

Risk assessment in target market selection by bread baking enterprises

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Abstract

Keywords:

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Introduction. The aim of research is to justify a comprehensive approach to enterprise risk management, which includes analysis of risk factors at the stages of target market selection by enterprise.

Materials and methods. Statistical and financial reporting of 26 Ukrainian bakery enterprises was carried out. For expert evaluation of the likelihood of risk events and the occurrence of each risk factor, a rating scale is employed, which includes five possible states ranging from 0 – Improbable to 1 – Likely. The scale for expert assessment of possible losses includes six ranges from 0 – no loss to 0.91–1 – catastrophic loss.

Results and discussion. The issue of minimizing or neutralizing risks is particularly pertinent when enterprises are selecting target markets. Seven stages of target market selection are proposed: assessment of enterprise level capabilities; identification of segmentation principles and factors; development of matrix models (functional maps); collection and analysis of information about the bakery market; selection and evaluation of market segments; collection and analysis of information about competitors; and target segments selection and making optimal managerial decisions.

The assessment of risk factors and possible consequences at the stages of target market selection by bread baking enterprises has led to the following conclusions: the probability of the risk of profit shortfall is 0.69, while the probability of the risk due to uneven output of finished products is 0.66. The probability of risk is 0.59 if the products do not meet the consumers requirements, the product features are worse in comparison with competitors, or if the marketing strategy is insufficiently developed.

The overall risk in selecting a target market for bread baking enterprises is 0.21, signifying a low probability of risk situations, but the total possible losses are at a moderate (acceptable) level of 0.6.

Conclusions. The proposed approach allows to prevent risks or at least to minimize the possible losses in the emergence of risk in target market selection and can be extended to other enterprises taking into account the branch specifics of their activity.

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Introduction

Challenges of enterprise risk management (ERM) has been the subject of research by many scientists in recent years. Researchers developed a variety of approaches to the identification and managing risks. The scientific literature has provided certain types of risks which emerge from business operations and comprehensive approaches to enterprise risk management.

The publications are devoted to theoretical approaches to risk management. In addition, the attention has focused on the effectiveness of risk identification, assessment and control systems implementation. Therefore, the ways of the uncertainty reduction and risk neutralization are determined.

According to Anton et al. (2020), «the empirical literature on ERM can be divided into four broad categories: the ERM implementation; the determinants of the ERM adoption; the effectiveness of the ERM process; other aspects of ERM, such as ERM across domains, ERM strategies, ERM maturity, the impact of institutional context on ERM adoption, ERM adoption in family firms, and ERM as a moderating factor between different variables».

This are considered the theoretical approaches to the definition of risks, their classification, a comparative analysis of integrated and traditional approaches to risk management, the risk management process (Spikin, 2013; Vitlinskiy et al., 2004).

Investigation of a combination of mechanisms that solve the agency and information problems in enterprise risk management is presented in Jankensgard (Jankensggrd, 2016).

It is identified the most significant factors affecting the implementation of risk management in enterprise activities and characterize risk management processes focused on three theoretical perspectives: the sociotechnical, the mutual adaptation and the dynamic capabilities (Jean-Jules et al., 2021).

From our point of view, the broadest list and risk characterization is presented in the paper of Harland et al. (2003), in which strategic, operational, competitive, reputational, financial, fiscal, regulatory, legal, supply, customer, asset depreciation risks are defined.

A number of publications are devoted to identifying risks of certain types of activities. McShane (2018) illustrates the role of ERM in enhancing the resilience of the organization and identifying factors which reduce employee resistance to change in the process of implementation a risk management system.

Relevant issues are the emergence and reduction of the negative impacts of financial risks. It was examine the impact of risk management on the financial performance of the enterprise and its non-financial activities, determine the impact of risk management on the productivity and the relationship between risk management and the quality of intellectual capital (Saeidi et al., 2021). Alviniussen and Jankensgård (2009) consider the problem of risk budgeting, which allows to monitor the financial indicators of the enterprise and overall risk profile. They identify the impact of corporate policies taking into account the capital expenditures, dividend payments and hedging on risks.

Effective risk management contributes to enhance competitiveness (Ennouri, 2013; Noccoand, 2006), while implementation of risk management system in strategic planning (Gates, 2006; Viscelli et al., 2017; Treadway Commission, 2016) ensures the achievement of strategic objectives.

Thus, Ennouri (2013) considers the systematic review of policies, procedures and practices in management to assess and manage risks in strategic planning. It is presented the proactive and reactive approaches to risk management. In this case, the proactive strategy allows to predict risks and implement measures to prevent adverse effects, while the reactive strategy helps to respond to emerging risks.

It is considered enterprise risk management framework as the basis for a more holistic and integrated risk management, including the internal control (Posch, 2020). The issue of balancing the strict control system and the broad authority in the establishing of the enterprise risk management framework. It is noted that an excessive control of results restricts flexibility of employees, instead of this, the lack of control in risk management may lead to an increasing of risky situations and has a negative impact on enterprise. However, a combination of risk management control, information sharing for risk assessment, and a proactive growth provide a broader set of alternatives for the enterprise.

Despite the widespread considering of risk management issues, lack of attention has been given to the identification of risks in the selection of target markets by enterprises. In addition, specific risks determine the branch specifics of enterprises activities.

The aim of the article is to justify a comprehensive approach to enterprise risk management, which includes analysis of risk factors at the stages of target market selection by enterprise.

Materials and methods

Materials

Assessing the risk of target market selection, the research was conducted on the basis of statistical and financial reports of 26 Ukrainian bread baking enterprises.

Methods

In the process of analytical risk assessment, the methods of observation and comparison, formalization, generalization, systematization, classification, analysis and synthesis, methods of qualitative and abstract-logical analysis were used.

Risk factor analysis was applied during a comprehensive assessment of risks for bread baking enterprises.

There are some issues of quantifying the impact of external and internal environmental factors on a risk degree. Environmental impact is always a likelihood and, therefore, it is impossible to predict the results accurately. The effect of different factors is controversial; moreover, it is difficult to take into account a wide variety of external and internal environmental factors. Thus, when assessing risks in conditions of incomplete and inaccurate information, it is advisable to use expert judgment to make adequate decisions (Qazi et al., 2021; Wehrspohn, et al., 2021).

A high degree of uncertainty in the strategic development of an enterprise requires acting appropriately to reduce it. In this case, it is important to estimate possible losses, possibility of their occurrence and impact of individual factors on the overall risk of the enterprises activities (Peljhan et al., 2021; Puia et al., 2021; Singh, et al., 2020).

The multifactorial risk assessment ensures making decisions under conditions of vague assessment of individual risk factors impact (Abergel et al., 2022; Lai et al., 2011; Vermeulen, et al., 1996).

It was proposed to consider the main elements of a multifactorial risk assessment as follows (Ilyashenko, 1997):

- risk of each alternative directions of development is considered as a complex of the elemental risks;

- necessary to distinguish consistent (can be implemented simultaneously, increasing a potential total loss) and inconsistent factors, sources of risk (the occurrence of one undesirable event eliminates another);
- elemental risks should be allocated according to the following scheme: nature of risk → possible consequences → risk factors. A structure (a model) is formed for each of the elemental risks that combines risk factors and possible effects of their different combinations. These models can be implemented in the form of a decision tree, a table, a set of inference rules;
- elemental risks (consistent and inconsistent) are recommended to be calculated as counterbalancing risk factors, which can confirm or deny the possibility of an undesirable event;
- it is recommended to use probability to evaluate the impact of specific risk factors.

The use of Bayes' formula in risk assessment is studied by the authors (Machado et al., 2023; Tchangani, et al., 2022).

If the judgment is evaluated with probability interpretations, we will use the Bayes' formula. I+1 judgment (i +1 risk factor) is calculated on the basis of i-previous judgment. In this way, the judgment will combined, if it is independent. Each next judgment clarifies the integral assessment of elemental risk. For this purpose, after the combination of several judgments, the estimation is combined with the next judgment – until their entire set came to an end (Bakaev et al., 1992).

The proposed approach provides an opportunity to determine a structure of risk factors and possible negative consequences of their impact, to identify different types of risk that are typical for any enterprise. Estimation of risk factors is recommended to implement by means of expert judgment.

Overall risk can be defined as the probability of independent negative events that can occur or as a calculation of consistent and inconsistent risks in the money flow indicators (risk of losing money).

To sum up different points of view, it is necessary to illustrate a risk assessment scheme (Figure 1).

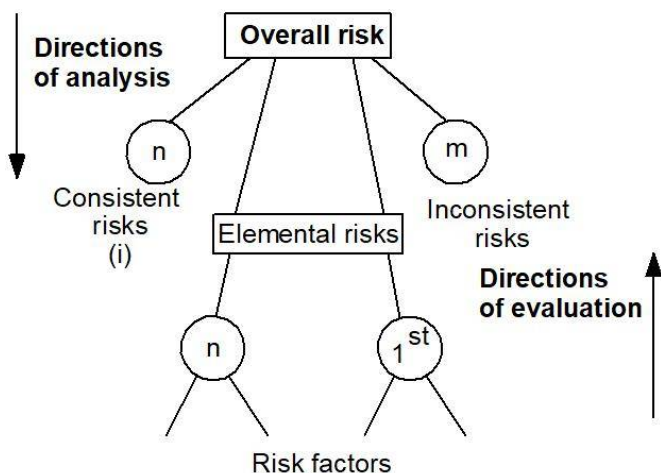


Figure 1. Risk assessment scheme

At first stage, it is important to perform a risk decomposition taking into account the enterprise' strategic development. Elemental risks are divided into consistent and inconsistent risks. Then, it is necessary to identify factors which can cause each risk situation. After that, in the reverse order, the quantitative risk evaluation is accomplished. For this reason, it is vital to estimate the degree of factors impact. Next step is a calculation of elemental risks to estimate a possible loss and probability of undesirable events occurrence. Finally, an overall risk assessment is calculated.

The uncertainty of risk factor assessment is characterised by inaccurate and incomplete data and is taken into account by probabilities.

The overall risk structure begins with the risk factors identification. It can be used for a forecasting and investigation of possible negative effects of different risk factors combinations on the business entities activity results. Each risk factor can increase or decrease (depending on the situation) the probability of negative consequences occurrence. Probability of risk factors impact on the outcome is different.

Probability of a negative result occurrence should include the effect of a whole complex of risk factors (independent judgment) and can be determined using causal models. These models help to explain the origins and estimate losses in the implementation of business processes using methods of probability theory. The basis of this approach is explained that causes and effects are related to conditional probability. The relative probability of a risk event occurring is calculated using Bayes' formula. According to the causal models, the degree of uncertainty for every event can be estimated by means of a probability.

Bayes' formula allows us to determine the probability of hypothesis (factor) F , in case of event H occurred, that is, the conditional probability of any hypothesis (Joyce, 2021):

$$P(F_j / H) = \frac{P(F_j) \cdot P(H / F_j)}{\sum_{i=1}^n P(F_i) \cdot P(H / F_i)} \sqrt{a^2 + b^2} \quad (j = 1, n), \quad (1)$$

where $P(F_j/H)$ – the probability that the hypothesis F_j occurs if H conclusion is true;

$P(F_j)$ - the probability of the hypothesis F_j ;

$P(H/F_j)$ – the posterior probability of H conclusion if the hypothesis F_j is known.

Formula of total probability is presented below:

$$P(H) = \sum_{i=1}^n P(F_i) \cdot P(H / F_i), \quad (2)$$

where $P(H)$ – a posterior probability of H conclusion.

If we take into account that any risk factor is a hypothesis, then the Bayesian method allows us to determine relative probability of conclusions (events) (Baka]:

$$P(H / F_j) = \frac{P(F_j / H) \cdot P(H)}{P(F_j)} \quad (3)$$

Thus, receiving of new evidence can increase or decrease the probability of a conclusion.

Bayesian network is shown in Figure 2.

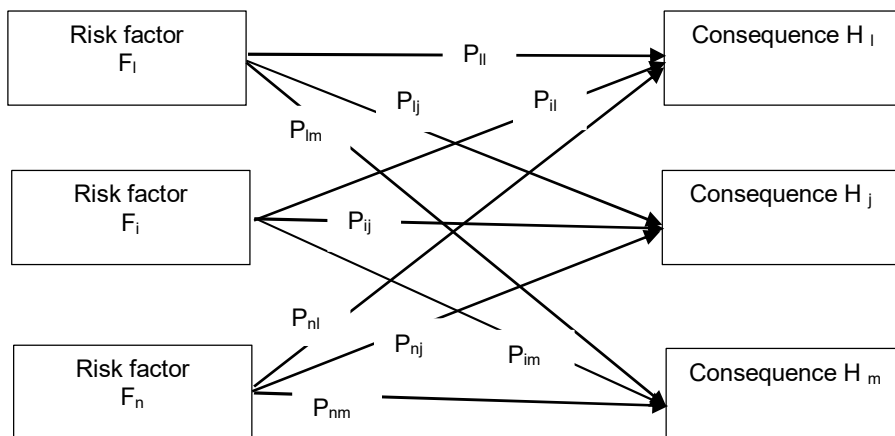


Figure 2. Bayesian network
Source: (Giarratano et al., 2004).

The casual model helps to identify a negative consequence or risk situation occurrence with probability accuracy measurement.

Results and discussion

Identification of the target market based on the risk profile

One of the most significant trends of corporate risk management in recent times is the development of enterprise risk management (ERM), which characterized a holistic approach to risk management for the enterprise and the centralized data aggregation on various types of risks (Alviniussen et al., 2009).

Rational decisions to determine the target market is based on the risk profile, which will allow to respond to changes in the external environment and make the most informed strategic and operational decisions.

To ensure the effectiveness of risk management, it is advisable to implement the method proposed in (Spikin, 2013), where the risk management process is considered as a sequence of steps (Figure 3). This approach can be used in the implementation of risk assessment, estimating the target market of the enterprise.

In the risk management process, assessing the probability of risk event occurrence plays an important role.

To apply expert judgment of a risk event occurrence and each risk factor appearance, it is necessary to develop an appropriate assessment scale. The authors proposes to use the following values of probabilistic factors assessment for expert conclusion (Table 1).

Authors propose to estimate the level of possible losses using loss coefficient. Loss coefficient is the ratio of maximum losses to the amount of the company's own funds for a certain economic operation (project). It is distinguished such zones of risk, according to the amount of loss ($K_z = 0$ – no losses; $K_z \leq 0.1$ – zone of the minimum risk; $0.1 < K_z \leq 0.3$ – zone of acceptable risk; $0.3 < K_z \leq 0.6$ zone of acceptable risk; $0.6 < K_z \leq 0.9$ zone of critical risk; $0.9 < K_z \leq 1$ zone of catastrophic risk) (Ilyashenko, 1997; Lototska et al., 2012).



Figure 3. The risk management process (Spikin, 2013).

Table 1

Rating scale

Evaluation factor	Expert judgment	Values
Probability of each risk factor occurrence and certain risk situation occurrence	Improbable (so unlikely that probability is close to zero)	0
	Remote- unlikely, although conceivable	0.25
	Possible – could occur sometime	0.5
	Probable – not surprised, will occur several times	0.75
	Likely – occur repeatedly / event only to be expected	1
Level of possible loss (Loss coefficient)	No losses	0
	Trivial loss	≤ 0.1
	Minor loss	0.11–0.3
	Acceptable loss	0.31–0.6
	Critical loss	0.61–0.9
	Catastrophic loss	0.91–1

Source: Own study based on the peculiarities of activity and financing of Ukrainian bread baking enterprises

Risk, as the expected possible losses, is determined by the formula (Ilyashenko, 2003):

$$R = \sum_{i=1}^n R_i , \tag{4}$$

where: R is an overall risk; R_i – risk of i -stage of their total number n .

Such approach allows us to predict and quantify the risk of *various* areas of the enterprise activities taking into account the factors influence and to observe the impact of each individual risk factor. The results of the analysis make it possible to reasonably develop a set of risk mitigation measures.

The need to extend products to new markets is determined by a decrease in demand caused by the rivalry among competitors, low purchasing power, changes in consumption patterns, poor quality of goods, an increase in prices, etc. Launching products into new markets require a reasonable approach to identifying target segments and minimizing the risk of poor performance. While the risk factors caused by changes in the external environment (macro-level) cannot be influenced by the enterprise, there are a number of micro-level risk factors that can be managed by business entities.

The risk can be significantly reduced if we analyze the influence of factors, quantify risks (possible losses), develop and implement measures to prevent and reduce them.

It should be emphasized that the right market targeting decision of a business entity provides almost all parameters of the enterprise activity: volume of supply, price policy, growth opportunities, competitiveness. Therefore, optimal target segment selection gives an opportunity to avoid most types of risks (Ilyashenko, 2003; Kotler et al., 2016, 2017).

In the conditions of changeable environment, lack of resources and crisis phenomena, it is necessary for enterprises to analyze the consumer market, envisage the origin of new consumers' necessities and produce the innovative products (Mostenska et al., 2015).

One of the major methods of consumer market analysis is segmentation. Market segmentation is one of the most efficient tools for identification of market development. Selecting target markets helps to improve the competitive positioning and avoid unnecessary competition. Market segmentation can enable to better serve and retain customers. Segmenting and reaching customers will help enterprises grow and remain focused on serving customers the way they would like to be served. Thus, choosing the right market segment can help create an improved and sustainable market positioning for an enterprise. It also helps strategically choose a competitive arena to operate in.

Steps to identifying the target market are:

- assessment of enterprise level capabilities;
- identifying the principles and factors of segmentation;
- development of matrix models (functional maps);
- gathering and analyzing information about markets;
- selecting and evaluating the market segments;
- collecting and analyzing information about competitors;
- target market selection.

Decision-making process of reorientation in a new product development, new sale markets (their segments or niches), is associated with risk acceptance. Therefore, making decisions based on market research, it is necessary to analyze the impact of internal and external risk factors.

It is important to estimate risk of finding the target market by segmentation. Taking into account the results of risk assessment we can make a decision about selection of different market segments and develop measures to reduce the degree of risk and enhance efficiency of bread baking enterprises.

It is not always possible to use the traditional approaches to quantify the degree of risk when the probabilities of undesirable events and possible outcomes (losses due to market changes, incorrect choice of market segment, lack of statistical information) are known. The necessity to take into account the whole complex of risk factors cause difficulties in quantitative risk assessment.

It is advisable to use approaches that allow us to quantify risk in the situation of incomplete and inaccurate information. This methodological approach is based on the elements of factor analysis and fuzzy logic (Markowski et al., 2009; Shang et al., 2013).

Risk analysis of the process of identifying the target market for new products will be carried out in stages: nature of risk → possible consequences → risk factors (conditions that increase or decrease the likelihood of undesirable events).

A factorial risk assessment should be conducted by considering the main stages of the target market selection. It gives us an opportunity to identify and analyze risk factors and assess the degree of risk at each stage of target market selection. The obtained results can be integrated in quantitative risk assessment.

The authors analyzed the main types of risks at the stages of target market selection by bread baking enterprises.

Elemental risks and the main factors that cause them at the stages of the target market selection are highlighted. An analysis of each elemental risk is given in Table 2.

A list of the main types of risk, factors that cause them and the possible consequences make it possible to apply the quantitative risk assessment methods and achieve optimal characteristics of the target market.

Risk factors assessment in selecting a target market by bread baking enterprises

Qualitative analysis will be a basis for the quantitative assessment of business entities risk activity. To calculate the overall risk of target market selection, each type of elemental risk should be structured into the risk factors and the possible consequences of their different combinations. These structures can be presented in the form of decision trees, tables or inference rules.

The analysis of advantages and disadvantages of existing methods of a risk degree estimation allowed us to choose a rational and adequate methodology based on risk factor assessment in the conditions of uncertainty. This methodology gives us an opportunity, taking into account branch specific of the enterprises, to quantify the degree of risk assessment for the appropriate enterprise in a target market selection.

It is necessary to use the method of expert assessments to identify risks of bakery enterprises. For the risk degree estimation, we conducted questioning with bringing of highly skilled specialists. They estimated different risks for medium-sized baking enterprises of Kyiv and Kyiv region. An expert group included five specialists approximately identical competence, each of them carried out an independent estimation. For determination of group estimations, the arithmetic average value of experts' estimations who participated in examination was used.

Consistency assessment of experts' opinions was carried out using the coefficient of concordance.

Experts had the list of risks that can take place on the enterprise and risk factors. It was suggested to estimate such indicators:

- probability of each risk factor appearance;
- probability of risk situation appearance (certain type of risk);
- degree of negative elemental risk influence on the activity of the enterprise (estimation of possible losses' size from undesirable event realization).

Probability of concrete risk situation appearance and probability of each risk factor appearance in the process of the enterprise economic activity was determined in parts of unit, according to the methodology given above (Table 1).

Components for each elemental risk have also been identified, combining risk factors and the potential impact of their different combinations. Experts' assessment of risk activity of bread baking enterprises is given in Table 3.

Table 2

Main types of risks at the stages of target market selection by bread baking enterprises

Essence of risk	Possible consequences	Risk factors
Stage 1. Assessment of enterprise level capabilities		
Inadequate production capability assessment and drawbacks in sales of new products	Difficulty or inability to produce the appropriate assortment of high quality products in quantities needed; difficulties in launching new products to target consumers	Insufficient analysis; underestimating or overestimating of production capability; A lack of qualified staff; Resources and goods distribution mistakes; Technical difficulties
Stage 2. Identification of principles and factors of segmentation		
Difference in predictable indicators of a structure, size and behavior of the target market; <i>insufficient</i> strategy for launching new products	Wrong target market segments (niches) selection; products are not selling; products do not meet the consumers requirements; additional costs for the right market research	A lack of qualified staff; making decisions based on incorrect or inaccurate information; Lack of awareness; underestimation of competitors; ignoring local conditions and traditions of consumption in different regions
Stage 3. Development of matrix models (functional maps)		
Inconsistency of the developed models with a structure, size, and behavior of the target market	Matrix models do not provide a clear information about the consumer market structure; it is necessary to do additional market research for selecting the target market segments	Inconsistent work of employees from different departments; lack of awareness; A lack of qualified staff; false information
Stage 4. Collection and analysis of information about the bakery market		
Making decisions based on incorrect or inaccurate information about market development perspectives	Non-competitive products; Production of bakery products that do not meet the market requirements; <i>insufficient</i> strategy for launching new products	The wrong method of collecting and analyzing information; insufficient analysis; lack of information; inaccurate information; a lack of qualified staff;

Table 2 (continue)

Essence of risk	Possible consequences	Risk factors
Stage 5. Selection and evaluation of market segments		
Difference in predictable indicators of a structure, size and behavior of the target market; <i>insufficient</i> market entry strategy	Wrong target market segments selection; products are not selling; products do not meet the consumers requirements; increasing costs for the right market research And re-segmentation	A lack of qualified staff; making decisions based on inaccurate information; Wrong target market segments selection; wrong choice of principles and factors of market segmentation; Insufficient accuracy of market segments evaluation and selection
Stage 6. Collection and analysis of information about competitors		
Inadequate production capability assessment and drawbacks in sales of competitors' products	Increasing competition (quality; price); Inability to sell a new product; The decrease in sales volumes; <i>Insufficient</i> sales profit	Insufficient analysis; underestimating or overestimating of production capability of competitors; underestimating the capability of production of competitors; Insufficient competence of experts; competitors' mistakes in distribution of goods
Stage 7. Target segments selection and making optimal managerial decisions		
Rejection of a new product; slow deployment of mass production or the impossibility of its deployment	The decrease in sales volumes; A profit shortfall; Bankruptcy risk	Making decisions based on inaccurate information; unpredictable changes in the external environment

Source: Own study based on expert assessment

Table 3
Risk factors assessment and possible consequences in selecting a target market by bread baking enterprises

Risk factors (Fi)	Possible consequences (negative result Hj)	Conditional probability P (Fi / Hj)
A lack of qualified staff	Production volume is lower than possible	0.1
	Disruption in production terms of finished products	0.2
	Products do not meet the consumers requirements	0.2
	Product features are worse in comparison with competitors	0.3
	Reducing sales	0.2
	<i>Insufficient</i> marketing strategy	0.1
	$\Sigma =$	1.0
Inadequate production capability assessment	Insufficient quantity of production volume	0.4
	Disruption in production terms of finished products	0.2
	Profit shortfall	0.4
	$\Sigma =$	1.0
Resources and goods distribution mistakes	Insufficient quantity of production volume	0.4
	Disruption in production terms of finished products	0.2
	Reducing sales	0.4
	$\Sigma =$	1.0
Insufficient analysis	Increasing competition	0.2
	Reducing sales	0.2
	Products do not meet the consumers requirements	0.1
	Product features are worse in comparison with competitors	0.1
	<i>Insufficient</i> marketing strategy	0.1
	Additional costs for the right market research	0.1
	Profit shortfall	0.2
	$\Sigma =$	1.0

<i>Table 3 (continue)</i>		
Risk factors (Fi)	Possible consequences (negative result Hj)	Conditional probability P (Fi / Hj)
Insufficient competence of experts	Reducing sales	0.3
	<i>Insufficient</i> information about market structure	0.2
	Additional costs for the right market research	0.2
	Increasing competition	0.2
	Profit shortfall	0.2
	$\Sigma =$	1.0
Insufficient and inaccurate information	<i>Insufficient</i> information about market structure	0.3
	Products do not meet the consumers requirements	0.3
	<i>Insufficient</i> marketing strategy	0.3
	Additional costs for the right market research	0.2
	$\Sigma =$	1.0
Ignoring local conditions and traditions of consumption in different regions	<i>Insufficient</i> information about market structure	0.4
	Products do not meet the consumers requirements	0.6
	$\Sigma =$	1.0
Underestimating the capability of production of competitors	Quality of product doesn't develop the competitive advantages	0.3
	Additional costs for the right market research	0.1
	Increasing competition	0.2
	Profit shortfall	0.4
	$\Sigma =$	1.0
Wrong method of collecting and analyzing information	Product features are worse in comparison with competitors	0.7
	Additional costs for the right market research	0.3
	$\Sigma =$	1.0
Change of inflation rate	Bankruptcy of an enterprise	0.2
	Profit shortfall	0.8
	$\Sigma =$	1.0
Unpredictable political and legislation changes	Bankruptcy of an enterprise	0.3
	Profit shortfall	0.7
	$\Sigma =$	1.0

Source: Own study based on expert assessment

Table 4

Risk factors assessment and possible consequences at the stages of target market selection by bread baking enterprises

Risk factors (F_i) and possible consequences (H_j)	Probability of risk factor appearance $P (F_i)$	Conditional probability of consequences appearance $P (F_i / H)$	Probability of risk $P (H)$	Conditional probability of risk occurrence $P (H / F_i)$
lack of skills and / or experience of employees	0.60	0.13	x	0.14
inadequate production capability assessment	0.60	0.40	x	0.42
resources and goods distribution mistakes	0.60	0.43	x	0.45
Insufficient output of finished products			0.63	0.34
lack of skills and / or experience of employees	0.60	0.17	x	0.18
inadequate production capability assessment	0.63	0.23	x	0.25
resources and goods distribution mistakes	0.60	0.20	x	0.22
Uneven output of finished products			0.66	0.22
insufficient analysis	0.63	0.17	x	0.13
insufficient competence of experts	0.58	0.27	x	0.23
resources and goods distribution mistakes	0.60	0.37	x	0.31
Reducing sales			0.50	0.22
wrong target market segments selection	0.55	0.30	x	0.24
insufficient competence of experts	0.58	0.20	x	0.15
insufficient and inaccurate information	0.68	0.27	x	0.17
ignoring local conditions and traditions of consumption in different regions	0.60	0.37	x	0.27
Insufficient information about market structure			0.44	0.21
insufficient analysis	0.63	0.13	x	0.13
lack of skills and / or experience of employees	0.60	0.17	x	0.16
ignoring local conditions and traditions of consumption in different regions	0.60	0.63	x	0.63
insufficient and inaccurate information	0.68	0.27	x	0.23

Risk factors (Fi) and possible consequences (Hj)	Probability of risk factor appearance P (Fi)	Conditional probability of consequences appearance P (Fi / H)	Probability of risk P (H)	Conditional probability of risk occurrence P (H / Fi)
Products do not meet the consumers requirements			0.59	0.29
insufficient analysis	0.63	0.10	x	0.06
insufficient competence of experts	0.58	0.20	x	0.13
Underestimating the capability of production of competitors	0.60	0.13	x	0.08
insufficient and inaccurate information	0.68	0.17	x	0.09
Additional costs for the right market research			0.38	0.09
Wrong method of collecting and analyzing information	0.58	0.70	x	0.72
insufficient analysis	0.63	0.13	x	0.13
lack of skills and / or experience of employees	0.60	0.27	x	0.26
Product features are worse in comparison with competitors			0.59	0.37
insufficient analysis	0.63	0.10	x	0.10
lack of skills and / or experience of employees	0.60	0.10	x	0.10
insufficient information	0.68	0.10	x	0.09
Insufficient marketing strategy			0.59	0.09
wrong target market segments selection	0.58	0.17	x	0.14
insufficient analysis	0.63	0.17	x	0.13
lack of skills and / or experience of employees	0.60	0.17	x	0.14
Reducing sales			0.50	0.14
insufficient analysis	0.63	0.20	x	0.16
underestimating the capability of production of competitors	0.60	0.20	x	0.17
insufficient competence of experts	0.58	0.17	x	0.14
resources and goods distribution mistakes	0.60	0.20	x	0.17

Risk factors (F_i) and possible consequences (H_j)	Probability of risk factor appearance $P (F_i)$	Conditional probability of consequences appearance $P (F_i / H)$	Probability of risk $P (H)$	Conditional probability of risk occurrence $P (H / F_i)$
Increasing competition			0.5	0.16
insufficient analysis	0.63	0.17	x	0.18
underestimating the capability of production of competitors	0.63	0.37	x	0.40
insufficient competence of experts	0.58	0.17	x	0.20
Profit shortfall			0.69	0.26
change of inflation rate	0.50	0.17	x	0.11
unpredictable political and legislation changes	0.60	0.30	x	0.25
Bankruptcy of an enterprise			0.34	0.18

Source: Own study based on expert assessment

Table 5

Risk assessment in selecting a target market by bread baking enterprises

Possible negative consequences	Conditional probability of risk occurrence	Probabilistic losses estimation
Insufficient output of finished products	0.34	0.59
Uneven output of finished products	0.22	0.61
Reducing sales	0.22	0.71
Insufficient information about market structure	0.21	0.33
Products do not meet the consumers requirements	0.29	0.61
Additional costs for the right market research	0.09	0.38
Product features are worse in comparison with competitors	0.37	0.57
Insufficient marketing strategy	0.09	0.49
Reducing sales	0.14	0.71
Increasing competition	0.16	0.40
Profit shortfall	0.26	0.81
Bankruptcy of an enterprise	0.18	1.00
Total risk	0.21	0.60

Source: Own study based on expert assessment

The same risk factor can cause both positive and negative situations. Therefore, it is possible to identify the impact of each risk factor on the possible outcomes. Probability of risk situation appearance (negative result H_j) and probability of each risk factor appearance (F_i) were determined by experts estimation. A generalized assessment of risk factors impact and possible consequences in selecting a target market for the bread baking enterprises are given in table 3. It was taken into account that the sum of the probabilities of possible consequences for each risk factor equals to one.

Qualitative analysis has shown that risk events may be a result of a poor performance of the various stages of target market selection. Negative situations can be caused by different risk factors. In this case, each of the undesirable situations is considered at one stage and excluded from consideration at other stage. This avoids the double counting of possible losses due to the occurrence of the same risk event.

Risk factors at the stages of target market selection, possible negative consequences of their influence and their probabilistic estimation, generalized probabilistic estimation of the result are given in Table 4.

Based on the data of the table 4, we calculated all possible losses of undesirable event appearance and found the overall risk in selecting a target market by bread baking enterprises (Table 5).

Estimation of conditional probability of risk appearance arising from the selection of new target markets by bread baking enterprises is shown in Figure 4 and Figure 5.

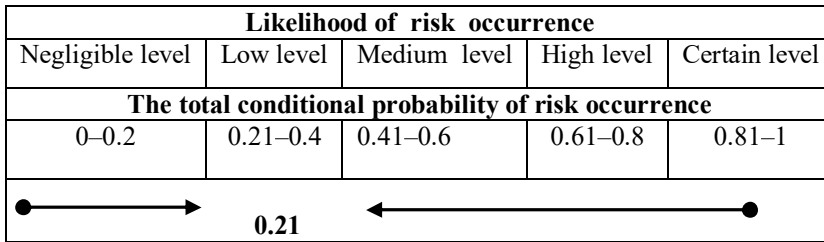


Figure 4. Conditional probability estimation of the micro risk occurrence at the target market selection by bread baking enterprises

Source: Own study based on expert assessment

Thus, for instance, the overall risk at the target market selection of the bread baking enterprises equals to 0.21, which means that there is a low probability of risk situation appearance, but the total possible losses will be on medium level (0.6).

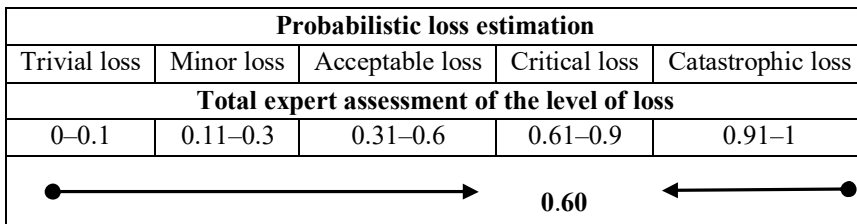


Figure 5. Probabilistic loss estimation of the influence of risk at the target market selection by bread baking enterprises

Source: Own study based on expert assessment

Discussion

Enterprise effectiveness management in the condition of uncertainty implies the importance of risk assessment to divide all the alternatives to reasonable, unjustified and risky ones.

Reasonable risk is a necessary attribute of strategy and management tactics in modern economic systems. In each risk situation, it is important to measure the level of risk (from acceptable level to the catastrophic risk). Thus, it is possible to calculate the level of optimal risk, the quantitative and qualitative assessment of concrete risk decisions. The degree of risk is the likelihood of risk occurrence and the level of possible losses.

To determine an effective way of risk management, it is necessary to design a matrix of "probability of losses occurrence" / "level of losses" according to the selected framework of probability and magnitude of losses estimation. This methodological approach helps us to design a matrix for the best choice of influence direction on risk of medium-sized bread baking industry enterprises of Kyiv and Kyiv region (Table 6).

Table 6
Decision matrix of a rational choice of influence on risk of bread baking enterprises

		Likelihood of risk occurrence				
		Negligible level	Low level	Medium level	High level	Certain level
		0–0.2	0.21–0.4	0.41–0.6	0.61–0.8	0.81–1.0
Level of loss		The degree of risk impact				
		Weak level	Moderate level	Medium level	High level	Immoderate level
Trivial loss	0.00–0.10	Risk acceptance			Risk acceptance or allocation, risk reduction	
Minor loss	0.11–0.30	Risk allocation or risk reduction	Risk transfer or allocation, risk reduction			Risk avoidance
Acceptable loss	0.31–0.60	Risk transfer or allocation, risk reduction			Risk avoidance	
Critical loss	0.61–0.90	Risk transfer or allocation, risk reduction		Risk avoidance		
Catastrophic loss	0.91–1.00	Risk transfer or allocation, risk reduction	Risk avoidance			

Source: Own study

Thus, on our point of view, the best choice for risk reduction is a combination of several methods and the main criterion for selection should be the optimal correlation between the degree of risk reduction achieved and all necessary costs.

Conclusions

1. Undertaken research gave an opportunity to develop an algorithm of factor analysis of risk types in the conditions of uncertainty, which including the following stages:
 - elemental risks allocation according to the following scheme: nature of risk → possible consequences → risk factors;
 - selection of experts;
 - risk factors assessment is carried out by method of expert judgement;
 - identification of the impact of certain risk factors assessment using probabilities;
 - development a structure for each of elemental risks that combines risk factors and the possible effects of their different combinations. These structures can be presented in the form of a decision tree, a table or a set of inference rules;
 - calculation of elemental risks (consistent and inconsistent) as counterbalancing risk factors;
 - experts' assessment of risks taking into account the probability of risk situation appearance and the degree of negative risk influence on the activity of enterprise;
 - *consistency assessment of experts' opinions*;
 - identification of the total level for each type of risk.
2. The main advantages of the proposed approach outlined above are the ability to calculate magnitude of risk in the conditions of uncertainty. It is possible to calculate the impact of each risk factor and estimate its share in total loss.
3. The considered approach can be used to estimate risks and choose the right ways for enterprise development. Based on the results of risk assessment, it is possible to determine the amount of funds that will be needed to prevent, reduce or avoid potential losses. Based on this assessment, a risk management system can be developed.

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