e.g., 1 point (or 10 points, or 100%);
- establishing the ratio between the best criterion value and the values of all the other criteria;
- giving relative values to remaining criteria in such a way that their sum equals 1;
- setting the significance levels of the criteria.

In order to achieve comparability, the values of quantitative and qualitative criteria should be normalized using formulas used in the literature (Ginevičius & Podvezko 2005; Zavadskas et al., 1999). The most widely used method for determining the significance of criteria in different areas is the expert judgment method. By assessing the significance of criteria using expert methods, we can prioritize them in order of importance. Although expert methods do not calculate the values of quantitative criteria with high precision, the complex method of determining the importance of criteria assesses their qualitative and quantitative characteristics. The significance of the criteria can be assessed using a ranking method. This method usually involves the evaluation of criteria on the basis of methodologically designed questionnaires, completed by experts, which are set up in such a way that the significance of the criteria or groups of criteria can be assessed.

The risk assessment of tourism complexes first identifies the external risks that have the greatest impact, both in terms of the damage caused and the likelihood of occurrence. A system of quantitative and qualitative criteria affecting the risks must then be established and their significance determined. In describing the risks of tourism service providers, the environment of the sector as a whole must be taken into account and relevant information describing the macro-, meso-, and micro-environmental factors affecting the risks must be selected.

The risk analysis of the selected tourism business service providers is then carried out by creating a multi-criteria analysis grouped decision-making matrix, which contains the quantitative and qualitative information developed. Once the grouped decision matrix has been compiled and the multi-criteria analysis of alternatives has been carried out, it is possible to select the riskiest area or business in the tourism supply chain and to analyze the most important determinants of this high risk. This also identifies the values and significance of the risks of the facilities under consideration.

Using the multicriteria comprehensive proportional assessment method (COPRAS), the business riskiness of the selected tourism service providers can be determined and ranked. This ranking depends on a framework of risk factors that adequately characterize the selected facilities, the risk assessment values, and the magnitudes of the significance values, which are determined by the experts during the survey.

The multi-criteria complex proportional assessment method calculates the priority and significance of the objects under consideration in four stages (Kaklauskas et al., 2006; Zavadskas et al., 1999; Andria et al., 2021; Liao et al., 2023):

Stage 1. The aim of this step is to obtain dimensionless (normalized) estimates from the comparators. The dimensionless estimates allow a comparison of all the

indicators in different units of measurement. This is done using the following formula:

$$d_{ij} = \frac{x_{ij} \cdot q_i}{\sum_{j=1}^{n} x_{ij}}, \quad i = \overline{1,m}; \quad j = \overline{1,n}, \tag{6}$$

where: x_{ij} is the value of risk i in decision option j; m is the number of risks; n is the number of options compared; and q_i is the significance of risk i.

The sum of the dimensionless weighted values, d_{ij}, obtained for each risk, x_i, is always equal to the significance, q_i, of that risk category:

$$q_i = \sum_{j=1}^{n} d_{ij}, \; i = \overline{1,m}; \; j = \overline{1,n} \tag{7}$$

The significance value, q_i, of the risk under consideration shall be apportioned to all alternatives according to their values, x_{ij}.

Stage 2. Calculate the sums of the normalized scores of the minimizing S_{-j} and maximizing S_{+j} estimated for option j. The following formulae are used to calculate them:

$$S_{+j} = \sum_{i=1}^{m} d_{+ij}; \tag{8}$$

$$S_{-j} = \sum_{i=1}^{m} d_{-ij}; \; i = \overline{1,m}; \; j = \overline{1,n}. \tag{9}$$

In this case, the larger the size of S_{+j}, the higher the riskiness of the object under consideration. The smaller the value of S_{-j} (negative risk factors), the more environmental factors that negatively influence the degree of riskiness of the object. In any case, the sums of the pluses, S_{+j}, and the minuses, S_{-j}, of all the alternatives are always equal to the sums of all the values of the maximizing and minimizing risk factors, respectively:

$$S_{+} = \sum_{j=1}^{n} S_{+j} = \sum_{i=1}^{m} \sum_{j=1}^{n} d_{+ij}; \qquad (10)$$

$$S_{-} = \sum_{j=1}^{n} S_{-j} = \sum_{i=1}^{m} \sum_{j=1}^{n} d_{-ij}; \; i = \overline{1,m}; \; j = \overline{1,n}. \qquad (11)$$

This is another way of checking the correctness of the calculations made.

Stage 3. The relative significance (effectiveness) of the options being compared is determined on the basis of the positive risk indicators, S_{+j}, and the negative risk indicators, S_{-j}. The relative significance, Q_j, of each object, *aj*, is determined according to the following formula:

$$Q_j = S_{+j} + \frac{S_{-\min} \cdot \sum_{j=1}^{n} S_{-j}}{S_{-j} \cdot \sum_{j=1}^{n} \frac{S_{-\min}}{S_{-j}}}; \quad j = \overline{1,n}. \qquad (12)$$

Stage 4. Prioritization of the sites under consideration in terms of risk. The higher the Q_j, the higher the riskiness of the object. If $Q_1 > Q_2 > Q_3$, then the first object can be considered the riskiest.

The above approach makes it relatively easy to assess and then select the riskiest options. The generalized criterion, Q_j, developed depends directly and proportionally on the relative influence of the values, x_{ij}, and the significances, q_i, of the risks being compared in the final result. This gives an objective prioritization of the objects to be analyzed in terms of their riskiness. The calculations using the multicriteria complex assessment method are usually carried out using software which allows the selection of the appropriate number of objects for the analysis and the use of a sufficient number of quantitative and qualitative indicators to characterize the risks in detail.

Stage 5. A clustered decision-making matrix for multi-criteria analysis of the analyzed objects is created, as shown in Table 1.

Table 1. Multi-criteria analysis grouped decision matrix

Risks of comparable objects $(a - a)_{1n}$	* (+ / –)	Significance	Unit of measurement	Evaluative and comparative objects					
				a_1	a_2	...	a_j	...	a_n
1. Personal risk factors	ž	q_1	m_1	x_{11}	x_{12}	...	x_{1j}	...	x_{1n}
2. External risk factors	$ž_2$	q_2	m_2	x_{21}	x_{22}	...	x_{2j}	...	x_{2n}
Health risks	$ž_i$	q_i	m_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
Criminogenic situation	...	...	...	...	...	...	...	...	...
Economic risk	$ž_t$	q_t	m_t	x_{t1}	x_{t2}	...	x_{tj}	...	x_{tn}
3. Tourism business risk factors	$ž_{t+1}$	q_{t+1}	m_{t+1}	$x_{t+1\,1}$	$x_{t+1\,2}$	...	$x_{t+1\,j}$	...	$x_{t+1\,n}$
Business risks	$ž_{t+2}$	q_{t+2}	m_{t+2}	$x_{t+2\,1}$	$x_{t+2\,2}$	...	$x_{t+2\,j}$	...	$x_{t+2\,n}$
Operational risk	$ž_i$	q_i	m_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
...	...	...	...	...	...	...	...	...	...
Competitiveness	$ž_m$	q_m	m_m	x_{m1}	x_{m2}	...	x_{mj}	...	x_{mn}
Sum of ranks				Q_1	Q_2	...	Q_j	....	Q_n

* *A +/– symbol indicates that a positive or negative value of the indicator corresponds to the impact of the risk*

In a complex site analysis, it is rational to combine quantitative and qualitative assessment. Multi-criteria methods of analysis allow for a more comprehensive study of the object, linking quantitative and qualitative criteria and integrating technical data and the results of economic evaluation methods or analyses in the analysis. Methodologies for weighting criteria are known as weighting methodologies, and are one of the methods of preference elicitation for quantifying or qualitatively assessing the importance that people attach to certain criteria for deciding on the implementation of a given measure. These methods include a wide range of surveys, which quantify public values, and indirect assessment methods, where relevant factors are identified through discussions between working groups or stakeholders to determine their preferences.

The methods for determining the values and significance of the criteria for external risk factors can be broadly divided into two groups:

- methods that allow risk assessments to be expressed in quantitative units (e.g. economic units, technical parameters).
- methods by which criteria are expressed/described in relative qualitative units (scores, percentages).

While quantitative criteria can be expressed in monetary terms or in other parameters, the determination of the values and significance of qualitative risk assessments is more complex. The significance of qualitative criteria can be determined by analyses, scientific studies, or databases, by comparing analogous objects with the objects under consideration, or by analyzing the macro, meso, and micro environments of regions with similar development or development trends. The values and significance of qualitative criteria are usually determined by means of expert or sociological surveys.

However, the use of expert methods to determine the values and significance of criteria (risks) may not avoid errors in determining the significance of quantitative criteria. As the values of the criteria change, so do their significance. Therefore, it is necessary to correctly determine the values of the criteria when determining their significance. The significance of the criteria should be constant across all comparisons. It is also necessary to adjust the significance of quantitative and qualitative criteria according to their importance.

In an expert judgment approach, it is important to establish the significance of the criteria, without which it is difficult to assess the reliability of the study. The purpose of this calculation is to determine whether there is a sufficient degree of agreement between the opinions of the individual experts to be able to rely on the results of the expert evaluation. The degree of agreement between the experts is indicated by Kendall's concordance coefficient, *W*. The calculation of this coefficient, using the established table of indicators of expert judgement, is carried

out on the basis of the formulae in the literature. This coefficient is equal to 1 if all experts have the same opinion. When all the rankings are different, the coefficient is equal to 0 (Podvezko, 2005).

It is difficult to achieve consistency of opinion in the development of a wide range of solutions in many economies in the tourism sector. In order to ensure the credibility of studies, experts must be selected in such a way that the social and interest groups they represent, the level of knowledge they have in the area under analysis, and their qualifications allow them to provide a balanced view reflecting qualitative indicators.

The concordance coefficient, *W*, can be used to determine the consistency of the opinions of a group of experts. The concordance coefficient is calculated as follows:

$$W = \frac{12S}{m^2 n\left(n^2 - 1\right)}, \quad W \in [0;1] \qquad (13)$$

where: *m* is the number of experts, *j* = 1,2..., *m*; *n* is the number of indicators, *i* = 1,2..., *n*; and *S* is the sum of squares of the deviations of the indicator values (ranks) from the overall mean of the experts' rank.

The sum of the squares of the deviations of the ranks, *Rij*, of each criterion from the mean rank, *S*, can be conveniently calculated using the following formula:

$$S = \sum_{i=1}^{n}\left[\sum_{j=1}^{m} R_{ij} - \frac{1}{2}m(n+1)\right]^2, \qquad (14)$$

where *Rij* is the rank given to the *i*-th criterion (indicator) by the *j*-th expert.

If the experts are in agreement, the value of the concordance coefficient, *W*, is

close to one; if the assessments are very different, the value of *W* is close to zero. The concordance coefficient can be used in practice if a threshold value is set to indicate when the experts' assessments can still be considered to be consistent. Kendall has shown that if the number of objects, *n*, is >7, the significance of the concordance coefficient can be determined using the χ^2 criterion:

$$\chi^2 = Wm(n-1) = \frac{12S}{mn(n+1)}, \qquad (15)$$

The random variable is distributed according to the χ^2 distribution with $\nu = n - 1$ degrees of freedom. According to the chosen significance level, α (in practice, α is usually taken to be 0.05 or 0.01), the critical value, χ^2_{kr}, is found from the χ^2 distribution table with $\nu = n - 1$ degrees of freedom. If the value of χ^2 calculated according to formula (5) is higher than χ^2_{kr}, the experts' assessments are in agreement.

In order to perform a factorial risk analysis of the tourism complex, a structured questionnaire covering 68 risk factors of tourism business was developed, the results of which were processed with Microsoft Excel and the SPSS software package (Field, 2005; Pukėnas, 2009).

The factor analysis led to the identification of 12 risk factors (categories):

F1 – Operational risk (internal risk).

F2 – Natural environment risks.

F3 – Country competitiveness risk.

F4 – Criminogenic situation and political environment risks.

F5 – Infrastructure risk.

F6 – Business risk (internal risk).

F7 – Health risks.

F8 – Economic risk.

F9 – Transport risks.

F10 – Risk of psychological and educational gaps (personal).

F11 – Health and age risks (personal).

F12 – Financial risk (personal).

The ratings (mean value*)* of all of these risk factors were determined as the average of the ratings of all the smaller risk factors that make up the risk factor. The 12 risk factors accounted for 60% of the total variation. All factors had relatively high reliability coefficients, ranging from 0.35 (for health risk) to 0.93 (for operative risk). Reliability coefficients were calculated according to the KMO test. KMO is a comparative index of the empirical values of the correlation coefficients and the values of the partial correlation coefficients. If the KMO measure has a low value, the factor analysis of the variables under consideration is not successful. A low KMO value indicates that the correlation between pairs of variables is not explained by other variables. It is assumed that KMO should be at least 0.7, or at least 0.6 in a borderline case (Čekanavičius & Murauskas, 2002).

Although the KMO obtained for the health factor is 0.35, which is quite low, only two risk factors describe this factor. All other calculated KMOs exceed 0.63 (one factor exceeding 0.63) and the calculated KMOs for all other 9 factors exceed 0.82. This indicates that, with the exception of the health factor, all other assessment results are reliable.

The internal correlation between a group of factors describing a particular factor indicates whether the specific factors are correctly assigned to the factor. The health factor has an internal correlation coefficient of 0.15, which is the lowest possible according to the requirements for factor analysis (Pukėnas, 2009). The internal correlation between risk factors in the other groups ranges from 0.15 to 0.69, indicating high internal consistency. The high correlation between a factor and its constituent factors, obtained for all factors, of more than 0.3, indicates a good compatibility of the factors selected to describe the factor.

Another important indicator in factor analysis is the weightings of the factors that make up each factor. A factor (e.g., operational risk) is considered to

be related to those variables – X_1, X_2, ... X_n (product mix, theft, etc.) – for which the weight estimates, λ_k, are at least 0.4 in absolute value (Pukėnas, 2009, formula 4.10). A positive weight indicates that the variable is positively correlated with the factor, while a negative weight indicates a negative correlation. Variables are equally important regardless of the sign of their weight (Pukėnas, 2009). As can be seen from the data presented in Table 2, all the factor weights are above 0.4, indicating that the respective factors are correlated with the factors.

The KMO test, the weights of the factors, and the internal correlation between the factors in the group showed that the factors were well chosen and grouped to describe the risk factors. A summary of the factor analysis results is presented in Table 2.

The KMO, the factor weights, and the internal correlation between factors were calculated using SPSS.

Table 2. Factor analysis results

Risks	***Factor weighting coefficients***	***Average value***	***KMO***	***Internal correlation between factors within a group***
Factor 1: Operational risk		**2.29**	**0.93**	**0.49**
Product range too small	0.806			
Theft/fraud in business by staff	0.792			
Theft by tourists	0.755			
Black market	0.753			
It is impossible to meet the needs of tourists	0.738			
Excessive prices in the industry in general	0.729			
Technological innovations such as reservation systems	0.700			
Lack of quality services	0.574			
Staff turnover	0.570			
Overtime worked by staff	0.476			
Frequency of leave and absenteeism	0.422			

Number of temporary staff compared to total staff	0.370			
Factor 2: Nature		**2.47**	**0.85**	**0.48**
Urbanization	0.814			
Seasonality	0.807			
Water contamination	0.713			
Air pollution	0.515			
Factor 3: Competitiveness		**3.18**	**0.82**	**0.36**
Negative country image	0.754			
Exchange rate fluctuations	0.681			
Currency exchange rate	0.547			
Low airline security	0.538			
Increase in international competition	0.537			
Inadequate airport security	0.530			
Increase in competition in the industry	0.354			
Changing tourist needs	0.277			
Factor 4: Criminogenic situation		**2.71**	**0.83**	**0.49**
Political unrest in the country	0.782			
Political instability in neighboring countries	0.764			
Wars/conflicts	0.578			
Terrorist activities	0.548			
Climate change	0477			
Fires	0.403			
Natural cataclysms	0.397			
Kidnapping and theft	0.277			
Factor 5: Infrastructure		**3.27**	**0.82**	**0.33**
Poor road safety in the form of road conditions, inadequate streets	0.686			
Prices too high	0.679			
Low level of IT technology development	0.558			
Poor public utilities such as water, electricity, sewage, etc.	0.430			

Too little attention paid to advertising from local authorities	0.418			
Ineffective national marketing	0.398			
Non-compliance with legislation	0.364			
Poor road safety in the form of road conditions, inadequate streets	0.363			
Prices too high	0.350			
Factor 6: Business risk		**2.83**	**0.84**	**0.51**
Shortage of skilled workers	0.776			
Lack of experienced staff	0.772			
Ageing tourism sector	0.760			
Insufficient funding for training	0.586			
Lack of adequate financial systems	0.468			
Insufficient funds for product development	0.278			
Factor 7: Health risks		**2.11**	**0.35**	**0.15**
HIV/AIDS	0.753			
COVID-19	0,789			
Diseases such as tuberculosis, influenza	0.688			
Factor 8: Economic risk		**3.12**	**0.63**	**0.46**
Inflation	0.763			
Interest rate	0.750			
Declining tourist leisure	0.291			
Factor 9: Transport risk		**2.88**	**0.82**	**0.69**
Rising fuel prices	0.455			
Transport-related costs	0.371			
Flight delays or cancellations due to unreliable airlines	0.285			
Insufficient tourist transport capacity	0.258			
Factor 10: Psychology and education		**2.00**	**0.65**	**0.55**
Insufficient knowledge of languages	0.355			

Cultural differences	0.471			
Insufficient skills	0.185			
Insufficient knowledge of languages	0.258			
Factor 11: Age and health		**2.01**	**0.63**	**0.56**
Health problems and accidents	0.733			
Failure to provide timely medical services	0.750			
Lack of necessary medicines	0.331			
Factor 12: Financial situation		**2.22**	**0.72**	**0.59**
Lack of cash when travelling	0.563			
Credit card payment problems	0.550			
Currency exchange problems	0.391			

The factor analysis shows the risks assessed by travel agencies based on the average score for the factor and for the individual sub-factors describing the factor. The importance of the risk category describing each factor is represented by factor importance. The factor analysis carried out led to the identification of 12 risk factors and the grouping of the factors, describing them accordingly. The data obtained allow the design of a questionnaire for a survey of experts to assess the risks to the tourism complex in terms of their likelihood of occurrence and their economic impact on the basis of the risk factors identified, which cover a range of important risk factors.

8.3. Expert risk assessments of the inbound tourism complex

A consumer risk assessment of the inbound tourism complex was carried out by interviewing experts, covering external environmental risks, internal risks of tourism service providers, and personal risks of tourism service users by type of tourism activity. The multi-criteria COPRAS method was applied to find the significance of the risk factors. This method led to the integrated risk assessment described in formulae 1 to 6. The COPRAS method can also be used to carry out risk assessment on the basis of both quantitative and qualitative indicators

(Ginevičius & Podvezko, 2005; Zavadskas et al., 1994; Kubiliūtė & Neverauskienė, 2023). This study was limited to qualitative assessments, but COPRAS allows multi-criteria risk assessment based on both quantitative and qualitative indicators.

Expert methods are usually used to determine the significance of qualitative criteria. In order to investigate and determine the significance of the risks at all levels of risk assessment, a survey questionnaire was designed. The questionnaire was designed to assess all the risks for the selected tourism complexes, i.e., leisure tourism, winter wellness tourism, summer wellness tourism, sightseeing tourism, and extreme sports tourism. For the expert survey, 6 expert groups (containing 6 experts each) representing different parts of the tourism complex with different interests were formed. As the assessment of the risks of the tourism complex and macroenvironmental aspects requires specific knowledge of the country's macro-economic business environment, one group of experts consisted of financial analysts and academics working in the field of macro-economic policy. The other group of experts consisted of service level employees of the tourism complex who are directly involved in the provision of services to tourists. An important group of experts are the guides who serve tourists and are the most familiar with the personal risks of tourists. Managers of travel agencies and their departments are the most familiar with the internal risks of tourism suppliers, and are therefore best placed to assess them. Managers of tourist information centers are also in a good position to objectively assess the various risks of a tourism complex, both in terms of the marketing of services and other risks. In order to make the study more objective, the experts were grouped as follows:

expert group 1 – staff at the service level of the tourism complex;

expert group 2 – heads of tourism agency departments

expert group 3 – heads of travel agencies;

expert group 4 – tour guides;

expert group 5 – heads of tourist information centers;

expert group 6 – economic experts.

The questionnaire was divided into three sub-sections, describing external risks, internal risks, and personal risks.

Each sub-system consisted of a series of indicators describing risk factors. The latter risk factors are in turn composed of a series of risk factors. The risk questionnaire had to assess the economic losses both in terms of the probability of the occurrence of the risk and its consequences on a 5-point scale. The higher the risk significance obtained, the more important this criterion was to the expert who assessed its significance and the more it will have an impact on the final outcome of the risk assessment. The averages of the criterion scores calculated from the expert assessment results and the resulting final risk assessment significances were determined for each expert group and for all expert groups. The COPRAS method allows for the assessment of both the positive and negative influence of risk factors. In the expert survey, all risk factors were formulated as positively influencing the increase in risk.

Table 3 summarizes the significance ratings for the tourism complex risk factors.

Table 3. Assessing the significance of risk factors in the tourism complex

Risks	Risk factors	Description of the risk		+ -	Average of the sum of the criteria scores under all experts					Σ (6- 10)	Criteria Significance (Exp. Groups I– VI)	Ranking of criteria
					Therapeutic tourism	Winter Fitness	Summer Fitness	Cognitive	Extreme sports tourism			
1	2	3	4	5	6	7	8	9	10	11	12	13
Personal risk for the consumer of tourism services	Psychology a and education	Insufficient knowledge of languages	scores	+	6	6	16	16	15	59	0.0186	**1**
		Cultural differences	”	+	8	9	8	8	20	53	0.0167	2
		Insufficient skills	”	+	20	20	16	16	25	97	0.0306	3
	Age and health	Health problems and accidents	”	+	10	20	9	9	25	73	0.0231	4
		Failure to provide timely medical services	”	+	10	15	12	12	20	69	0.0218	5
		Lack of necessary medicines	”	+	6	8	4	4	20	42	0.0133	6
	Financial situation	Lack of cash when travelling	”	+	6	9	9	9	9	42	0.0133	7
		Credit card payment problems	”	+	4	8	6	6	9	33	0.0104	8
		Currency exchange problems	”	+	6	9	9	9	9	42	0.0133	9

External environmental risks	National competitiveness	Negative country image	”	+	15	15	20	20	12	82	0.0259	10
		Exchange rate fluctuations	”	+	9	12	15	15	9	60	0.0190	11
		Currency exchange rate	”	+	8	8	4	4	8	32	0.0101	12
		Low airline security	”	+	10	10	10	10	10	50	0.0158	13
		Increase in international competition	”	+	9	12	8	8	8	45	0.0142	14
		Inadequate airport security	”	-	8	8	8	8	8	40	0.0126	15
		Increase in competition in the industry	”	+	9	9	6	6	9	39	0.0123	16
		Changing tourist needs	”	+	6	9	9	9	15	48	0.0152	17
	Infrastructure	Poor road safety in the form of road conditions, inadequate streets	”	+	10	10	10	10	8	48	0.0152	18
		Prices too high	”	+	6	16	12	12	12	58	0.0183	19
		Low level of IT technology development	”	+	6	4	6	6	6	28	0.0088	20
		Poor public utilities such as water, electricity, sewage, etc.	”	+	5	4	4	4	5	22	0.0070	21
		Too little attention to advertising from local authorities	”	+	9	12	12	12	16	61	0.0193	22
		Ineffective national marketing	”	+	9	12	9	9	16	55	0.0174	23
		Non-compliance with legislation	”	+	4	6	9	9	20	48	0.0152	24
		Power outages	”	+	8	9	9	9	9	44	0.0139	25
	Transport	Rising fuel prices	”	+	9	6	9	9	15	48	0.0152	26
		Transport-related costs	”	+	8	20	5	5	4	42	0.0133	27
		Flight delays or cancellations due to unreliable airlines	”	+	9	6	6	6	6	33	0.0104	28
		Insufficient tourist transport capacity	”	+	9	9	9	9	9	45	0.0142	29
	Economic environment	Inflation	”	+	4	4	4	4	4	20	0.0063	30
		Interest rate	”	+	4	9	6	6	12	37	0.0117	31
		Declining tourist leisure	”	+	16	12	12	12	6	58	0.0183	32
		Reduced tourist revenue due to the economic crisis	”	+	4	1	2	2	9	18	0.0057	33
	Natural environment	Urbanization	”	+	16	16	12	12	8	64	0.0202	34
		Seasonality	”	+	5	5	5	5	3	23	0.0073	35
		Water contamination	”	+	10	10	10	10	10	50	0.0158	36
		Air pollution	”	+	5	5	10	10	10	40	0.0126	37
	Health risks	HIV/AIDS	”	+	15	8	8	8	3	42	0.0133	38
		Diseases such as cholera, tuberculosis, malaria, COVID-19	”	+	5	5	4	4	3	21	0.0066	39
	Criminogenic situation and political stability in the country	Political unrest in the country	”	+	8	6	8	8	6	36	0.0114	40
		Political instability in neighboring countries	”	+	5	5	5	5	5	25	0.0079	41
		Wars/conflicts	”	+	5	5	10	10	10	40	0.0126	42
		Terrorist activities	”	+	8	10	6	6	10	40	0.0126	43
		Climate change	”	+	15	15	10	10	10	60	0.0190	44
		Fires	”	+	15	15	15	15	20	80	0.0253	45
		Natural cataclysms	”	+	5	4	4	4	4	21	0.0066	46
		Kidnapping and theft	”	+	10	6	6	6	6	34	0.0107	47
		High overall criminogenic level	”	+	8	6	15	15	20	64	0.0202	48

Internal risk of the tourist service provider	Business risks	Shortage of skilled workers	”	+	15	6	25	25	25	96	0.0303	49
		Lack of experienced staff	”	+	9	6	9	9	9	42	0.0133	50
		Ageing tourism sectors	”	+	12	12	16	16	16	72	0.0227	51
		Insufficient funding for training	”	+	12	12	15	15	15	69	0.0218	52
		Lack of adequate financial systems	”	+	12	12	12	12	15	63	0.0199	53
		Insufficient funds for product development	”	+	16	16	12	12	8	64	0.0202	54
	Operational risk	Product range too small	”	+	8	8	8	8	12	44	0.0139	55
		Theft/fraud in business by staff	”	+	3	3	3	3	3	15	0.0047	56
		Theft by tourists	”	+	9	3	3	3	3	21	0.0066	57
		Black market	”	+	6	8	15	15	6	50	0.0158	58
		It is impossible to meet the needs of tourists	”	+	12	9	12	12	12	57	0.0180	59
		Excessive prices in the industry in general	”	+	8	8	8	8	10	42	0.0133	60
		Technological innovations such as reservation systems	”	+	12	15	12	12	6	57	0.0180	61
		Lack of quality services	”	+	6	4	6	6	4	26	0.0082	62
		Staff turnover	”	+	4	4	4	4	16	32	0.0101	63
		Overtime worked by staff	”	+	4	4	4	4	4	20	0.0063	64
		Frequency of leave and absenteeism	”	+	9	9	9	9	12	48	0.0152	65
		Number of temporary staff compared to total staff	”	+	12	12	12	12	20	68	0.0215	66
		Customer complaints	”	+	12	12	12	12	20	68	0.0215	67
		Non-compliance with statutory norms	”	+	6	6	16	16	15	59	0.0186	68
		Number of rankings			**738**	586	611	618	618	3165	1	

The results of the expert assessment show that among the 68 risk factors or risk assessment criteria in the economic risk assessment, external environmental factors have the highest significance. The ranking of the significances was based on the order of priority given by the experts, as shown in Table 4.

Table 4. Ranking of tourism complex risk factors in order of significance

x_i	Criterion	Significance of criterion
1	Operational risk	0.17
2	Business risks	0.15
3	Risks related to national competitiveness	0.13
4	Criminogenic risk	0.11
4	Infrastructure risks	0.10
5	Psychological factors	0.07
6	Age and health-related risks	0.06
7	Transport risks	0.05
8	Economic environment risks	0.05

9	Natural environment	0.05
10	Financial risks	0.04
11	Health risks	0.02
	Total	1

When comparing the significance of the risk assessment in terms of the external environment, the internal tourism business environment, and the personal risks of tourism service users, the results of the survey of experts showed that the most important risks are external environmental risks (0.5172) and internal business risks (0.332). In contrast, the personal risk of the tourism consumer is only 0.16, meaning that the risks faced by the tourist depend primarily on external risk factors and the internal risks of business service providers.

The expert evaluations were further analyzed using the criterion significance ranking method. The significance of the criteria can be determined using the following formula:

$$q_j = \frac{t_j}{\sum_{j=1}^{n}\sum_{k=1}^{r} t_{jk}}. \qquad (16)$$

In the present study, the significance levels are as follows: $q1$ = 0.0186; $q2$ = 0.0167; $q3$ = 0.0301.

To determine whether the results of the study are sufficiently reliable and can be used for further analysis, the consistency of the experts' opinions was established. The reliability of the study was checked by calculating the degree of agreement between the groups of experts, expressed as a concordance coefficient. In this study, the experts were grouped according to their individual interest groups, and the concordance of opinions was therefore assessed on the basis of the aggregated results of the groups' criterion scores.

The sum of the squares of the deviation of the scores for each criterion was calculated according to the following formulae (Kvederytė et al, 2000):

$$S = \sum_{j}^{n} \left(\sum_{k=1}^{r} t_{jk} - \frac{1}{n} \sum_{j=1}^{n} \sum_{k=1}^{r} t_{jk} \right); \quad (17)$$

$$T_k = \sum_{l=1}^{H_l} \left(h_l^3 - h_l \right) \quad (18)$$

where: T_k is the indicator of the ranks involved in rank k; H_l is the number of ranks in rank k; h_l is the number of ranks in rank k; l is the number of related ranks in group for k experts; t_{jk} is the rank assigned to the criterion of k experts; r is the number of experts; and n is the number of criteria to be assessed.

The average of the sum of the criterion ranks was then calculated.

$$1/68(59+53+57..+..67+68)=3165/68=46.54$$

The sum of the squares of the deviation of the scores for each criterion was then calculated:

$$S = (59 - 46.54)^2 + (53 - 46.54)^2 + (6746.54)^2 + ...+ (59 - 46.54)^2 = 21192$$

Using the above ranking and formulas, we can determine the concordance coefficient (the degree of agreement between opinions) and its significance:

$$W = \frac{12 \times 21192}{36 \times 24360} = 0.29$$

This calculation establishes the reliability of the expert survey conducted. The coefficient indicates the degree of agreement between the individual opinions (the coefficient is equal to 1 if all the experts' rankings are the same, 0 if all the rankings are different, and 0 if the experts' opinions are not the same). The calculated value of the coefficient of concordance, W, is greater than zero, so we can conclude that the reliability of the significance values of the criteria obtained by the ranking method is sufficient.

The criterion for the concordance factor is defined as follows:

$$\chi^2 = 254304/(6 \times 68 \times 70) = 48.9 > \chi^2$$

The number of degrees of freedom for this problem is:

$$v = n - 1 = 68 - 1 = 67$$

The study used 68 criteria assessed by 6 expert panels. The result shows a low degree of agreement between the experts. This is understandable, as the criteria values were set by different expert groups assessing the environment and its impact on the sector. In addition, the 69 criteria evaluated make the study more complex and expert bias more likely. In order to increase the reliability of the study, it could be carried out by determining the significance of the criteria separately for each of the sub-systems of the risk under consideration: external risk factors, internal business risk factors, and personal risk factors. This would make the study simpler for the experts. The experts' evaluations are stochastic in nature, and changing the composition of the groups would also change the values of the indicator scores and the table on which the concordance coefficient depends (Podvezko, 2005).

The results of the expert survey were processed using a multi-criteria complex proportional hazards method, and are summarized in Table 5.

Table 5. Economic risk assessment of tourism complex risk factors

Risks	Risk factors	Description of the risk		+ -	Numerical values of the normalized criteria assessed					Significance of the criteria
					Therapeutic tourism	Winter Fitness	Summer Fitness	Cognitive	Extreme sports tourism	
1	2	3	4	5	6	7	8	9	10	11
Personal risk for the consumer of tourism services	**Psychology a and education**	Insufficient knowledge of languages	**scores**	+	0.007	0.007	0.019	0.019	0.018	0.01871
		Cultural differences	”	+	0.007	0.008	0.007	0.007	0.017	0.01681
		Insufficient skills	”	+	0.025	0.025	0.020	0.020	0.031	0.03076
	Age and health	Health problems and accidents	”	+	0.009	0.019	0.008	0.008	0.023	0.02315
		Failure to provide timely medical services	”	+	0.011	0.016	0.013	0.013	0.022	0.02188
		Lack of necessary medicines	”	+	0.004	0.005	0.003	0.003	0.013	0.01332
	Financial situation	Lack of cash when travelling	”	+	0.009	0.013	0.013	0.013	0.013	0.01332
		Credit card payment problems	”	+	0.005	0.009	0.007	0.007	0.010	0.01047
		Currency exchange problems	”	+	0.009	0.013	0.013	0.013	0.013	0.01332
External environmental risks	National competitiveness	Negative country image	”	+	0.020	0.020	0.026	0.026	0.016	0.02601
		Exchange rate fluctuations	”	+	0.011	0.015	0.019	0.019	0.011	0.01903
		Currency exchange rate	”	+	0.010	0.010	0.005	0.005	0.010	0.01015
		Low airline security	”	+	0.016	0.016	0.016	0.016	0.016	0.01586
		Increase in international competition	”	+	0.011	0.014	0.010	0.010	0.010	0.01427
		Inadequate airport security	”	-	0.013	0.013	0.013	0.013	0.008	0.01269
		Increase in competition in the industry	”	+	0.012	0.012	0.008	0.008	0.012	0.01237
		Changing tourist needs	”	+	0.010	0.009	0.009	0.009	0.015	0.01522
	Infrastructure	Poor road safety in the form of road conditions, inadequate streets	”	+	0.015	0.015	0.015	0.015	0.012	0.01522
		Prices too high	”	+	0.007	0.018	0.018	0.014	0.014	0.01840
		Low level of IT technology development	”	+	0.009	0.006	0.009	0.009	0.009	0.00888
		Poor public utilities such as water, electricity, sewage, etc.	”	+	0.007	0.006	0.006	0.006	0.007	0.00698
		Ineffective national marketing	”	+	0.011	0.015	0.015	0.015	0.019	0.01935
		Too little attention to advertising from local authorities	”	+	0.010	0.013	0.010	0.010	0.017	0.01744
		Non-compliance with legislation	”	+	0.003	0.005	0.007	0.007	0.015	0.01522
	Transport	Rising fuel prices	”	+	0.012	0.014	0.014	0.014	0.014	0.01395
		Transport-related costs	”	+	0.009	0.006	0.009	0.009	0.015	0.01522
		Flight delays or cancellations due to unreliable airlines	”	+	0.005	0.013	0.003	0.003	0.003	0.01332
		Insufficient tourist transport capacity	”	+	0.010	0.007	0.010	0.007	0.007	0.01047

	Economic environment	Inflation	”	+	0.014	0.014	0.014	0.014	0.014	0.01427
		Interest rate	”	+	0.006	0.006	0.006	0.006	0.006	0.00634
		Declining tourist leisure	”	+	0.004	0.004	0.006	0.006	0.012	0.01173
		Reduced tourist revenue due to the economic crisis	”	+	0.018	0.014	0.037	0.037	0.007	0.01840
	Natural environment	Urbanization	”	+	0.003	0.003	0.001	0.001	0.006	0.00571
		Seasonality	”	+	0.020	0.020	0.015	0.015	0.010	0.02030
		Water contamination	”	+	0.007	0.007	0.007	0.007	0.004	0.00729
		Air pollution	”	+	0.008	0.016	0.016	0.016	0.016	0.01586
	Health risks	HIV/AIDS	”	+	0.063	0.006	0.013	0.013	0.013	0.01269
		Diseases such as tuberculosis, influenza	”	+	0.013	0.007	0.013	0.007	0.003	0.01332
	Criminogenic situation and political stability in the country	Unstable political situation	”	+	0.007	0.007	0.005	0.005	0.004	0.00666
		Political unrest in neighboring countries	”	+	0.011	0.009	0.011	0.011	0.009	0.01142
		Wars/conflicts	”	+	0.008	0.008	0.008	0.008	0.008	0.00793
		Terrorist activities	”	+	0.006	0.006	0.013	0.013	0.013	0.01269
		Climate change	”	+	0.010	0.013	0.008	0.008	0.013	0.01269
		Fires	”	+	0.019	0.019	0.013	0.019	0.013	0.01903
		Natural cataclysms	”	+	0.019	0.019	0.019	0.019	0.025	0.02537
		Kidnapping and theft of tourists	”	+	0.007	0.005	0.005	0.007	0.005	0.00666
		High overall criminogenic level	”	+	0.011	0.006	0.006	0.006	0.006	0.01078
Internal risk of the tourist service provider	Business risks	Shortage of skilled workers	”	+	0.008	0.008	0.015	0.015	0.020	0.02030
		Lack of experienced staff	”	+	0.018	0.018	0.030	0.030	0.030	0.03045
		Ageing tourism sectors	”	+	0.013	0.013	0.013	0.013	0.013	0.01332
		Insufficient funding for training	”	+	0.017	0.017	0.023	0.023	0.023	0.02284
		Lack of adequate financial systems	”	+	0.018	0.018	0.022	0.022	0.022	0.02188
		Insufficient funds for product development	”	+	0.016	0.016	0.016	0.016	0.020	0.01998
	Operational risk	Product range too small	”	+	0.020	0.020	0.015	0.015	0.010	0.02030
		Theft/fraud in business by staff	”	+	0.009	0.014	0.009	0.009	0.014	0.01395
		Thefts by tourists	”	+	0.005	0.005	0.005	0.005	0.005	0.00476
		Black market	”	+	0.003	0.003	0.003	0.003	0.003	0.00285
		It is impossible to meet the needs of tourists	”	+	0.006	0.008	0.016	0.016	0.006	0.01586
		Excessive prices in the industry in general	”	+	0.018	0.018	0.018	0.018	0.018	0.01808
		Technological innovations such as reservation systems	”	+	0.011	0.011	0.011	0.011	0.013	0.01332
		Lack of quality services	”	+	0.014	0.018	0.036	0.014	0.009	0.01808
		Staff turnover	”	+	0.008	0.005	0.012	0.008	0.005	0.00825
		Overtime worked by staff	”	+	0.003	0.003	0.003	0.003	0.010	0.01015
		Frequency of leave and absenteeism	”	+	0.006	0.006	0.006	0.006	0.006	0.00634
		Number of temporary staff compared to total staff	”	+	0.011	0.011	0.011	0.011	0.015	0.01522
		Customer complaints	”	+	0.013	0.013	0.013	0.013	0.036	0.02157
		Non-compliance with statutory norms	”	+	0.013	0.013	0.013	0.013	0.036	0.02157
		Sum of maximizing criteria, S_+			0.767	0.764	0.814	0.782	0.877	**1**
		Object significance, *Qj*			**0.767**	**0.764**	**0.814**	**0.782**	**0.877**	
		Ranking of objects according to the economic impact of risk			**4**	**5**	**2**	**3**	**1**	

The significance of *Qj* was determined, thus outlining the riskiest elements of tourist complexes.

The assessment of the inbound tourism complex in terms of the most important risk criteria affecting the probability of risk and the economic consequences of risk has been presented, both in terms of the significance of the risk criteria and their values. Therefore, from the information presented in the table, an integrated risk index of the tourism complex by type of tourism can be calculated, the calculation of which is presented in formulae 1 to 6. Multiplying the values of each risk by the weights of the criteria and summing the weighted risks gives the risk assessment of tourism complexes by type of tourism. For example, the overall risk score for therapeutic tourism is 0.767, and the scores for the individual levels are summarized in Table 6.

Table 6. Significance of risk criteria and values by risk category

x_i	Criterion	Medical tourism	Winter Fitness	Summer wellness	Cognitive	Extreme sports tourism	Significance of criterion
1	Operational risk	9.87	10.20	12.17	10.47	12.90	0.17
2	Business risks	5.350	5.350	6.300	6.300	6.500	0.15
3	Risks related to national competitiveness	6.767	7.150	6.433	6.433	6.533	0.13
4	Criminogenic situation	8.050	7.400	7.217	7.750	7.417	011
5	Infrastructure risks	11.47	12.42	12.00	11.75	13.08	0.10
6	Psychological factors	1.58	1.65	2.04	2.04	2.94	0.07
7	Age and health-related risks	1.20	1.95	1.16	1.16	3.00	0.06
8	Transport risks	2.89	3.07	2.85	2.52	2.87	0.05
9	Economic environment risks	3.33	3.08	4.50	4.50	3.38	0.05
10	Natural environment	2.94	3.44	2.97	2.97	3.10	0.05
11	Financial risks	1.78	2.89	2.67	2.67	3.00	0.04
12	Health risks	6.00	1.03	2.00	1.53	1.20	0.02
	Overall risk indicator		0.764	0.814	0.782	0.877	1

As can be seen from the information presented in Table 6, extreme sports tourism is the riskiest type of tourism. The lowest risk in Lithuania's inbound tourism sector is represented by winter wellness and medical tourism. This is due to low risk probability estimates for infrastructure, transport, and health risks. Extreme sports tourism has high risk ratings due to higher probabilities and economic losses related to health damage and injuries and other higher risks in the operational, infrastructure, and transport risk groups.

The information in the table allows for an analysis of risks according to the main categories and a comparison between the different areas of the tourism complex. The model is not only valuable for assessing the risks of tourism complexes, but is also suitable for the economic risk assessment of specific enterprises operating in the tourism sector. Another very important feature of the applicability of the model is that it allows for economic risk assessment using both qualitative and quantitative indicators, both together and separately. The model allows for the identification of different risk categories and levels of risk factors, along with the assessment of risk in terms of risk factors, risk enhancers, and risk mitigators. A computer-based risk assessment model based on the COPRAS complex multi-criteria assessment method has been developed, which can be easily adapted and can quickly assess risks by changing their indicators, their values, and the significance of the criteria.

8.4. Tourism complex risk management

Based on the study, the following risk management model is proposed (Figure 6). This model consists of 4 steps.

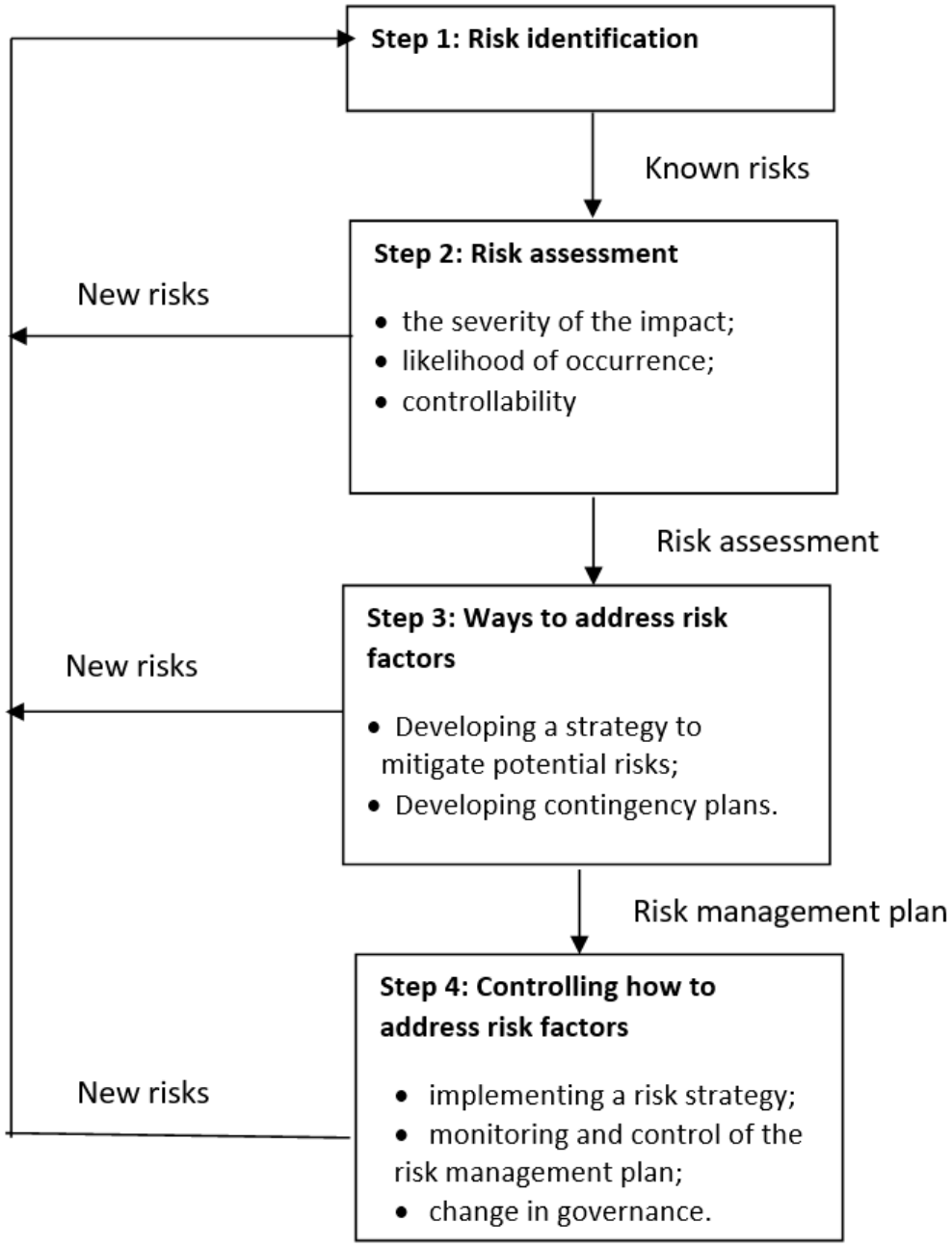


Figure 6. Risk management model

Table 7 shows the content of the 5 main risk management phases.

Table 7. Content of risk management steps

1. Risk planning	Planning is the preparation of an organization for risk management, which establishes sequences of actions, assigns responsibility for specific areas, and allows for the continuous collection of external and internal data to monitor and improve the risk management process.
2. Risk identification	A list of threats is drawn up on the basis of statistical information, historical data, and practical knowledge. In this way, threats can be grouped into clusters, depending on which areas of the clusters' activities are affected by the threats and which are likely to have the greatest negative consequences. These lists should be kept under constant review and updated. It is important that once problems have been identified, it is possible to move on to specific actions.
3. Risk assessment	This involves is the determination of the likelihood that a particular threat will affect specific activities and cause undesirable consequences. Risk assessment can be either qualitative – where risks are not measured in numbers or percentages, but only in terms of concepts (low, medium, high), and therefore do not lead to accurate results – or quantitative – a sophisticated method that provides accurate data on potential risks. The latter approach is much more effective than the former, making risks fully manageable, allowing the accurate and rapid prediction of their impact, their financial evaluation, and the choice of the best risk management approach.
4. Selecting risk management tools	This entails the selection of tolerable and intolerable risks and the selection of ways and means to ensure effective protection against them. It is important that the cost of the risk management measure is less than the loss caused by the risk itself, and that it is robust and does not create other unmanageable risks.
5. Risk control	In most cases, the actual processes are different from those planned and regulated, and it is important to make the appropriate adjustments before the next cycle so that the deviations do not distort the management process.

The five main stages of the risk management process are closely interlinked. At the outset, the organization's planning process sets the conditions for risk management (responsible parties, sequences of actions, etc.). The risks are then identified and evaluated, and appropriate tools and procedures are selected to manage them. Risk control covers all stages of management; it records deviations from the regulated conditions, which are evaluated at the start of the next management cycle, or adjustments are made promptly within the same cycle. Risk management is a collective effort that must be carried out on an ongoing basis by internal and external specialists. Only a regular and continuous process can produce positive

results

As can be seen from the risk management model presented in Figure 6 and Table 7, it is essential to identify the risks and then assess them in terms of their likelihood of occurrence and the severity of their impact. An important aspect is controllability: once the risk factors have been assessed and the nature of the risk has been determined, it is possible to identify ways to address the risk factors, develop strategies to mitigate the assessed risks, and develop contingency plans to address them. Once mitigation and control strategies and plans have been developed, it is important to ensure that the risk monitoring plan is monitored and to assess the effectiveness of the measures implemented in mitigating and controlling the risks.

In summary, business risk management is becoming an increasingly important issue. It is important for companies to be able to manage risks, as this is key to their success and survival in a dynamic, competitive market, and to achieving positive results. A company can only operate effectively if it understands the causes, sources, and types of risk and assesses the degree of risk. Business risk management provides an opportunity to forecast results and minimize the negative consequences for a company's performance.

Conclusions

Factor analysis was carried out to identify 12 risk categories and to group factors accordingly. Factor analysis showed the risks assessed by travel agencies in terms of the average score for the category and for the individual factors describing it.

A survey of experts and the application of the multi-criteria COPRAS method led to the identification of the significance of risk factors. This method led to the creation of an integrated risk assessment. Studies have shown that the COPRAS method can be used to carry out risk assessments based on both quantitative and qualitative indicators.

The results of the peer review showed that 68 risk factors or risk assessment criteria used in economic risk assessments have the highest significance in relation to external environmental factors. When comparing the significance of the risk assessment in terms of the external environment, the internal environment of the tourism business, and the personal risks of tourism service users, the results of the expert survey showed that the most important risks are the risks of the external environment (0.5172) and the risks of the internal business (0.332). In contrast, the personal risk of the tourism consumer is only 0.16, which means that the tourist's exposure to risks depends primarily on external risk factors and the internal risks of business service providers.

The information on the significance of the risk criteria and the values of the risk categories obtained during the research allows risks to be analyzed according to their main categories, and enables comparison between the different areas of the tourism complex. The presented model of economic assessment of tourism risk is not only valuable for assessing the risks of tourism complexes, but is also suitable for the economic risk assessment of specific enterprises operating in the tourism sector. Another very important feature of the applicability of the model is that it allows for economic risk assessment using both qualitative and quantitative indicators, both together and separately. The model allows for the identification of different risk categories and levels of risk factors, along with the assessment of risk in terms of risk drivers, risk enhancers, and risk mitigators. A computer-based risk assessment model based on the COPRAS complex multicriteria assessment method has been developed, which can be easily adapted and can quickly assess risks by changing their indicators, their values, and the significance of the criteria.

In summary, business risk management is becoming an increasingly important issue. It is important for companies to be able to manage risks, as this is the key to their success and survival in a dynamic, competitive market, and enables them to

achieve positive results. A company can only operate effectively if it understands the causes, sources, and types of risk and assesses the degree of risk. Business risk management provides an opportunity to forecast results and minimize the negative consequences for a company's performance. The model of risk management developed in this paper can be fully realized by using the methodology proposed.

An integrated risk index of the tourism complex by type of tourism has been calculated, showing that the riskiest type of tourism is extreme sports tourism. The lowest risk in Lithuania's inbound tourism sector is characterized by winter wellness and medical tourism. This is due to low risk probability estimates for infrastructure, transport, and health risks. Extreme sports tourism has high risk ratings due to higher probabilities and economic losses related to health damage and injuries, and other higher risks in the operational, infrastructure, and transport risk groups.

The multi-criteria assessment of the inbound tourism complex allows risks to be analyzed according to the main categories and enables their comparison between the different areas of the tourism complex. This model is not only valuable for the risk assessment of tourism complexes, but is also suitable for the economic risk assessment of specific enterprises operating in the tourism sector.

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