

Methodology of Business Risk Analysis and its Practical Application in the Enterprises Working in the Global Market

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One of the most important aspects which guarantees successful work of a company, i.e. risk analysis is considered. The exploration of risk analysis is essential both theoretically and practically as it reduces the risk of loss, venturesome dealings and harm for a company's good will. The shortage of both theoretical and practical knowledge about risk, processes of risk analysis and its stages prevent companies from business development both locally and internationally.

The exploration of this field is even more relevant because there is no clear and unanimous concept of risk analysis which would be accepted both by scientists and business environment. At present, the conception of risk analysis of authorities, various institutions and foreign and Lithuanian scientist differs greatly.

Risk analysis is distinguished by the variety of methods, their complexity and lengthening time of their implementation. The classification of methods may also vary greatly whereas reasons (advantages and disadvantages) for such classification are explained differently by scientists. Meanwhile, companies face real practical problem how to choose a method which could be the most appropriate and conforming to company's financial possibilities.

The perception that risk analysis is a very complex and responsible process during which risk should be identified, assessed, analyzed and estimated, i.e. to manage, encourage companies to assign this process for professionals, i.e. specialized companies of risk analysis, the launching of which increased as there was the gap in the market in this field.

The aim of the article is to work out the methodology of risk analysis and to compare the stages of risk analysis process used by Lithuanian risk management analysis companies.

Having performed the analysis of scientific literature and summarized various approaches, risk analysis as a constituent part of risk management concept is presented, method groups and types of risk analysis, stages of individual method processes are discerned as well as advantages and disadvantages of qualitative and quantitative risk analysis methods are explored. Having systemized different viewpoints of authors, four main stages of risk analysis process were distinguished: organizational investigation, identification, estimation and evaluation. Business companies are recommended to use a resumptive model of risk analysis process in the context of risk management process.

The investigation is conducted using the data of three

Lithuanian companies: SC Compservis, PriceWater-HouseCoopers/Lietuva and SC Synergy Consulting. The aim of the investigation was twofold: 1) to find out what risk analysis methods and stages are applied by risk analysis companies; 2) to compare the essential stages of risk analysis process which are described theoretically and applied practically and to identify their similarities and differences. The results of investigation were: 1) Lithuanian risk analysis companies more often apply qualitative risk analysis methods than quantitative ones; 2) the stages of SC Synergy Consulting and SC Compservis risk analysis process (asset identification and valuation, threats assessment, vulnerabilities assessment and risk identification and its evaluation) are the same and identical to the stages of risk analysis discerned by R.K. Rainer, J.R. Charles A. Snyder, Houston H. Carr (1991); Sharon Halliday, Karin Badenhorst, Rossouw von Solms (1996).

Keywords: *risk, risk analysis, risk management, risk analysis methods, stages of risk analysis process.*

Introduction

The processes of constantly changing conditions of business environment, increasing flow of information, integration to the world market augment the risk of business companies and stipulate the necessity of risk management. One of the most important constituent parts of risk management processes is risk analysis, the analysis of which is significant both theoretically and practically. It is based on the fact that till now there is no unanimous methodology of risk analysis which would enable to make effective decisions that would reduce the unacceptable risk till the admissible level. There is no homologous approach of risk analysis process. Foreign authors (Strutt, 1993; Boroush, 1998; Frosdick, 1997; Chapman, 2007, and others), Lithuanian scientists (Bagdonas, 1996; Laskienė, 2003), heads of business companies (Vageris, 2006; Jokūbauskas, 2006) and various institutions (Australian Government, 2005; Australian Agency for International Development (AusAID), 2005; International Organization of Standards (ISO), 2002; International Advancing Security Worldwide (ASIS), 2003) treat the concept of risk analysis differently.

Rapidly increasing rates of economic growth determine the complexity of risk analysis methods, the variety of their types and lengthen the time of implementations of methods. (Labuschagne and Eloff, 1998). In scientific literature, various methods of risk analysis are described:

qualitative, quantitative and combined (Bagdonas, 1996; Rasche, 2001; Urniežius, 2001; Bandyopadhyay, P. Mykytyn, K. Mykytyn, 1999; Snyder, Carr, 1991; Ahmed, Kays, Amornsawadwatana, 2007; Vageris, 2005; Jokūbauskas, 2006; Laskienė, 2003); qualitative methodologies, tree based techniques and techniques for dynamic systems (N. E. M. "Business Solutions", 2002; College of Engineering and Engineering Technology Northern Illinois University, 2006); update risk, downside risk, and composite methods (ISO/IEC Guide 73, 2002; Risk Management Standard, 2002); intuitive, inductive and deductive techniques (Frosdick, 1997); stages of risk analysis processes (White, 1995; Australian Agency for International Development (AusAID), 2005; Chapman, 2007; Backlund, Hannu, 2002; Rainer, Snyder, Carr, 1991; Sharon Halliday, Karin Badenhorst, Rossouw von Solms, 1996; Mobey, Parker, 2002); advantages and disadvantages of methods (Vageris, 2005; Australian Government, 2005; Bomil Suh&Ingo Han, 2002; Rainer, Snyder, Carr, 1991), therefore to choose the most appropriate and accurate method of risk analysis is complex.

Business companies which try to tackle such risk analysis problems as risk analysis immaturity, lack of information and data security methods, insufficient competence of employees who participate in risk analysis or the lack of experience of a company, need methods which would offer effective solutions for the elimination of such problems.

In case of Lithuania, business companies often lack detailed and qualified information about the methods risk analysis, their processes and the methods of risk decrease (Jokūbauskas, 2006). Therefore, not all Lithuanian companies are able to evaluate the most risky branches themselves. Realizing the incapability and competence short-

age of companies, specialized companies or risk management are set up.

The aim of the article is to perform the methodology of risk analysis and to compare the stages of risk analysis process used by Lithuanian risk management analysis companies.

Tasks:

- to introduce the definition of risk analysis based on the opinions of the authors ;
- to determine the differences between the processes of risk analysis and risk management;
- to outline the essence of methods and stages of processes analyzed in the research literature;
- to recommend a resumptive model of risk management process in the context of risk management process;
- to present the advantages and disadvantages of quantitative and qualitative analysis methods;
- to evaluate the similarities and differences of the stages of risk analysis processes applied in Lithuanian enterprises.

Object of the article – risk analysis in the enterprises working in the global market.

Research methods used in the article are systematic analysis of research literature and the comparative analysis of the risk analysis methods and processes suggested by various authors and applied by Lithuanian companies.

Conception of risk

Many literary sources and authors provide a diverse definition of risk analysis (see Table 1).

Table 1

Definitions of risk analysis

Author	Definition
ISO/IEC Guide 73:2002	Risk analysis – systematic use of information to identify sources and to estimate the risk.
Australian Government "Risk Analysis Framework", 2005	Risk analysis – the process of risk assessment, management and communication (risk analysis = risk assessment + risk management+ risk communication).
V. Bagdonas, 1996	The aim of risk analysis is to supply the future partners with necessary data according to which the expedience of taking part in the project is decided, and which helps to foresee the safety measures against possible financial losses.
Mark Boroush, 1998	Risk analysis is being used to evaluate and manage the potential of unwanted circumstances in a large array of areas: industrial explosions; machine part and other mechanical and process failures; workplace injuries; injury or death from diseases, natural causes, lifestyles and voluntarily pursued activities; the impacts of economic development on ecosystems and financial market transactions.
Australian Agency for International Development (AusAID), 2005	Risk analysis – a systematic use of available information to determine how often specified events may occur and the magnitude of their consequences.
Steve Frosdick, 1997	Risk analysis – the sum of the processes of risk identification, estimation and evaluation.
Robert Chapman, 2007	Risk analysis – the overall process of risk identification, risk analysis and risk evaluation.
International Advancing Security Worldwide (ASIS), 2003	Risk analysis – a detailed examination including risk assessment, risk evaluation and risk management alternatives performed to understand the nature of unwanted, negative consequences to human life, health, property, or an environment; an analytical process to provide information regarding undesirable events; the process of quantification of the probabilities and expected consequences for identified risks.

Strutt (1993) gives the fullest definition of risk analysis where he sets out the concept in seven stages as follows:

- systematic assessment (item by item – question every part of the system);
- identification of risks (global and local scale);
- assessment of risks (frequencies and consequences). This may involve a number of different analyses;
- establish acceptable or tolerable levels of risk;
- evaluation of risk. Are the risks acceptable? Can they be reduced and at what cost?
- determine, whether the risks are as low as reasonably practicable;
- determine risk reduction measures where appropriate.

The proposed definitions imply that some authors handle risk analysis in a wider sense, i.e. the definition includes risk evaluation, risk management, and other processes; meanwhile other authors treat risk analysis as a component of the whole risk management process. Having summarized different approaches of risk analysis, we can draw a conclusion that risk analysis as a constituent part of the risk management is systematic appliance of information for risk evaluation and assessment as well as for the selection of risk reduction methods.

In order to understand the peculiarities of the processes of risk management and risk analysis, the relationship between the terms which well reflect risk management and analysis is shown in the Figure 1 (based on their definition in the ISO Guide 72).

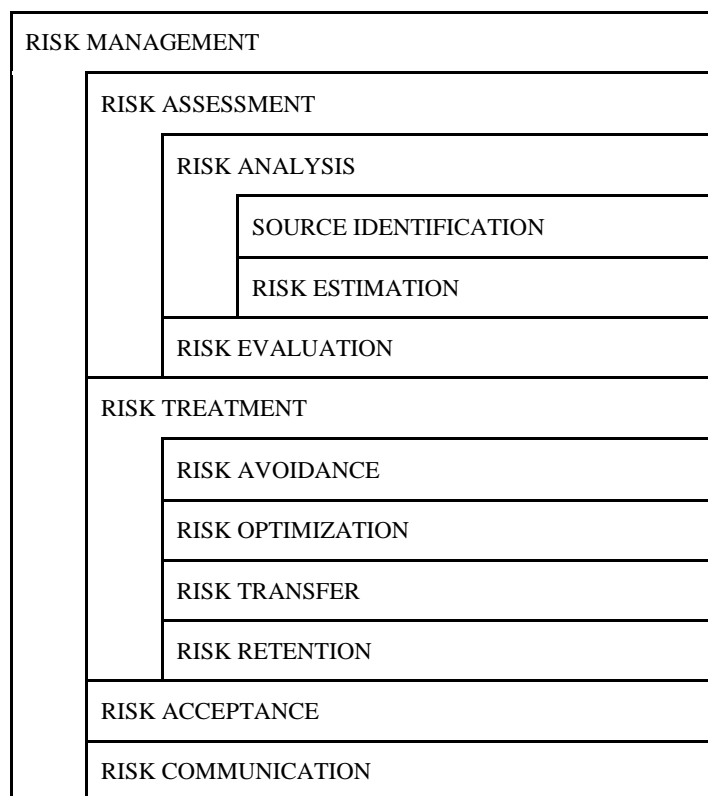


Figure 1. Relationship between terms, based on their definition in the ISO Guide 72

The processes of risk management and risk analysis may seem to be identical; however, it is necessary to understand their differences and commons. Risk management is the analysis of possible risk, the process of potential loss decrease and tangible asset protection. Risk management is a wider concept which encompasses risk analysis, risk monitoring, assumption of risk, and informing about risk, i.e. the cooperated actions which are taken to manage and control risks of an organization.

The aim of risk management process is to decrease risk to the acceptable level; meanwhile, risk analysis is performed in order its results were used as a base to implement risk reduction processes and to assess their efficiency, for example, disposing of ineffective means, implementing new and maintaining existing risk management means.

According to S. Liučvaitis (2003) risk management is

not passive inclination to take risk but a set of methods and means used to influence the firm's future results and get the least deviated from the expected results, meanwhile risk analysis is a search for the least deviation possible and its definition.

Risk analysis methods and stages of risk analysis process

As risk analysis is a complex process, many authors provide a diverse classification and definition in various literary sources of it. Methods of risk analysis are the means to increase the possibility to identify all possible risks and dangers in certain conditions. Table 2 renders the classification of methods of risk analysis provided by various authors.

Table 2

Methods of risk analysis

Author	Group of risk analysis methods	Types of methods
V. Bagdonas (1996); R. Vageris (2005); T. Rasche (2001); T. Jokūbauskas (2006); R. Urniežius (2001); D. Laskienė (2003); R.K. Rainer, J.R. Charles A.Snyder, Houston H. Carr (1991); A. Achmed, B. Kays, S. Amornsawadwatana (2007); K. Bandyopadhyay, P. Mykytyn, K. Mykytyn (1999)	Qualitative	What if?; Fuzzy Metrics; Scenario Analysis; Questionnaires Failure Mode and Effect/Criticality Analysis) (FMEA/FMECA); Hazard and Operability Studies (HAZOPS) Human Error Analysis (HEA); Reliability Block Diagrams Fault Tree Analysis (FTA); Event Tree Analysis (ETA); First Order Reli- ability Methods (F.O.R.M.); Probabilistic Risk and Safety Assessment (PRA & PSA); Survey questionnaires; Fuzzy metrics; Scenario analysis
	Quantitative	Statistical; Analysis of cost expedience, Expert systems; Analytical; Ana- logue appliance; Analysis of relative risk value; Sensitivity analysis; Monte Carlo simulation; Turning-point analysis; Methods of discount norm; Cost-Benefits Analysis; Delphi technique
R. Vageris (2006); K. Bandyopadhyay, Peter P. Mykytyn, K. Mykytyn (1999)	Combined (quantitative and qualitative approaches)	Attack tree analysis, Delphi techniques, Value chain analysis
N. E. M. “Business Solutions“ (2002); College of Engineering and Engineering Tech- nology Northern Illinois University (2006)	Qualitative methodologies used in the nuclear and chemical processing plants	Preliminary Risk Analysis (PHA); Hazard and Operability Studies (HAZOP); Failure Mode and Effects Analysis (FMEA/FMECA)
	Tree based techniques used to quantify the probabilities of occurrence of accidents and other undesired events leading to the loss of life or economics loses in prob- abilistic risk assessment.	Fault Tree Analysis (FTA); Event Tree Analysis (ETA); Cause- Consequence Analysis (CCA); Management Oversight Risk Tree (MORT); Safety Management Organization Review Technique (SMORT)
	Techniques for Dynamic System	Dynamic Event Logic Analytical Methodology (DYLAM); Dynamic Event Tree Analysis Method (DETAM); Markov Modeling; Digraph/Fault Graph; Go Method
ISO/IEC Guide 73 (2002), Risk Manage- ment Standard (2002)	Update (positive) risk	Market survey; Prospecting; Test marketing; Research and Development; Business impact analysis
	Downside (negative) risk	Treat Analysis; Fault Tree Analysis (FTA); Failure Mode and Effect Analysis (FMEA)
	Both	Dependency modeling; SWOT analysis (Strengths, Weaknesses, Opportu- nities, Treats); Event Tree Analysis (ETA); Business continuity planning; BPEST (Business, Political, Economic, Social, Technological) analysis; Real Option Modeling; Decision taking under conditions of risk and uncer- tainty; Statistical inference; Measures of Central Tendency and dispersion PESTLE (Political Economic Social Technical Legal Environmental)
S. Frosdick (1997)	Intuitive technique	Brainstorming
	Inductive technique (What if?)	Preliminary Hazard Analysis (PHA); Checklists; Human Error Analysis (HEA); Hazard and Operability Studies (HAZOPS) Failure Modes and Effects Criticality Analysis (FMECA)
	Deductive technique (so how?)	Event and Fault Trees

Summarizing the classification of methods of risk analysis, the conclusion was drawn that the majority of authors are predisposed to divide the methods of risk analysis into qualitative and quantitative, certain types of methods coincide in all classifications (for example, FTA and ETA).

There is a great variety of risk analysis methods;

therefore, in order to avoid the complexity of the risk analysis process, stages of risk analysis process are systemized (see Table 3). Based on the stages of risk analysis process presented in Table 3, the general risk analysis process is presented in the context of risk management (see Figure 2).

Table 3

Stages of risk analysis process

Author	Stages of risk analysis process
D. White (1995)	1) <i>Risk identification</i> Perceiving hazards; identifying failures; recognizing consequences
	2) <i>Risk estimation</i> Estimating risk probabilities; describing risk; quantifying risk
	3) <i>Risk evaluation</i> Estimating significance of risk; judging acceptability of risk; comparing risk against benefits
Australian Agency for International Development (AusAID), 2005	1) <i>Estimation (or determination) likelihood and consequences</i>
	2) <i>Estimation level of risk</i>
R. Chapman (2007)	1) <i>Context</i> Developing an intimate knowledge of the business activity under examination. Vital the context step is the need to understand the activity objectives. The context step should also establish the “what“, “when“, “who“ and “how“ of the activity.
	2) <i>Identification</i> Identifying the opportunities and threats to all key activities.
	3) <i>Estimation</i> Assessing both risk and the opportunities to business in terms of their probability and their impact.
	4) <i>Evaluation</i> Understanding the net effect of the identified threats and opportunities on an activity when aggregated together.
F. Backlund, J. Hannu (2002)	1) <i>Scope definition and documentation of risk analysis plan</i>
	2) <i>Hazard identification and initial consequences evaluation</i> , i. e. rough preliminary analysis to provide guidance as to where it was most important to start up the main analysis.
	3) <i>Risk estimation</i>
	4) <i>Analysis verification</i>
	5) <i>Documentation of risk analysis report</i>
	6) <i>Analysis update</i> is a standard and fundamental step within risk analysis
R.K. Rainer, J.R. Charles A. Snyder, Houston H. Carr (1991); Sharon Halliday, Karin Badenhorst, Rossouw von Solms (1996)	1) <i>Asset identification and analysis</i>
	2) <i>Threat identification and analysis</i>
	3) <i>Vulnerability identification and analysis</i>
Bomil Suh, Ingoo Han (2002)	1) <i>The organizational investigation</i> Determining what needs to be managed; understanding the organization’s mission
	2) <i>Asset identification and evaluation</i>
	3) <i>Treat and vulnerability assessment</i>
	4) <i>Annual loss expectancy calculation</i>
A. Mobey, D. Parker (2002)	1) <i>Identification, where all potential risks affecting an organization are identified</i>
	2) <i>Estimation, where the identified risks are assessed and their importance, likelihood, severity and impact are determined</i>
	3) <i>Analysis and evaluation, where the acceptability of the risk is determined and the actions that can be taken to make the risk more acceptable are evaluated</i>

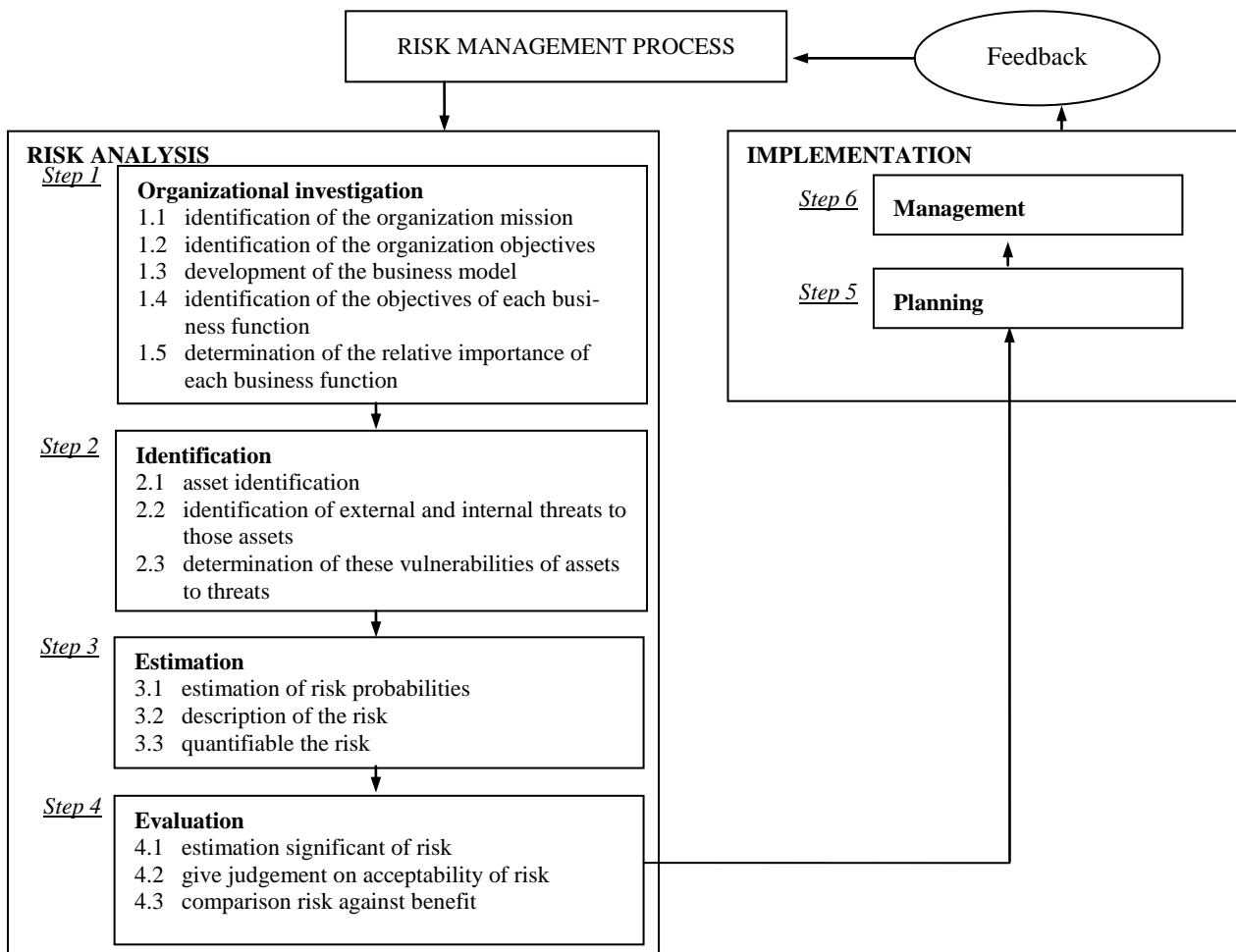


Figure 2. Risk analysis process in the context of risk management process

(Rainer, JR., Snyder, Carr (1991); Bomil Suh, Ingoo Han (2002); Chapman (2007); White (1995); Mobey, Parker (2002))

Organizations should develop conditionally simple risk analysis procedures, which should be adapted and adjusted for departments of various practice, as well as should incorporate both people who understand operations of activity, and those who understand technical aspects of systems under consideration

Before deciding which method of risk analysis to apply, the organization should estimate the advantages

and disadvantages of qualitative and quantitative risk analysis methods (Vageris, 2005; Australian Government "Risk Analysis Framework", 2005; Bomil Suh & Ingo Han, 2002; Rainer, Snyder, Carr 1991). However, the advantages and disadvantages of each method suggest that each one may best be applied to certain types of threats or certain areas of the organization.

Table 4

Advantages and disadvantages of two types of methods

Quantitative methods	Qualitative methods
<p>Advantages Applicability to all assets Mathematical foundation Support to cost-benefit decision</p> <p>Disadvantages Inappropriateness of monetary asset value Inappropriateness of general statistics Time consuming</p>	<p>Simple risk calculation, flexible Usefulness where there is the lack of experience Less time, effort and expensive consuming</p> <p>Inability of cost-benefit decision Subjective results, inexact More difficult to incorporate uncertainty</p>

Summarizing disadvantages and disadvantages, the conclusion may be drawn that qualitative analysis is simple, and its main task is to determine risk factors according to the stages or activities of the project which cause

danger, or to determine potential risk fields and at the same time to identify possible risks. (Bagdonas, 1996). Quantitative methods are more complex, and are based on complicated theories (statistics, theory of combinations,

theory of games, theory of chaos, etc.) and on artificial intelligence systems as well as neuron networks. These methods are more widely applied by insurance and investment companies (Vageris, 2006).

Stages of risk analysis applied by Lithuanian companies

Due to constantly growing competition and unavoidable business environment changes related with the integration into European Union organizations face the problems of the establishment and maintenance of the company's value in the environment, in which constant changes are in process, new opportunities are coming along, uncertainty is dominating. In such conditions of activity, a thorough analysis of risk factors as well as risk analysis needs to be performed. In order to avoid or to reduce the losses due to occurring risk, companies use the

services of companies which perform risk analysis more and more often.

Lithuanian companies' catalogue of 2007 had 11 entries of companies dealing with the problem of risk management. However, most of them provided only the services of lending risk evaluation, credit risk management, life risk assurance, business safety auditing, etc.

For the comparative analysis of raw data, two Lithuanian specialized risk management companies, which perform a thorough risk analysis in all sections of the company, were chosen.

SC *Compservis* performing the risk analysis follows CRAMM (CCTA Risk Analysis and Management Methodology), the methodology of information protection risk analysis and management, developed by the order of the government of Great Britain and applied worldwide (see Figure 3).

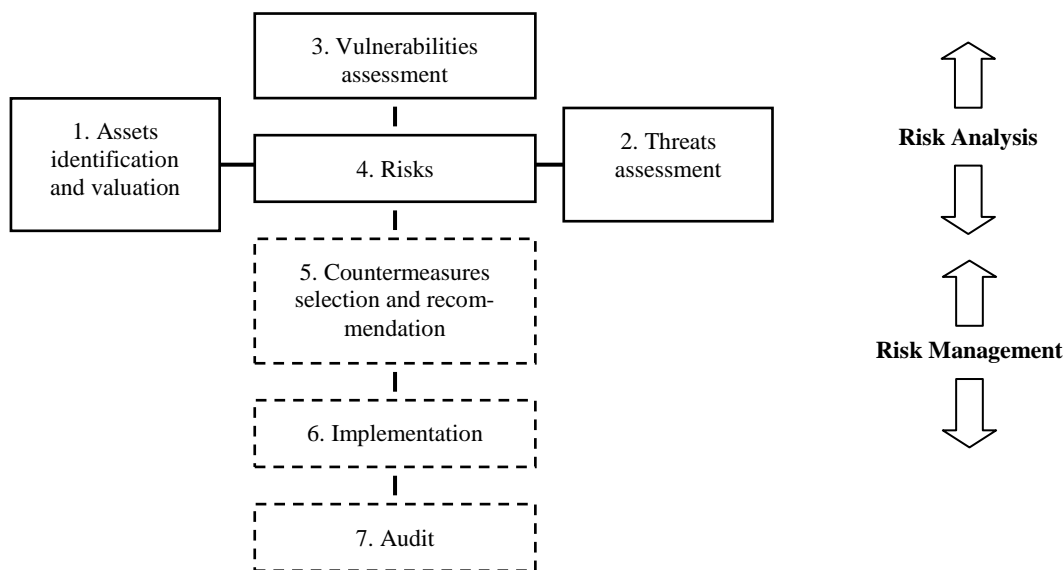


Figure 3. Risk management process using CRAMM methodology

According to the data of survey of company's employees, during the year of 2005 and 2006 CRAMM model was purchased by 5 or 6 companies. The methodology is not fully effective as specialized training of workers is required, the data of risk analysis are analyzed qualitatively.

The company *PriceWaterHouseCoopers/Lietuva*, performing the risk analysis of the company and preparing the plan of congruence security measure and assistance in its appliance, follows Monte Carlo simulation.

PriceWaterHouseCoopers's specialists of business dynamics C. Rodgers, J. Petch (1999) suggested the following risk analysis model of reference nature. The structure of the risk analysis process phases shown above, means:

- ✓ *identifying the risks*: describes techniques used to get a list of possible risks, and how to determine which risks are appropriate for modeling;
- ✓ *quantifying the risks*: this section looks at issues that arise when trying to accurately quantify risks, such as which distribution is appropriate for what type of process, what is correlation, etc. It also gives an overview of the issues that can

arise when quantifying risks with clients;

- ✓ *risk analysis*: this section is devoted to the "how to" of Monte Carlo simulation within spreadsheet model, from the impact model design to the generation of outputs;
- ✓ *presenting the results*: describes the different ways of presenting the results of uncertainty and risk analysis, both graphically and ion translating the results back into easily understood terms; and
- ✓ *beyond presentation*: this last section looks at how to take outputs from the modeling and interpret them in the context of business decision making.

Imitative simulation with Monte Carlo method enables to form a mathematical model of business project with undefined values of parameters and, knowing the probabilistic distribution of project parameters and the relation between parameters, to learn the distribution of project efficiency (Laskienė, 2003).

SC *Synergy Consulting* uses both qualitative and quantitative risk analysis method to assess the information safety risks. Head of SC *Synergy Consulting* T. Jokūbauskas (2006) lists such stages of risk manage-

ment process that are successfully applied in twenty companies per year:

- 1st stage. Assets (the identification and modeling of the assets, the analysis of the impact on performance)
- 2nd stage. Threats (the identification of threats and their evaluation)
- 3rd stage. Vulnerabilities (identification of vulnerabilities and their evaluation)
- 4th stage. Risks (identification of risk, its evaluation)
- 5th stage. Control measures (the selection of recommended control measures, the identification of existing control measures, the selection of measures scheduled to be applied, and the preparation of safety development program)
- 6th stage. Appliance of control measures (organizational, technological)
- 7th stage. Audit (the audit of the safety development program, the audit of the efficiency and correspondence to company's safety policy of the new control measures).

However, as T. Jokūbauskas claims, Lithuanian market prefers qualitative methods of risk analysis because companies are not predisposed to provide rates of their financial activity.

In summary, the conclusion can be made that the stages of *SC Synergy Consulting* and *SC Compservis* risk analysis process (1 – 4) are the same and identical to the ones described by R.K. Rainer, J.R. Charles A. Snyder, Houston H. Carr (1991); Sharon Halliday, Karin Badenhorst, Rossouw von Solms (1996). However, the only difference is that the risk is evaluated by risk management specialists in one company, and by the CRAMM methodology in the other.

The mentioned companies prefer the methods of qualitative risk analysis, meanwhile, *PriceWaterHouse-Coopers/Lietuva* favors the methods the qualitative risk analysis.

Conclusions

1. The globalization and Lithuanian's integration into the world market, as any other new phenomena, increases the risk for the companies going into business. However, Lithuanian and foreign scientists agree that there is no common notion of risk analysis, classification of its methods, and division of stages of risk analysis process.
2. Having performed the analysis of scientific literature, risk analysis is proposed to be treated as a constituent part of risk management process which involves risk identification, evaluation and estimation as well as the choice of risk decrease methods.
3. The survey of risk analysis methods showed that 4 classifications of risk analysis methods may be distinguished: 1) qualitative, quantitative, and composite methods; 2) qualitative, tree and dy-

namic system methodologies; 3) intuitive, inductive and deductive methods; 4) upward risk, downward risk and composite methods.

4. Companies that have decided to apply qualitative or quantitative risk analysis methods should evaluate the advantages and disadvantages of them. Qualitative methodology is simpler and it defines the most important fields of risk, it is flexible when there is a shortage of information. However, the results depend on the competence of the risk analysis group. Though the computation of quantitative risk analysis methods is complex, the methodology is highly objective, not dependent on the estimator's opinion.
5. With reference to the different author's attitude to the division of the stages of the risk analysis process, the model was comprised summarizing risk analysis process in the context of risk management process.
6. Having performed the comparative analysis of scientific literature and investigated the stages of risk analysis process, it appeared that methodologies of *SC Compservis* CRAMM and stages of *SC Synergy Consulting* risk analysis process are analogical to the ones described by R.K. Rainer, J.R. Charles A. Snyder, Houston H. Carr (1991); Sharon Halliday, Karin Badenhorst, Rossouw von Solms (1996). The survey of the raw data showed that Lithuanian companies when performing risk analysis prefer qualitative risk analysis methods rather than quantitative ones.

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Verslo rizikos analizės metodologija ir jos praktinis taikymas globalioje rinkoje veikiančiose įmonėse

Santrauka

Straipsnyje nagrinėjama aktuali verslo įmonių problema – rizikos analizės metodologijos taikymas siekiant sumažinti verslo riziką iki priimtino lygio.

Nuolat besikeičiančios verslo aplinkos sąlygos, informacijos srauto augimas, integracijos į pasaulinę rinką procesai didina verslo įmonių riziką ir kartu verčia ieškoti būdų, kaip tą riziką valdyti. Viena iš svarbių verslo rizikos valdymo proceso sudedamųjų dalių yra rizikos analizė; jos tyrinėjimas reikšmingas tiek teoriniu, tiek praktiniu požiūriu. Tai pagrindžiama tuo, jog iki šiol nėra vienos rizikos analizės metodologijos, leidžiančios priimti efektyvius sprendimus, kurie sumažintų nepriimtina riziką iki leistino lygio. Mokslinėje literatūroje nėra vienareikšmiško požiūrio į rizikos analizės procesą. Užsienio autoriai (Strutt, 1993; Boroush,1998; Frosdick, 1997; Chapman, 2007 ir kt.), Lietuvos mokslininkai (Bagdonas, 1996; Laskienė, 2003), verslo įmonių vadovai (Vageris, 2006; Jokūbauskas, 2006) bei įvairios institucijos (Australian Government, 2005; Australian Agency for International Development (AusAID), 2005; International Organization of Standards (ISO), 2002; International Advancing Security Worldwide (ASIS), 2003) skirtingai traktuoja rizikos analizės sampratą.

Sparčiai didėjantys ekonominio augimo tempai lemia rizikos analizės metodų sudėtingumą, jų įvairovę ir ilgina metodams įgyvendinti skirtą laiką (Labuschagne and Eloff, 1998). Mokslinėje literatūroje gausiai aptariami įvairūs rizikos analizės metodai (kokybiniai, kiekybiniai ir kombinuoti (Bagdonas, 1996; Rasche, 2001; Urniežius, 2001; Bandyopadhyay, P. Mykytyn, K. Mykytyn, 1999; Snyder, Carr, 1991; Achmed, Kays, Amornsawadwatana, 2007; Vageris, 2005; Jokūbauskas, 2006; Laskienė, 2003); kokybinė, medžio ir dinaminės sistemos metodikos (N. E. M. „Business Solutions“, 2002; College of Engineering and Engineering Technology Northern Illinois University, 2006); „aukštyn nukreiptos rizikos“, „žemyn nukreiptos rizikos“ ir mišrūs metodai (ISO/IEC Guide 73, 2002; Risk Management Standard, 2002); intuityviniai, induktyviniai ir deduktyviniai metodai (Frosdick, 1997); rizikos analizės procesų etapai (White, 1995; Australian Agency for International Development (AusAID), 2005; Chapman, 2007; Backlund, Hannu, 2002; Rainer, Snyder, Carr, 1991; Halliday, Badenhorst, Rossouw von Solms, 1996; Mobey, Parker, 2002), metodų pranašumai ir trūkumai (Vageris, 2005; Australian Government, 2005; Bomil Suh&Ingo Han, 2002; Rainer, Snyder, Carr 1991), tad pasirinkti tinkamiausią ir tiksliausiai nustatantį rizikingiausias veiklos sritis metodą yra sunku.

Verslo įmonėms, siekiančioms susidoroti su tokiomis rizikos analizės problemomis kaip rizikos analizės nebrandumas, informacijos ir duomenų saugos užtikrinimo metodų neturėjimas, nepakankama rizikos analizėje dalyvaujančių darbuotojų kompetencija ar patirties organizacijoje stoka, reikalingi rizikos analizės metodai, siūlantys efektyvius būdus minėtoms problemoms spręsti.

Lietuvos verslo įmonėms dažnai trūksta išsamios kokybiškos informacijos apie rizikos analizės metodus, jų procesų etapus bei rizikos mažinimo priemones (Jokūbauskas, 2006), todėl ne visos jos pajėgios savarankiškai įvertinti rizikingiausias veiklos sritis. Matydamos įmonių nesugebėjimą valdyti riziką ar jų kompetencijos stoką, kuriasi specializuotos rizikos valdymo įmonės.

Straipsnio tikslas – nustatyti rizikos analizės metodologiją ir palyginti Lietuvoje veikiančių rizikos valdymo įmonių atliekamą rizikos analizės proceso etapus. Tikslui pasiekti iškelti šie **uždaviniai**: 1) remiantis autorių nuomonėmis, pateikti rizikos analizės apibrėžimą; 2) nustatyti rizikos analizės ir rizikos valdymo procesų skirtumus; 3) nusakyti literatūroje analizuojamų rizikos analizės metodų esmę, rizikos analizės proceso etapus; 4) rekomenduoti apibendrintą rizikos analizės proceso modelį rizikos valdymo proceso kontekste; 5) pateikti kiekybinių ir kokybinių rizikos analizės metodų pranašumus ir trūkumus; 6) įvertinti Lietuvos rizikos valdymo įmonių atliekamos rizikos analizės procesų etapų panašumus ir skirtumus.

Straipsnio objektas – rizikos analizė globalioje rinkoje veikiančiose įmonėse.

Tyrimo metodika apima sisteminę literatūros analizę, skirtingų autorių siūlomų ir Lietuvos įmonių taikomų rizikos analizės metodų bei procesų etapų lyginamąją analizę.

Straipsnio pirmoje dalyje apibendrinamos įvairių autorių pateiktas rizikos analizės sampratos ir prieinama prie išvados, kad rizikos analizė – tai rizikos valdymo proceso sudedamoji dalis, apimanti rizikos identifikavimą, apskaičiavimą ir įvertinimą bei rizikos mažinimo būdų parinkimą. Siekiant išvengti rizikos analizės ir rizikos valdymo procesų sutapatavimo, buvo nustatyti rizikos valdymo ir rizikos analizės procesų skirtumai, leidžiantys teigti, kad rizikos valdymas yra platesnė sąvoka ir apima rizikos analizę, rizikos priežiūrą, rizikos priėmimą ir informavimą apie riziką, t. y. koordinuoti veiksmai, kuriais siekiama valdyti ir kontroliuoti organizacijos riziką (ISO Vadovas, 2002).

Antroje straipsnio dalyje susisteminama rizikos analizės metodų klasifikacija, jų pranašumai ir trūkumai bei pateikiamas rizikos analizės proceso skirstymas į atskirus etapus. Rizikos analizės metodų apžvalga parodė, kad skiriami keturi rizikos analizės metodai: 1) kokybiniai, kiekybiniai ir kombinuoti metodai; 2) kokybinė, medžio ir dinaminės sistemos metodikos; 3) intuityviniai, induktyviniai ir deduktyviniai metodai; 4) „aukštyn nukreiptos rizikos“, „žemyn nukreiptos rizikos“ ir mišrūs metodai. Prieita prie išvados, kad dauguma autorių rizikos analizės metodus linkę skirstyti į kokybinius ir kiekybinius, tačiau tam tikros metodų rūšys (klaidų medžio analizė (FTA) ir įvykių medžio analizė (ETA)) aptinkamos visose klasifikacijose.

Apibendrinus autorių pateiktus rizikos analizės metodų pranašumus ir trūkumus, nustatyta, kad kokybinė metodika yra paprastesnė, ją taikant nustatomos svarbiausios rizikos sritys, esant informac-

jos trūkumui, ji pasižymi lankstumu, tačiau rezultatai priklauso tik nuo rizikos analizės grupės kompetentingumo. Nors kiekybinių rizikos analizės metodų apskaičiavimai sudėtingi, tačiau metodika pasižymi dideliu objektyvumu, nepriklauso nuo vertintojų nuomonės. Siekiant išvengti rizikos analizės proceso sudėtingumo ir painumo, buvo susisteminti skirtingų autorių pateikiami rizikos analizės proceso etapai. Daroma išvada, kad rizikos analizės procesą galima suskirstyti į keturis pagrindinius etapus: organizacijos tyrimą, identifikavimą, vertinimą ir analizę.

2007 metų Lietuvos įmonių katalogo duomenimis, rizikos valdymo klausimus skelbėsi sprendžiančios 11 įmonių, tačiau dauguma jų teikė tik tokias paslaugas kaip kreditavimo rizikos įvertinimas, kredito rizikų valdymas, gyvybės rizikos draudimas, verslo saugos auditas ir kt., todėl trečioje šio straipsnio dalyje pirminių duomenų lyginamajai analizei pasirinktos trys Lietuvoje veikiančios specializuotos rizikos valdymo įmonės, atliekančios išsamią rizikos analizę visose įmonės veiklos grandyse. Nustatyta, kad *UAB Synergy Consulting* ir *UAB Compservis* pirmenybę teikia kokybiniais rizikos analizės metodams, nors vienoje įmonėje riziką vertina rizikos valdymo specialistai, kitoje – tam naudojama CRAMM metodika. Tuo tarpu bendrovė *PriceWaterHouseCoopers/Lietuva*, atlikdama įmonių rizikos analizę bei rengdama atitikties užtikrinimo priemonių planus ir padėdama juos įgyvendinti, vadovaujasi Monte Karlo metodu, t. y. pirmenybę teikia kiekybiniais rizikos analizės metodams.

Atlikus sisteminę literatūros analizę, padarytos tokios **išvados**:

1. Globalizacija ir Lietuvos integracija į pasaulinę rinką, kaip ir visi nauji reiškiniai, padidina rizikos laipsnį ekonomine veikla užsiimančioms įmonėms, tačiau Lietuvos ir užsienio mokslininkai pripažįsta, kad iki šiol vienareikšmiškos nuomonės dėl rizikos analizės sampratos, jos metodų klasifikavimo, rizikos analizės proceso etapų skirstymo nėra.
2. Remiantis skirtingų autorių nuomonėmis dėl rizikos analizės proceso etapų skirstymo, buvo sudarytas apibendrinantis rizikos analizės proceso modelis rizikos valdymo proceso kontekste.
3. Atlikus mokslinės literatūros lyginamąją analizę ir įmonių rizikos analizės procesų etapų tyrimą, paaiškėjo, kad *UAB Compservis* CRAMM metodikos ir *UAB Synergy Consulting* rizikos analizės proceso žingsniai analogiški autorių R.K. Rainer, J.R. Charles A. Snyder, Houston H. Carr (1991); Sharon Halliday, Karin Badenhorst, Rossouw von Solms (1996) išskiriamiems rizikos analizės proceso žingsniams. Pirminių duomenų tyrimas parodė, kad Lietuvoje rizikos analizę atliekančios įmonės dažniau taiko kokybinius, o ne kiekybinius rizikos analizės metodus.

Raktažodžiai: *rizika, rizikos analizė, rizikos valdymas, rizikos analizės metodai, rizikos analizės proceso etapai.*

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