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INTEGRATED MANAGEMENT OF MARKETING RISK AND EFFICIENCY

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Abstract. There are two principal problems arising for marketing management: first – the increase of marketing ability to use effectively its resources, and second – to inventory the risks influencing marketing activity in order to develop their management strategy. Considering exceptional riskiness of marketing, the solution of marketing efficiency problems is not separable from identification of risks, influencing marketing, and their management strategies development. Integrated analysis of marketing efficiency and risk management problems is performed in two ways. First, a marketing risks portfolio management situation is analysed in such a way that resources, intended for risk management, are distributed among the means of decreasing value at risk in such a manner that the overall value of risk, i.e. the resultant of all risk values, would be minimal. Second, based on the expert efficiency estimates for a unit of costs in every element of marketing structure, a distribution of costs is pursued which would uphold the best increase of marketing-generated marginal utility. To find the solution, imitative modeling and stochastic optimization methods are used.

Keywords: marketing efficiency, marketing risk, integrated management of marketing efficiency and risk.

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JEL Classifications: G11, G17, D81, M31, M39.

1. Introduction

Every marketing professional or expert knows from his/her experience that marketing is an ocean of various risks and swimming in this ocean is extremely dangerous without having a universal theoretical approach to risk management as well as proper risk identification, quantitative evaluation and economic assessment technique (Suhobokov 2007; Vlasenko, Kozlov 2009). If it is true that achieved the lowest risk management level helps to save useful resources by 10–15 percent in any kind of activities, then, these figures for marketing, searching for ways of promoting goods and services, should be at least doubled.

However, there is the reverse of the medal, implying that the research into marketing risk management requires high competence and vast expenses (Ginevičius, R.;

Ginevičius, A. 2008). There are many problems in marketing, which in other areas of activity are addressed with standard methods, and in marketing they require new theoretical approaches (Pennings 2004; Tikkanen *et al.* 2007; Martinez-Lopez, Casillas 2009; Morgan *et al.* 2009; Sharma *et al.* 2009; Watkins, Hill 2009; Corsaro, Snehota 2010). Management of marketing risk and efficiency can also be treated as a multi-criteria problem and the methodology of solving such problems in various related areas of economic research is properly presented in Ginevičius, Podvezko (2008) and Ginevičius, Zubrecovas (2009).

In fact, the problems of marketing risk management, which are as old as marketing itself, are not thoroughly analyzed and described in the literature. Even in the most recent databases in the Internet many scientific papers are presented only for limited use.

2. Marketing risk – where did it come from?

Marketing risk identification is probably derived from the identification of market risks in general and designing of their management schemes. The papers of Mark R. Greene (1969) and Donald R. Tull (1967), where marketing risks are separated from the problems associated with common market risks and their study, deserve special attention in this respect. Marketing risk researches are practically not separable from the researches on international business risk. Therefore, the framework for integrated risk management in international business' suggested by Kent D. Miller (1992), is considered by many to be a move towards crystallizing market risks out of common entirety of risks, including transnational business risks. In Table 1 (which is based on the work of Zhang *et al.* 2008a), the crystallized types of marketing risks and a set of factors influencing them are presented for a retail trade company together with layers for evaluation of risk index.

However this work, like many other studies of marketing risks, is restricted to ranking various types of risk (possible harm made) according to certain points (Zhang *et al.* 2008b; Zhou *et al.* 2006; Wang 2009; Wen-Fei 2004). Though for risk management decision-making usually a universal quantitative evaluation is needed, allowing in parallel to determine the possible harm made to recipients.

The paper of Greene (1969) 'How to rationalize your marketing risk' considers a hypothesis that 'managers who estimate possible losses and honestly evaluate the risk involved can vastly improve their marketing decisions'.

The paper also provides a logic flow chart for marketing risk decisions, where 5 steps present marketing risks collectively, outlining major problems of marketing risk analysis aimed at collecting the information required for making risk management decisions (see Fig. 1). In fact, a profound risk concept is described in this five- step analysis, and decision-making logic based on combining risk and confidence is suggested.

Step 2 defining the extent of maximum loss and its probability which may be used for integral evaluation of possibility and its confidence deserves special attention. However we think that step 3, presenting risk (possible loss) as a negative consequence of riskiness of a particular process (object) and the interaction of loss possibilities and abilities of a recipient (subject) is also very important. It may be stated that most of recent publications lack such profound risk concepts.

Table 1. Environmental risk types and factors influencing their occurrence in retail enterprise transnational marketing (Zhang *et al*. 2008a)

	Risk types	Risks factors	Project layer
Macro environmental risks	Polity risks	Polity certainties in host countries; strike; economic crisis; force of religion and nationalism; threatening local retailers; inharmonious relationship with communities and residents in host countries	The certainty of policy Attitude to foreign investors The certainty of economy The certainty of currency/ exchange rate Social environment and ideological system
	Economic risks	Strict market entering policy; retail control; change of exchange rate; deterioration of international balance of payments in host countries; inflation; foreign exchange control; economic policy change	
	Cultural risks	Cultural difference between the host country and home country; nationalism tendency in the host country; retailers being unfamiliar with culture in the host country, etc.	
Environmental industry risks	Market risks	Business recession in local retail industry; incorrect commodities sale; wrong market forecast; lack of price competitiveness, etc.	Degree of retail industry boom Degree of retail industry competition
	Competition risks	Intense competition between local retail enterprises; the entering of transnational retail groups; intense competition on domestic market and so on	
	Supply chain risks	Credit situation of suppliers or partners; relative by big conflict with local suppliers; lack of information communication of supply chain; lacking localization purchasing and so on	
Internal risks of enterprise	Expanding risks	Capital chain break caused by expanding; risks of development private brand; excessive investment; insufficient revolving fund; interest increase	The rate of sales profit Market share Price sensitivity Internal risks of enterprise Price competitiveness Evaluation of promotion effect The proportion of sales cost Degree of customer satisfaction Degree of customer loyalty
	Credit standing risks	Poor quality of sold goods; poor image of origin; environmental pollution resulting from commodity production	
	Internal management risks	Inaccurate management culture comprehending; high frequency changes of managers or brain drain; inefficient communication and cooperation between employees, etc.	
	Promotion risks	Unreasonable retail marketing mix; frequent promotion; potential risks caused by promotion, etc.	

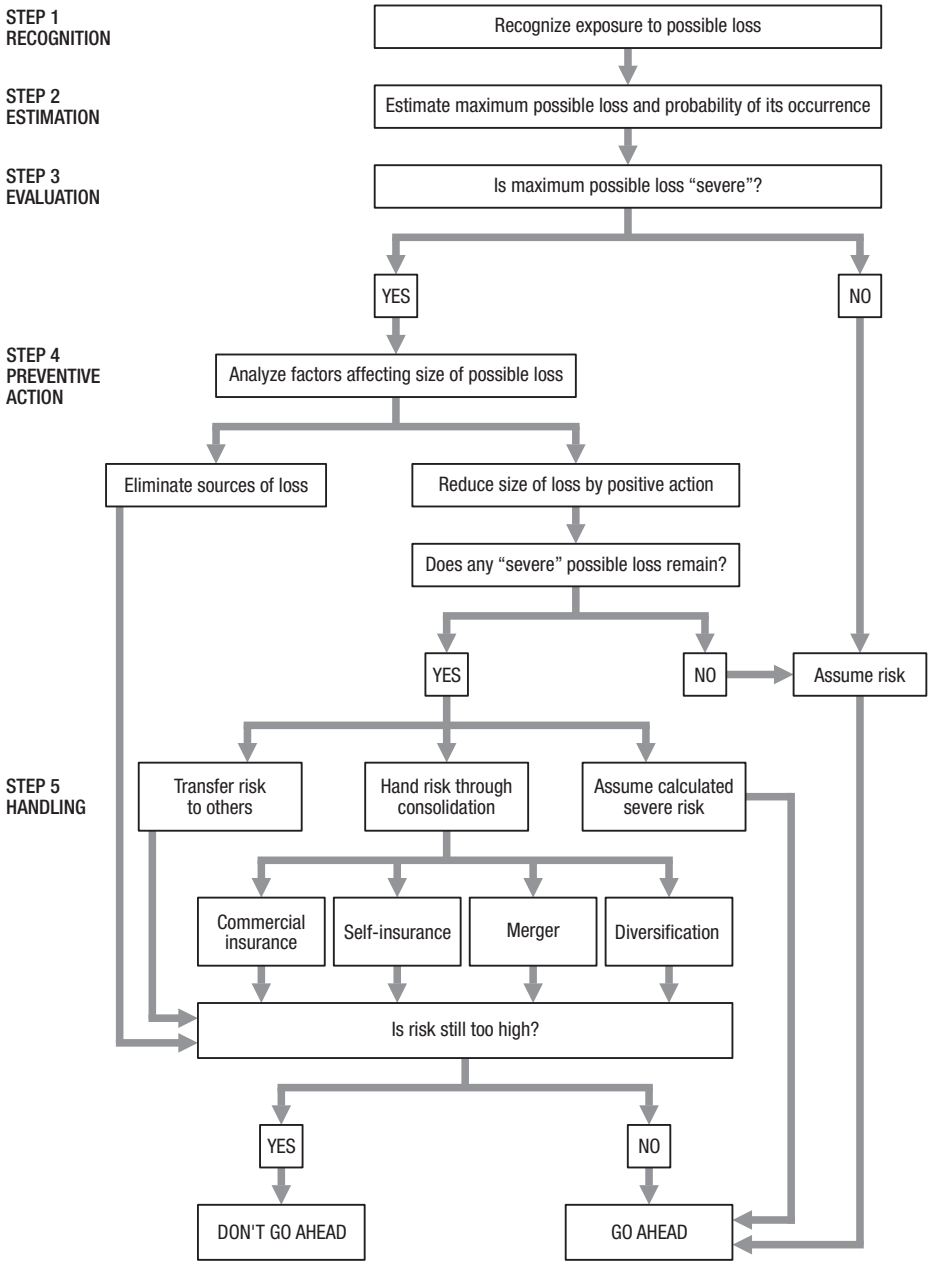


Fig. 1. Logic flow chart for marketing risk decisions (Greene 1969)

It should also be noted that the authors do not just play with such impressive terms as macroeconomic and microeconomic risk, currency exchange rate risk, etc., which being powerful in expressing risk probability are still closely related to the particular criteria describing marketing, as far as their possible effects are concerned.

3. A scheme of identification of marketing risk criteria, quantitative risk evaluation and economic assessment

3.1. Marketing risks identification and management peculiarities

Today, any kind of activities is exposed to various types of risks closely associated with the process of globalization (Mačerinskas *et al.* 2003). This primarily applies to marketing which, making usable a part of international business, on the one hand, and being the investment activities, on the other, is exposed to a great variety of risks (Sabonienė 2009). Taking it not seriously, we may say that it is much easier to name risks that do not concern marketing than list all of them.

Some of the risks in international business are strategic risk, operational risk, political risk, country risk, technological risk, environmental risk, economic risk, financial risk, terrorism risk.

Types of investment risks are as follows: inflation risk, interest rate risk, business risk, financial risk, tax risk, event risk, liquidity risk and etc.

One can see that the above risks directly concern marketing, however, separate analysis of marketing risks, even the most important ones, along with that seeking to develop management models, is hardly possible in practice and not acceptable from the theoretical point of view.

It may be stated that the methods of comprehensive marketing risk analysis, allowing the dangers of risks to be associated with expenses required to avoid losses, have not been developed yet. Development of such methodology or marketing risk management scheme is the primary objective and means of marketing cost efficiency increasing.

It is expected that marketing risk pools could become a tool of marketing risk analysis and help generate information required for decision making. On the one hand, they could evaluate risks for major marketing activities, while, on the other hand, they could stimulate centres of marketing risk costs to achieve the goal described above (see Fig. 2).

What items could become risk pools or structures fixing natural results of risk effects and allowing the demand for risk expenses to be quantitatively evaluated? It seems that it would be difficult to suggest an alternative to ideology generally dominating in business, according to which centres integrating results of all the activities could serve as the centres of expenses. On the one hand, the effect of all risks to which a particular activity is subject to is accumulated in these total items. On the other hand, the dynamics of these items reveals the need for risk management and possibilities of the latter.

Structural elements of marketing, denoted as 4P, 7P or other P number, which can be used as the centres of risk costs, offer exceptional possibilities to this activity. At the same time, they are the centres of direct marketing expenses and investments (see Fig. 2).

However, assessing the effect or effectiveness of marketing (Valančienė, Gimžauskienė 2009) and each structural element in particular, the problems associated with the ambiguity and even lack of the account data arise. Nevertheless, theoretical and practical works emphasize the importance and urgency of these problems. In marketing, whose

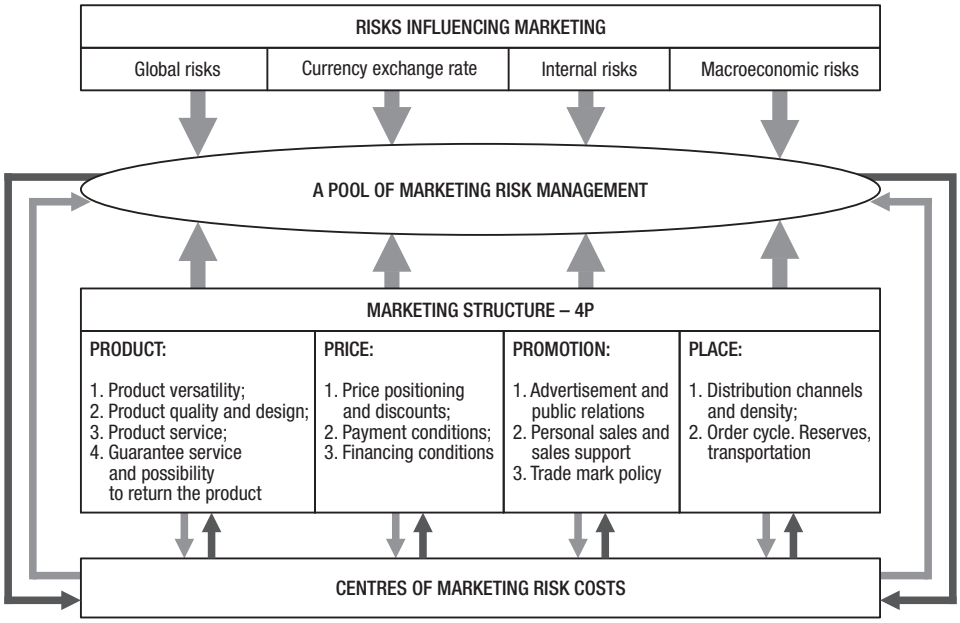


Fig. 2. A scheme of marketing risk management pool

aims and goals are directed towards the near or distant future, possibilities are usually considered to be stochastic values or processes. This provides the necessity that, assessing a possibility, its size, confidence and risk, considered to be the riskiness of a set of possibilities and ability of a recipient of risk consequences to deal with risk, should be defined.

Thus, three-dimensional presentation of a set of possibilities requires adequate methods of determining their significance to various recipients (Rutkauskas 2006; Rutkauskas *et al.* 2008a, b; Rutkauskas, Ginevičius 2010), which are commonly based on the use of a three-dimensional utility function u:

$$U = u\,(e,\, g,\, r), \tag{1}$$

where e is the guarantee of effectiveness (effect) indicator, g is possibility's guarantee and r is possibility's risk.

3.2. Marketing risks portfolio management

Further, general marketing risk as a portfolio of risk components' structure management possibilities will be analysed.

The value at risk determination of various risk types is thoroughly analysed in literature. However, the answer to the reverse problem of risk-influencing parameters change in order to alter the value at risk in the desired direction is not obvious and cannot be described quantitatively. Along with that, management of the general risk as an entirely accumulating all the types of risk requires certain resources distribution among sepa-

rate risk types in order to get the highest effect. In other words, resources used for risk management should allow to maximally reduce the expected losses concerning risk.

Of course, for solution of this type of problem an analysis of the particular activity processes is necessary. First of all, an analysis of risks contents and factors influencing value at risk should be performed. Further, factors of influencing the means of value at risk management, as well as their interdependencies, behaving in the same direction, should be inventoried. There is no doubt that for every type of risk there exists a complex of means allowing the reduction of value at risk to the desired extent.

Also, while selecting complexes of means for value at risk reduction, a problem of the so-called efficient complexes arises pointing out that efficient complex should allow reducing expected losses with minimal costs or obtain the highest reduction with available resources.

It is obvious that the reasoning of efficient complex of means or, moreover, their efficiency evaluation can be rarely presented using typical and universally spread schemes. Often such evaluations can be performed only with the help of expert systems. Moreover, many processes and dependencies have clear stochastic nature, therefore expert systems must also be adequately oriented.

Thus, the main objective becomes clear – to distribute financial resources intended for value at risk reduction among value at risk reducing means in order to obtain the maximum reduction of value at risk (the resultant of all the risks), i.e. possible loss, described by the magnitude of loss possibility, reliability of possibility and risk, and also to measure it in scale adequate for such evaluation – three-dimensional utility function's values' scale.

With regard to what is said earlier, optimal risk portfolio management problem should be formulated as follows:

To find such a distribution of resources intended for value at risk reduction among separate risk types

$$w_i : w_i \geq 0; \sum_{1}^{n} w_i = 1 \tag{2}$$

which, considering the obtained probability distributions

$$R_1(a_1, s_1),\ R_2(a_2, s_2) \ldots R_n(a_n, s_n) \tag{3}$$

of loss reduction means efficiency possibilities of a unit investment into separate risk types r_i would generate a utility function

$$U = u(e; p; r) = \exp\{e/r\} \cdot p\{\xi \geq e\} \tag{4}$$

maximizing the probability distribution of general loss reduction possibilities.

Thus here $R_i(a_i, s_i)$ are the unit-value effects of possible loss reduction of random variables with presented parameters a_i and s_i, and w_i is a part of expenses intended for risk management which is devoted for implementation of $i^{\text{-th}}$ risk management mean. As it was already mentioned, estimations of means' effects $R_i(a_i, s_i)$ in the research were obtained with the help of experts.

Technical analysis of situation can be interpreted as a solution to stochastic optimization task.

As the object of the research is the problem of marketing efficiency management considering risk, for methodical explanation of further research it is worthwhile to recall that in the context of 4P there are four different types of risk – r_1, r_2, r_3, r_4, i.e. one for every component of marketing structure P_1, P_2, P_3, P_4.

Visually decision-making is presented using the following scheme (Fig. 3).

With the help of statistical data and experts valuations it was determined that investment of 1 Lt into means of avoiding losses under separate risk types (here – under separate components of structure) should guarantee effects, described by Normal probability distributions of effect possibilities, namely:

$$N(a_1 = 1.35;\ s_1 = 0.13),\ N(a_2 = 1.51;\ s_2 = 0.25),\ N(a_3 = 1.83;\ s_3 = 0.48),$$
$$N(a_4 = 1.12;\ s_4 = 0.39),$$

here a_i are the mean values of respective probability distributions of effect possibilities, and s_i are the standard deviations.

Further, according to the logic of Fig. 3, the solution to (1)–(3) problem is presented.

Fig. 4 section a presents Markowitz portfolio, which depicts all the possibilities (discrete case) of distributing a unit of investment among various risk loss reduction means. Fig. 4 section b presents an efficiency line of portfolios, with only maximum mean values of portfolios under the predetermined risk level.

If one analysed only mean values, then the schemes of a and b sections would provide the comprehensive information on the possibility of rational distribution of funds. However, in practice it is necessary to know all the possibilities and evaluate their reliability. Fig. 4 section c presents an efficiency zone as an analogue of the efficiency line, or, simply, a spatial view of portfolio possibilities when possibilities are characterized by their extent, reliability and risk. If one took more detailed values of quintiles of probability distributions, – percentiles, milipercentiles, etc., – the result would be a continuous set. The geometrical view of such a possibility is presented in Fig. 4 section c, where the set of quintiles is represented by percentiles.

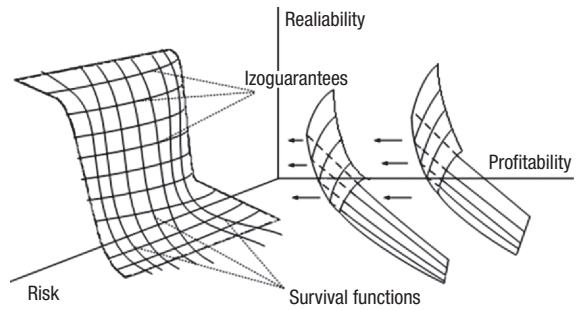


Fig. 3. Search for intersection of effectiveness zone (left side) and utility function (right side) of general value at risk reduction effects

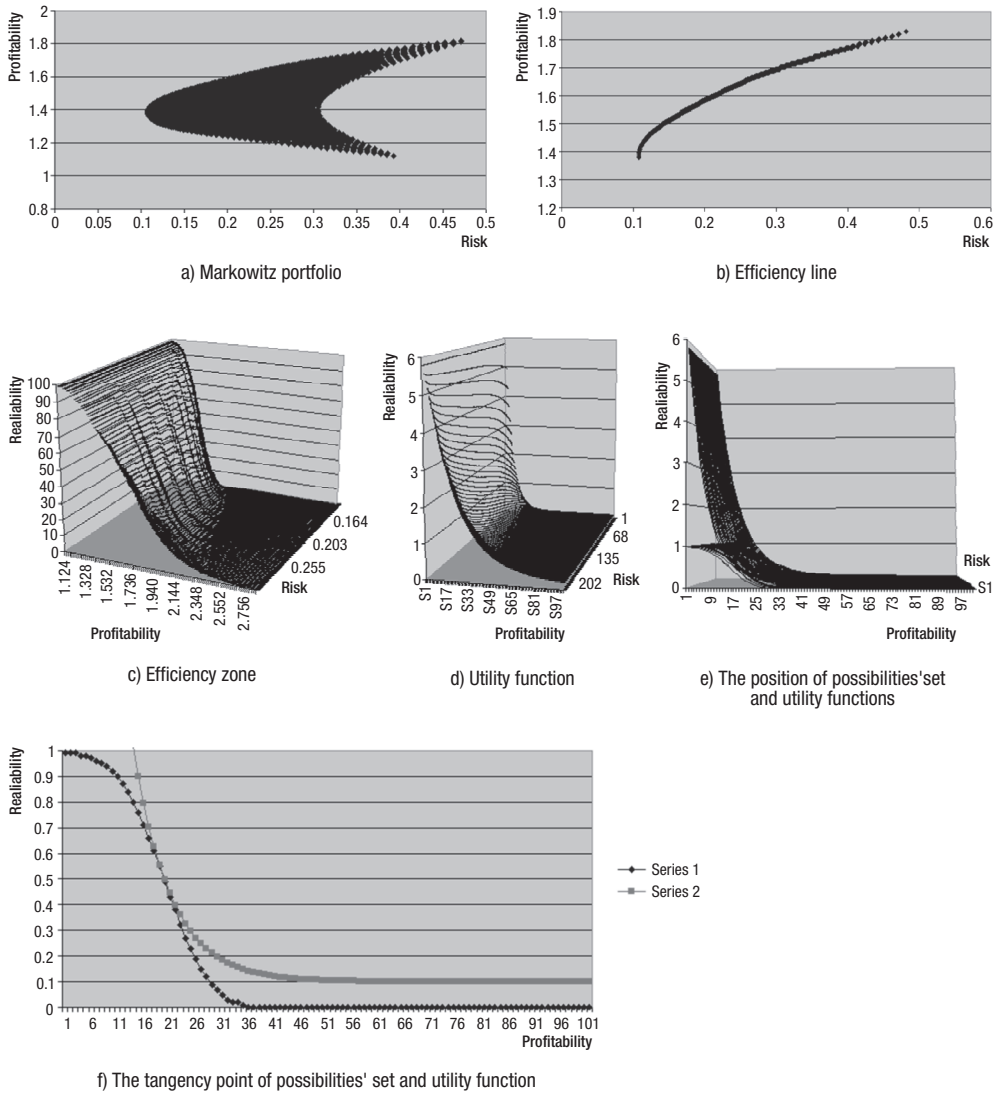


Fig. 4. Visualization of (1)–(3) problem solving

As every portfolio possibility out of possibilities' set is characterized by three already mentioned parameters – the extent of avoidable loss, the guarantee of avoidance and risk, related to a possibility under analysis, the selection of the best possibility is getting complex in the sense that all the mentioned parameters have different dimensions: unit of money – for loss, probability – for avoidance guarantee and probability distribution of possibilities – for loss because of risk. Therefore for selection of the best possibility an adequate utility function is needed. In case of success, utility function can become the functional, i.e. the rule, which would provide a financial estimation of the loss avoided for every possibility evaluated by three parameters. However, in general this

is a problem requiring separate analysis, and utility function becomes a means of possibilities' grading or expert valuation. Fig. 4 section d presents a utility function which evaluates utility of every possibility according to the following formula:

$$U = \exp\left\{\frac{e}{r}\right\} \cdot p\,, \tag{5}$$

here e – the extent of possibility, measured in monetary expression; p – reliability of possibility; r – risk related to the analysed possibility.

Thus, U is an indicator without dimension.

In Fig. 4 section e the tangency point of efficiency zone (section c) and utility function (section d) is presented. This point allows us to determine the values of all the coordinates of the three-dimensional surface – extent of possibility, reliability of possibility and risk class of the analysed possibility – and also a structure of the respective portfolio.

In the presented case the structure is $w_1 = 0.52$; $w_2 = 0.22$; $w_3 = 0.06$; $w_4 = 0.2$. The value of possibility $e = 1.43$; the guarantee of possibility $p = 0.55$; and $r = 1.12$.
Results of decisions of integrated marketing efficiency and risk management possibilities will be presented in the same sequence.

4. Efficiency against or with risk

Today motivation of almost every activity is disclosed with the help of certain "diptic", when one line of story is intended for organizers of activity (owners) interests' satisfaction, and the second represents a risk of possibilities having encouragement powers and nurturing caution, threatening with possible losses. Thus cherishment of utility for the owner of activity is possible with a provision of "tempering risk", as well as with a provision of "risking in the name of maximizing the value under creation". Nevertheless, many researches on risk management more apparently disclose the former line – to manage risk in order to decrease the threats for efficiency extent.

Further in this paper, while projecting the scheme of marketing efficiency increasing, the provision of risking in the name of maximizing the value being created will be followed. This scheme is based on the system of estimations in line with all the expert valuation rules and involving all the components of 4P marketing structure. Every component of 4P structure was also analysed as a whole of four components. This system is presented in Table 2. Here every estimation shows the possibilities of a unit investment to develop a marginal effect in the respective marketing segment. These possibilities are described by possibilities' probability distribution $D(a_i, s_i)$, where a_i is a mean value of possibilities and s_i is the standard deviation of possibilities' set.

Now the task is different than the task of paragraph 3.2, – how to use available resources in order to obtain value at risk reduction maximum. Now we attempt to maximize the effect of costs described by the three indicators: effect's possibility, reliability of this possibility and risk related to this possibility.

Table 2. Marketing 4P structure of expert valuations according to the effect of unit costs

PRODUCT	**PRICE**
$a_1 = 1.4$; $s_1 = 0.042$	$a_5 = 1.2$; $s_5 = 0.03$
$a_2 = 1.3$; $s_2 = 0.0165$	$a_6 = 1.32$; $s_6 = 0.03$
$a_3 = 1.275$; $s_3 = 0.038$	$a_7 = 1.325$; $s_7 = 0.045$
$a_4 = 1.375$; $s_4 = 0.043$	$a_8 = 1.275$; $s_8 = 0.039$
PROMOTION	**PLACE**
$a_9 = 1.25$; $s_9 = 0.018$	$a_{13} = 1.41$; $s_{13} = 0.043$
$a_{10} = 1.22$; $s_{10} = 0.025$	$a_{14} = 1.17$; $s_{14} = 0.015$
$a_{11} = 1.225$; $s_{11} = 0.04$	$a_{15} = 1.15$; $s_{15} = 0.035$
$a_{12} = 1.375$; $s_{12} = 0.045$	$a_{16} = 1.125$; $s_{16} = 0.038$

There is no doubt that both problems arise from the same objective – how to use in the best manner the resources intended for marketing efficiency increase, but it is necessary to notice that there is no courage to say that the result of the solution would be the same, i.e. that in both cases the same investment portfolio would be selected. However, attempting to compare the solutions of both problems would encourage experts to take universally the evaluation of probability distributions of possibilities.

Thus, having the unit values presented by the experts in Table 2 and the pairs of parameters of probability distributions of investment possibilities for every component of marketing structure, the problem can be formulated as follows:

To find such a distribution of resources intended for marketing efficiency increase among separate components of marketing structure

$$w_i : w_i \geq 0; \sum_{1}^{n} w_i = 1. \tag{6}$$

Which, considering the obtained probability distributions

$$D_1(a_1, s_1), D_2(a_2, s_2) \ldots D_n(a_n, s_n) \tag{7}$$

of unit investment possibilities to create marginal effect in every component of marketing structure, would generate a utility function

$$U = u(e; p; r) = \exp\{e/r\} \cdot p \tag{8}$$

maximizing the probability distribution of general effect of possibilities.

Here e is the value of investment effect possibility, p – the guarantee of this possibility and r – the class of risk where the possibility belongs.

The influence of possibilities' probability distribution form and statistical interdependence on optimal solution

Before analysing particular situations it is worth noticing that experts, presenting their own estimations, i.e. mean values and standard deviations of possibilities as a measure of possibilities' variability usually do not present their opinion about the form of the distribution (Normal, Pareto, etc.). Thus searching for a particular solution the forms of the decisions under analysis will be selected, retaining the values of parameters set by the experts.

Similarly, experts have not presented the indicators of interdependencies of the analysed possibilities, however, they have stated that such dependencies should certainly exist. Nevertheless, in order to evaluate the indicators of possible statistical dependencies with the help of experts one should possess certain software for processing the expert opinions.

In order to measure the influence of the forms and interdependences of probability distributions on possible decisions the following situations will be examined:
First, when probability distributions are Normal and not correlated;
Second, when probability distributions are Lognormal and not correlated;
Third, when random variables describing the possibilities are correlated and this correlation is expressed by a correlation matrix;
Fourth, when there are additional constraints w_i.

It is worth noticing that in marketing research 4P receives a status of certain invariance, in the sense that even if marketing object varies substantially, the costs of 4P marketing structure retain the proportions in the set limits.

In the expert valuations such an appearance is perceived as a phenomenon of the structure hierarchy.

Experts in their valuations also have pointed out a certain structural hierarchy, a priori orienting towards a certain structure of costs between P1, P2, P3 and P4.

While performing estimations it was attempted to evaluate what changes of 4P costs structure would be favourable for optimization of the general decision.

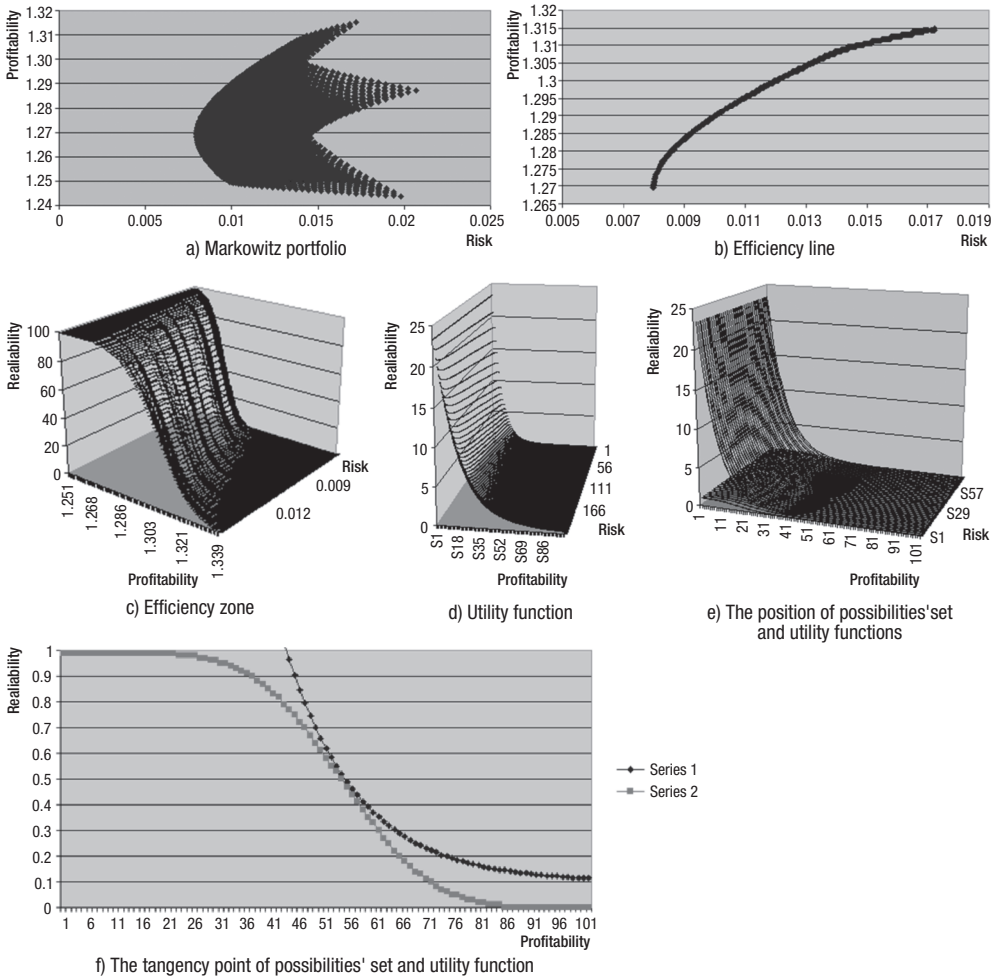
A situation when probability distributions are Normal, not correlated random variables, available resources are distributed in equal parts among P1, P2, P3 and P4, and optimization is performed in distributing resources among subcomponents. The results of the decision are presented in Fig. 5. Here the logic of Fig. 4 is retained.

In 5a section all possible cases of funds distribution are presented, i.e. all possible portfolios as a set of pairs of random variables' "standard deviations – mean values", and in section 5b only the possibilities' set of efficient portfolios is presented. Here the portfolios having the highest mean value under the certain risk level are presented. Section 5c presents the efficiency zone, where analogically to the efficiency line of "standard deviation – mean value" all the efficiency lines "standard deviation – quintile" are presented. Section 5d shows the geometrical view of adequate utility function, and section 5e – the mutual position of efficiency zone and utility function, when utility function is approaching the surface of possibilities (efficiency zone), and the first tangency point is indicating the solution (section 5f). Thus the resources distribution structure (portfolio) among subcomponents P1, P2, P3 and P4 is determined, which is oriented towards a possibility allowing to obtain the maximum of the selected utility function. Further in the text the graphical representations of, in our opinion, expected situations are presented.

Fig. 6 presents the visualization of solution analogical to Fig. 5 only with an assumption of correlation dependency between probability distributions, which is described by the conditional correlation matrix (9), where presented correlation coefficients describe average correlation dependencies between sub-elements P_i.

$$C_{ij} = \begin{pmatrix} 1 & 0,5 & 0,4 & 0,3 \\ & 1 & 0,3 & 0,2 \\ & & 1 & 0,2 \\ & & & 1 \end{pmatrix}. \quad (9)$$

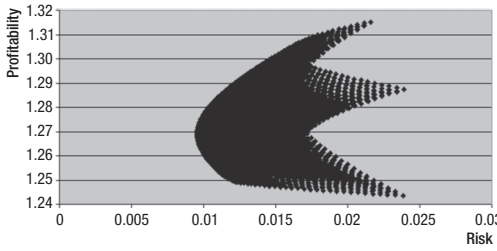
Figs. 7 and 8 present the visualization of solution analogical to Fig. 5 with initial distribution among P1, P2, P3 and P4 is made according to the proportion 4:3:2:1 and according to the structure provided by experts, respectively.



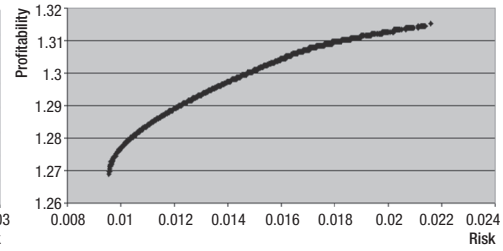
g) $w_1 = 0.0167$; $w_2 = 0.0778$; $w_3 = 0$; $w_4 = 0.1556$; $w_5 = 0.0167$; $w_6 = 0.0778$; $w_7 = 0$; $w_8 = 0.1556$; $w_9 = 0.0167$; $w_{10} = 0.0778$; $w_{11} = 0$; $w_{12} = 0.1556$; $w_{13} = 0.0167$; $w_{14} = 0.0778$; $w_{15} = 0$; $w_{16} = 0.1556$

U = 19.5

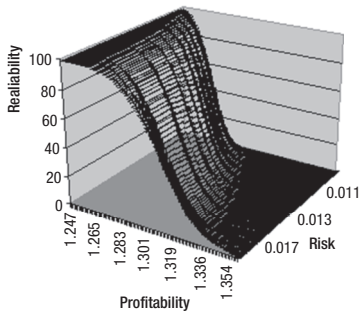
Fig. 5. Visualization of (4)–(6) problem solving, when distributions D(a_i, s_i) from Table 2 were assumed to be not correlated Normal variables N(a_i, s_i)



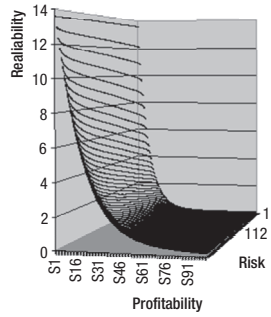
a) Markowitz portfolio



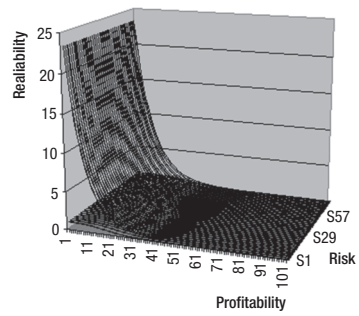
b) Efficiency line



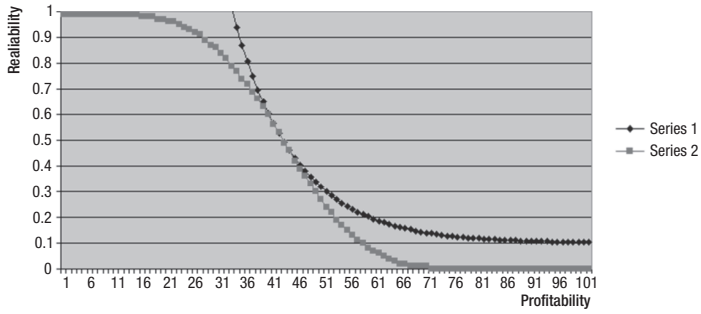
c) Efficiency zone



d) Utility function



e) The position of possibilities'set and utility functions

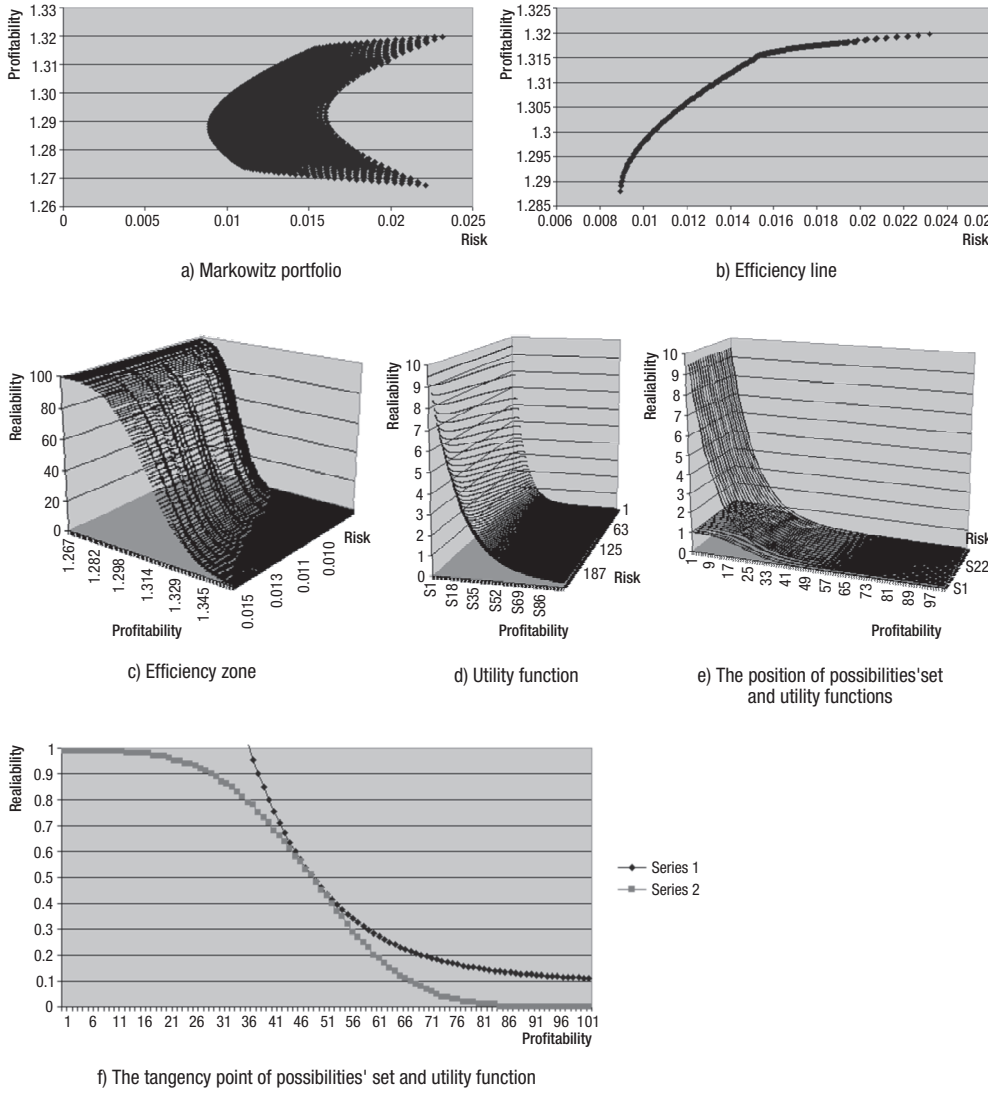


f) The tangency point of possibilities' set and utility function

g) $w_1 = 0.0833$; $w_2 = 0$; $w_3 = 0.0778$; $w_4 = 0.0889$; $w_5 = 0.0833$; $w_6 = 0$; $w_7 = 0.0778$; $w_8 = 0.0889$; $w_9 = 0.0833$; $w_{10} = 0$; $w_{11} = 0.0778$; $w_{12} = 0.0889$; $w_{13} = 0.0833$; $w_{14} = 0$; $w_{15} = 0.0778$; $w_{16} = 0.0889$

U = 13.4

Fig. 6. Visualization of (4)–(6) problem solving, when distributions D_i from Table 2 were assumed to be correlated random variables with the same a_i and s_i values, and investment proportions among separate P_i were left the same



a) Markowitz portfolio

b) Efficiency line

c) Efficiency zone

d) Utility function

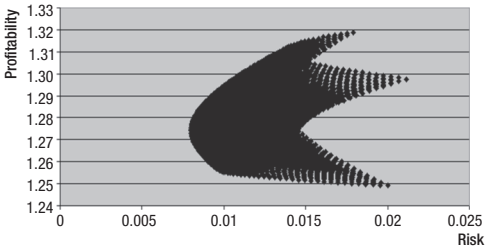
e) The position of possibilities'set and utility functions

f) The tangency point of possibilities' set and utility function

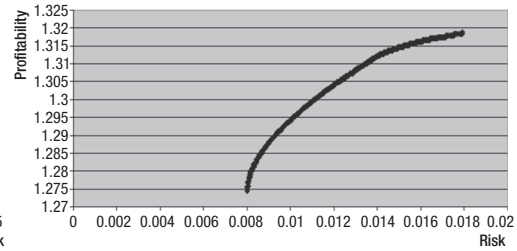
g) $w_1 = 0.2667$; $w_2 = 0.0711$; $w_3 = 0.0533$; $w_4 = 0.0089$; $w_5 = 0.2$; $w_6 = 0.0533$; $w_7 = 0.04$; $w_8 = 0.0067$; $w_9 = 0.1333$; $w_{10} = 0.0356$; $w_{11} = 0.0267$; $w_{12} = 0.0044$; $w_{13} = 0.0667$; $w_{14} = 0.0178$; $w_{15} = 0.0133$; $v_{16} = 0.0022$

U = 9.4

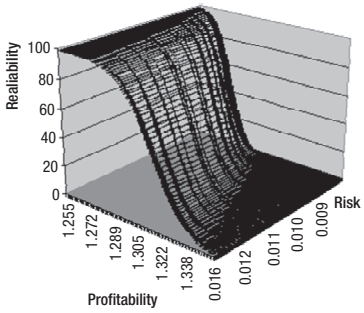
Fig. 7. Visualization of (4)–(6) problem solving, when initial distribution among P_1, P_2, P_3, and P_4 is not balanced in equal parts, but according to proportion – 4:3:2:1



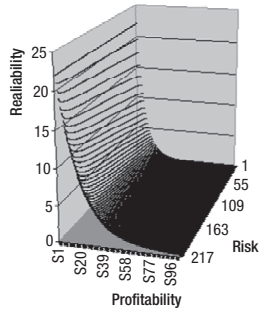
a) Markowitz portfolio



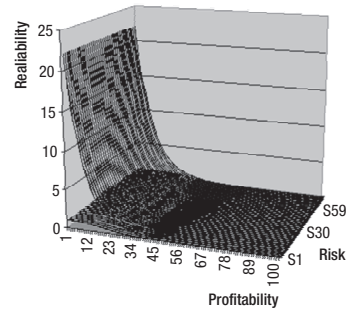
b) Efficiency line



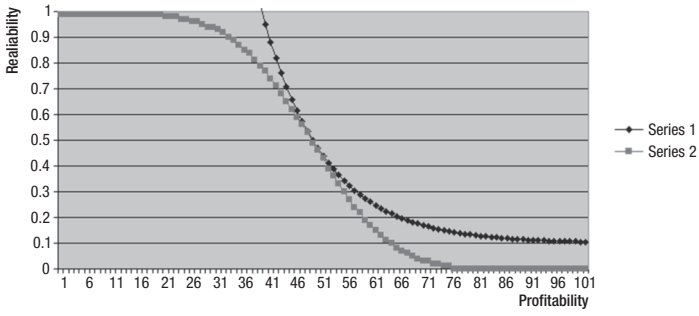
c) Efficiency zone



d) Utility function



e) The position of possibilities'set and utility functions



f) The tangency point of possibilities' set and utility function

g) $w_1 = 0$; $w_2 = 0.1465$; $w_3 = 0.014$; $w_4 = 0.1535$; $w_5 = 0$; $w_6 = 0.1129$; $w_7 = 0.0108$; $w_8 = 0.1183$; $w_9 = 0$; $w_{10} = 0.1083$; $w_{11} = 0.0103$; $w_{12} = 0.1134$; $w_{13} = 0$; $w_{14} = 0.0989$; $w_{15} = 0.0094$; $w_{16} = 0.1036$

U = 21.7

Fig. 8. Visualization of (4)–(6) problem solving, when the situation analogical to Fig. 5 is analysed, based on the structure a priori provided by experts:
$w^1 = w_1 + w_2 + w_3 + w_4 = 0.314$; $w^2 = w_5 + w_6 + w_7 + w_8 = 0.242$;
$w^3 = w_9 + w_{10} + w_{11} + w_{12} = 0.232$; $w^4 = w_{13} + w_{14} + w_{15} + w_{16} = 0.2119$

5. Conclusions and suggestions

1. Marketing efficiency management is inseparable from the marketing risk management.
2. Marketing risk peculiarities require adequate such risk management concepts and measure systems.
3. Calculating dependencies in marketing research, analytical research methods often directly confront with variety interference in information provision and other forms. Experts' generated dependencies between the desired effect and incurred costs totally fulfilled the characteristics of expert estimations.
4. In order to achieve the optimal distribution of possible resources according to the detailed components of marketing structure, optimized calculations have been accomplished with reference to the expertly given estimations, formed as stochastic variables.
5. Optimization evaluations showed that the marketing cost structure greatly depends on the allocation forms of expectations probability costs to become effect, as well as on the statistical interdependence rate of the effect turns in a separate component of marketing structure.

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INTEGRUOTAS MARKETINGO RIZIKOS IR EFEKTYVUMO VALDYMAS

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Santrauka

Kyla dvi pagrindinės marketingo valdymo problemos: pirma – tai marketingo gebėjimo efektyviai naudoti jam skirtus išteklius didinimas, antra – inventorizuoti marketingo veiklai įtaką darančias rizikas, siekiant parengti jų valdymo strategiją. Atsižvelgiant į išskirtinį marketingo rizikingumą, jo efektyvumo problemų sprendimas neatsiejamas nuo rizikų, darančių poveikį marketingui, identifikavimo ir jų valdymo strategijų sukūrimo. Straipsnyje marketingo efektyvumas ir rizikos valdymo problemos nagrinėjamos dviem būdais. Pirmas – nagrinėjama marketingo rizikų portfelio valdymo situacija, kai ištekliai, skirti rizikai valdyti, dalijami tarp priemonių, skirtų rizikų vertei mažinti (*Value at Risk*), taip, kad bendroji rizikos vertė, t. y. visų rizikos verčių atstojamoji, būtų minimali. Antras – remiantis ekspertų efektyvumo įverčiais sąnaudų vienetui kiekviename marketingo struktūros elemente, ieškomas toks sąnaudų padalijimas, kuris puoselėtų naudingiausią marketingo sukuriamo ribinio naudingumo prieaugį. Sprendimams rasti pasitelkti imitacinio modeliavimo ir stochastinio optimizavimo metodai.

Reikšminiai žodžiai: marketingo efektyvumas, marketingo rizika, integruotas marketingo efektyvumo ir rizikos valdymas.

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