Prof. **Natalia Apatova**
Ph.D. **Stanislav Malkov**

RISK ASSESSMENT OF VIRTUAL ENTERPRISES

Virtual Enterprise is a new type of economic activity that combines the traditional business risks and risks of the virtual space.The article describe the classification of virtual enterprises risks which gave the possibility to define three main groups of risks and they causes; to build the mathematical model of traditional economic indicators with risk account; to use the volatility index to Internet market for assessment of virtual enterprises risks and identify the demand, supply and the price on the commodity. The model and the method of using the volatility index illustrated by practice examples.

Keywords:virtual enterprise, risk assessment, mathematical model, volatility index, Internet market, risk indicator, risk cause.

Introduction. Internet economics is a new scientific and practice area which develops very quickly and the theory is not only ahead of reality but does not exist in enough volume. Many virtual enterprises start in the world every day; each organization has its website and realizes the activity in Internet in different forms beginning from sample advertising to commercial, finance, learning, political forms. There are many books and articles about transforming the principles, forms, types and structures of traditional firms and organizations when they transfer their activities into Internet (see, for example,Davidow& Malone,1992; Filos&Banahan, 2001; William, 2006).

Moving to the Internet many economic activities served as the basis for the creation of virtual enterprises, producing primary network product - the information and carrying out trade and service, including financial functions (Beddle,2010). Internet has changed the demand for goods and services, expanded the proposal; user-consumer has involved in the production process, has allowed to personalize consumers, to take into account their wishes and meet the diverse needs, by the way of making products to order and selecting them from a huge range of products (Strauss & Frost, 2011).The Internet is a factor of development individual entrepreneurship and small business, as well as infrastructure and space for its operation.This business is largely corresponds to the traditional in terms of content, but has a number of features related to the virtual environment that imposes certain requirements and restrictions on its success (Fellenshtein, 2000).

Despite the positive effect of the Internet on social and economic processes, new types of risks for both entrepreneurs and consumers (Kumar & Harding, 2011).These risks examined in the literatureand there are manyrecommendations of management on the business risks of virtual enterprises (Ponis, 2010).However, currently there is no common point of view on the virtual enterprise as economic actors on the Internet, the mechanisms of their functioning and risk management because cyber-attack and other risks change very quickly. Necessary to solve several problems as to systematize the virtual enterprises risks, to find the causes and roots of each group of risks, to define the characters of virtual enterprises and their risks, methods and instruments of risk's evaluation.

Risk's factors of virtualenterprises. A virtual enterprise locates in the high risks area, because it exposed to both traditional commercial risks and risks of the virtual environment. All businesses for normal and successful work should be stable and for virtual enterprises which works in the Internet there are special principles of stable. These principle help to manage the e-commerce enterprise (Apatova&Malkov, 2013).

1.Whole system, which is an enterprise, may be in a state in which the strategic goals of development realized, regardless of the impact of internal and external factors.

2.The internal factors need to include those risk factors that reduce the sale, including technical failures of computers and networks, databases and violations of software errors, violation of terms of purchases and sales, failures in service delivery.

3.The impact of external factors shaping introduced by external risks manifested in the actions of competitors to win more of the market (expansion of the range of goods, lower prices, additional services, expansion of payment options products, the introduction of discount systems, etc.), changes in legislation or tariffs delivery.

4. It is necessary to introduce a system of assessments, indicatorsfor destabilizing factors, as well as some integral index - the signal of economic stability violations of the enterprise.

5. The management of virtual trade enterprise includes the following functions: assessment of economic sustainability, simulation and analysis of the indicators, the formation of the optimal range.

The control must be included in the management of all elements of the enterprise, including financial unit, event marketing, and communications with customers, logistics operations and security.

Business process models of the virtual trading companies allow you to track different streams, especially trade, financial and information, and manage them.The main role in the development strategy of trade enterprise plays a commodity policy, including assortment, logistics and pricing.Trade policy is a sequence of control actions that govern the formation of optimal commodity production enterprises and the implementation of the interests of owners and employees.Trade policy provides a stable enterprise competitiveness in the market.The basic principles of commercial policy are the integration of the management of all business units, focus of the competitive environment, the consistency of all kinds of resources, flexibility, control and timely prioritization.

Organization of commodity flows associated with the formation and use of inventory, supply chain organization. In the traditional trade inventories using several indicators: the retail turnover volume (or value) of inventories, the profitability of inventories, sales profitability etc. The advantage of virtual stores is that they usually do not have large warehouses, logistics chains formed in the course of execution of orders of customers shopping, speed of delivery the product to the buyer often depends on the availability of his stock and by the coordinated work of all participants in the chain, from the manufacturer required product. Often it is a question of buying durable goods or garments and accessories, in this case, the buyer is satisfied with the expectation of a few days, or even weeks, which allows the seller to contact the supplier or manufacturer and make an additional order.The goods flow is very dynamic, as opposed to its traditional understanding of where the goods first be distributed to sale outlets, and then must be expect that they will be sold out. The goods flow and working capital change their parameters, in the virtual stores they are minimized and become more dynamic, as opposed to the traditional trade, the risk of excess inventories is minimizing and do not need a large number of parameters to optimize the flow of goods. Working capital, which means as a characteristic of the turnover of resources in the enterprise, represents funds invested in assets. The working capital also minimized in the process of minimizing the assets of virtual trading enterprise.This is possiblebecause to start an Internet store in some cases, the necessary equipment is a computer and a modem to connect to the Internet, and with the development of mobile communication may be sufficient (in extreme cases), and the mobile phone.

There are features of the organization of supplies in the system of Internet commerce, communication of all subjects of the logistics chain, which operates as a virtual company with several agents, including direct suppliers (manufacturers), transport companies, banks, customers and the Internet as a computer network infrastructure. Managementof the procurement process is an important element inthe traditional trade. The traditional tradedecides the following tasks:building relationships with customers, identify target groups, retention the contingent of customers, meet their economic interests; building relationships with suppliers of goods, security of supply by the partners, the satisfaction of all participants in the supply chain; forming relationships with creditors, minimizing the cost of capital sources, ensuring efficient use of working capital.Internet trade was very dependent on providing a network connection, a dedicated lines and modems until the advent of mobile phone. The benefits of trade using mobile to connect to the Internet, are the following: universal access, localization, personalization, flexibility and ease of use, data portability and speed product payments.

In modern enterprises, an important management objective is to manage information flow particularly important solution to this problem is for the virtual enterprise. Management of

information flows of virtual enterprises allows, first, to save time, which in modern conditions is one of the main factors of competitiveness.This achieved by combining into a single stream of goods and information along the entire supply chain from manufacturer to consumer.Information flow defined as a set of documented indicators reflecting the dynamics of the movement of material and financial flows. The operation of such flow system can achieve a compromise between centralized and decentralized procurement management, which leads to lower costs.The special management system of the informational flows is necessary for the control the time factor as a new production factor and the information whenis separated from the physical flows can be itself a product or service. This is particularly evident in Internet trading when the buyer has the opportunity to assess the quality of the goods only according information provided him , including it can compare prices and detailed information about the product in different stores.In this case, the buyer get primarily an information service, and only after the decision about purchase, the process of transaction starts. This service is provided free of charge to the buyer, but further purchases in the virtual store depend on its quality.

Competitiveness issues are relevant to all companies, including shopping for traditional enterprises and virtual. The first step in the development of the trading company is entering the market, overcoming related barriers. These barriers are customs tariffs, tax system, interest rates and   market infrastructuredevelopment.For virtual enterprise, these barriers can be important, but for it, the nature-geographical and environmental barrier factors are insignificant because space action of virtualenterprise has no physical boundaries and virtual enterprises do not cause damage to the environment in terms of environmental barriers.Really, no significant barriers are at the regional scale and other local barriers or in the level of market concentration and the degree of substitutability of goods.

From market's risks for the virtual enterprise are commercial risk as the risk of trading activity and the impact of the risks of competition.Virtual enterprises have good competitive potential, which consists of an innovative, social and economic potentials and the potential of information technology.Effect of scale, which is working for Internet trade, makes it possible not to take into account the impact of factor of competitive environment.

One of the factors affecting the stability of the virtual trading enterprise is its advertising, which is a showcase of online store, as well as brief banners on other websites. Management of Internet advertising - is one of the elements of marketing not only virtual, but for traditional businesses.

Marketing in virtual trade enterprises including logistics and communications functions. Marketing software regards goods, prices, sales promotion, marketing; logistical support covers issues of needed goods, the required quantity and quality, minimize costs, required time, place and the necessary consumers.The use of Internet technologies in marketing allows to communicative functions (advertising, branding the web, public relations, customer support, provide feedback to the target audience),marketing of goods and services.Marketing communications are the mechanism of production and transmission to the target audience the content of the information necessary to form dynamic support and a positive image of the manufacturer (or sales agent of the market). Internet technologies in marketing activities have three groups of functions.

1. Customer service (commercial communications, electronic consumer survey, monitoring visits to the site server or virtual enterprise, sent questionnaires).

2.Communication (advertising and promotion products, advertising campaigns, support for consumer testing of new products to the organization of feedback from customers).

3.Sales and logistics functions(sales via the Internet shops, Internet sales sites of manufacturers, sales through Internet portals).E-sale is the process of establishing an online interaction with a potential buyer for the transfer of the ownership of the goods and the physical transfer of goods. For the implementation of these two actions is necessary to realize several steps. First, to conclude an agreement with the buyer for the sale and payment of goods or services. Second, to provide the customer with the necessary information with fixing it on the server of the virtual trade enterprise. Third, to track the process of delivering the goods to the buyer as from the

seller and from the buyer. Forth, support the payment through online payment systems and fifth, delivery of the goods. At each stage of the transaction with the buyer exist mutual risks: for the seller there are the risks of supply disruptions, non-receipt of payment from the buyer and for the buyer - receiving the product which nonequivalent his image (size, color, quality, specifications, etc.), removal of extra money from the account when paying goods and other types of risks.

Analyze of business activity in the computer network and features the work of virtual trade enterprise leads to the conclusion of the main sources of risks inherent in the economic processes and data objects. The following main causes of each kind of business risks allow their means of control, including the prevention and minimization.

Causes of information risks. Information on the electronic site of the seller may not be accurate. License, copyrights, trade secrets can be stolen because of unauthorized access to the site of the seller. Following unauthorized access to the seller's site the information about customers, suppliers, and payroll and so on can also be stolen or deliberately spoiled, and then be posted on the Internet or sold to competitors. Information contained on the website of the seller, may violate laws of other countries (for example, the similarity of the names of companies, names, etc.). Information, which has been introducedby customers with plastic cards, can be intercepted and used for personal gain. Intellectual property leakage may occur due to the transition of the virtual enterprise workers to competitors.

*Causes of technological risks.*Negligence and errors in the design, as well as for programming the website of the seller. Unauthorized access to the site of the seller. Infecting virus the software of seller is a result of cyber-attacks. Crash the server your Internet service provider. Interception by a third party, such as a plastic card buyer introduced by the client code and the card number when purchasing online seller. Inadequate of speed of seller server to receive and data processing. Outdated hardware and software and as the result is the inability of seller's server to process incoming applications ofclients. Wrong e-commerce integration with the internal base of the company.Improper integration of e-commerce with the internal management processes of the virtual enterprise.Poor site design, leading to long loading of the site and the difficulty of finding the necessary information.

Causes of business risks. Legal risks associated with the use of information that may violate the laws of other actors both traditional and virtual marketplace. Risks associated with the site developers to pay the seller (payment was not fixed in the contract, or not detailed). Lack of financial resources to support the site of the seller. Negative impact on the business because of the transition of personnel to competitors, Changes in relationships with suppliers: access to information, commodity mass distribution strategy, marketing tactics.Lack of mass of commodities due to poor interaction with suppliers. High costs for the delivery of goods and the distribution of the mass of commodities. The inconvenience of returning the goods by the client is a result of lack of coordination with customers.Inability to control the temporary cyclical commodity mass due to incorrect miscalculations turnover ratio. Risks associated with the vulnerability of the site name of the seller, as others can already use this name. Improper integration of e-commerce with the internal management processes within the company.Lack of integration of e-commerce channels of delivery of goods from suppliers.

Many of the risks of the two above-stated groups are interlinked and they tend to repeat. A characteristic feature of these risks is their immediate importance for the Internet trade, but these risks also apply to business is e-commerce, but because at the present stage of development is traced a clear relationship between business and e-commerce, then these risks are common.

Methods for assessing business risks of virtual enterprises. The main problem of enterprises in the face of uncertainty is risk management, which requires a risk assessment, development of methods and models of management.

When assessing the risks using various methods, including the construction of a decision tree with predictable risk factors, the construction of econometric risk factors and obtain an integrated numerical evaluation, expert risk assessment, options for its occurrence and management, theoretical-game approach.

In order to more fully characterize the risks and their level (degree), it is necessary to build a system of hypotheses with alternative solutions, which in ideal can be turned into an expert system for the entrepreneur.Only a specialist in the field of Riskology may carry out this conversion because first, the system of hypotheses requires the testing on truth, then it will be the process of alternatives development to the use of economic and mathematical methods and models. As suggested A.V. Sigal (Sigal,2014), risk management carried out according to the following conceptual scheme: the qualitative analysis - quantitative assessment - accounting and risk management decision-making.Quantitative analysis uses techniques such as analogies method, sensitivity analysis, risk analysis of losses, the method of simulation, statistical methods, expert estimates.Game-theoretic modeling of economic risk more accurately reflects the economic and market situation where the interests of the parties are not the same, and there is no need for undue risk.

The main feature of Internet trading is that it is performed in real time at any time and in any geographic location.In this regard, the corresponding software must maintain a dialogue with the user automatically, creating the appearance of an open shop with traditional retailers.Direct marketing channels for virtual trade companies - is, above all, telemarketing, using the Internet and mobile communications and interactive marketing, but are also traditional channels: the individual sale, but with the use of customer databases, marketing by e-mail or social computer networks, marketing through electronic catalogs and traditional information products.The advantages of Internet technology in telecommunicationshave the following characteristics. First, timely (almost instantaneous if no faults or overloads lines) delivery of relevant information to any place. Second, simultaneous centralization and decentralization; third, the possibility of decision-making at all levels of the management hierarchy; forth, the possibility of rapid revision and updating of plans and programs; fifth, receiving and sending information not only from the workplace; sixth, interactive contact with potential buyers and production partners.

Commercial communication effectiveness can be evaluateon the following criteria (Lebedenko, 2008):

1. Profitability (profitability of promotion and return on assets).

2.Sales (growth rates of the average monthly turnover volume of purchases in monetary terms, the frequency and amount of purchases) income (revenue dynamics and the level of sales).

3.Market share (market share in the number of sales of goods and the proportion of regular customers).

4. Earnings (the size of the gross income).

Overall indicators of communicative efficiency of an electronic resource may be as follows. On the technological norms the indicators mean, first, the concordance the name of the site its thematic focus. Second, the ease of finding resources on the network, third, the speed of access to the resource, forth, the price of hour job site, fifth, the speed and qualities of pages load and its open ability (opening speed, matching the page link, completeness represented on this website information, the opportunity to return to the previous or home page).The content indicators of the information provided in the site are accordance it to the intended audience and purpose of the site; lack of grammatical and stylistic errors; completeness and accuracy of the information filed; timely periodic updating of data, their relevance and more information is available.On the criterion of navigation: the logical structure of the site organization, correct references and correspond to the contents, usability navigation.By design criteria: the quality of graphics and its load; accordance for marketing objectives the line style and color; ease of page layout, efficient use of page space; lightness perception interface and text.Interactivity criteria: the presence of contact information, a variety of communication options; the availability of additional services (forums, chat rooms, conferences, guest books, surveys); assistance to users (virtual managers and salespeople are able to give advice on the choice of the goods); responsiveness to customer requests; various forms of payment for the goods and their delivery.These criteria are universal for all virtual trading companies and can use for qualitative and quantitative assessment of its work, planning and adjustment activities at any stage.

In the activities of the virtual trade enterprise also important the marketing based on relationships, which allows you to build long-term relationships with customers in order to increase the duration of their life cycle and increase the level of satisfaction from the goods or services received.The virtual relationship of seller and buyer involved factors such as equality, support for constant dialogue, mutual trust, and mutual benefit. The added value of goods or services is created in the course of the relationship; the buyer becomes the follower of the virtual trading company, its brands and, as a result, participates in advertising of goods or services, but the e-shop.

Agents of advertising services market are the advertisers, advertising producers, distributors and consumers of advertising, but in the case of Internet advertising a software package is also included and facilitates the work of the first three groups of agents.Internet advertising is a means of marketing communications in an interactive environment it has an impact on consumer awareness, ensure their needs for goods or services, changes the behavior of the buyer in respect of the goods and leads to its acquisition. Advertising is classified on the following signs. First, the basis of the breadth of coverage of the target audience. Second, the type of presentation of the advertising information and the area occupied by it (the banner on the screen), third, a method of influence on the consumer, forth, the effect of the duration of the viewing of advertising, fifth, the supplying technology, the position on the website and the method of contacting the consumer advertising.

When managing Internet advertising and interactive communications implementation must take into account the specifics of Internet users, their knowledge of other goods and on similar products of other commercial enterprises, greater openness of new products, preference the value of the cost of goods or services.Consumer behavior - it is their action aimed at obtaining, consumption or using of goods or services, taking into account their prices and personal incomes.The consumer behavior - namely, the Internet user, depends on a number of new factors, and differs from the consumer behavior in the traditional trade in the context of a virtually unlimited choice.The stereotypes of consumer behavior to be followed by the sellers, it is necessary to take into account their dynamic change, identify patterns of change, to fix the situation, in which the changes consumer behavior and keep track of the turning point in their behavior. Databases of Internet store, which store the acquired specific consumer goods, time and frequency of their purchases, money spent, as well as personal data that ask many sellers, registering buyers play a role in predicting consumer behavior.The stored information about each buyer, the history of his purchases, information about age, sex, allow the seller to do his personal proposal, congratulate the holidays and present gifts.This trade policy is only possible under the conditions of use of modern information technology and the Internet it allows to achieve maximum efficiency of the enterprise, forming a stable positive relationship with customers.There is almost impossible a conflict between buyer and seller in the virtual environment, interpersonal hostility, which reduces the risk of communication, forms a friendly way both the buyer and the seller.

Creation of a virtual enterprise is an innovation and investment project, for manage risks they can be divided into three groups of risks.They are violation of the partners of their contractual obligations,market risks and other risks, including new technologies and political risks.The first group of risks are into account in the discount rate, the project's revenues and expenses. This group of risk will affect in different ways: to assess the loss of income is necessary to consider the likelihood of breach of contract on the part of partners and the share of the budget, which is lost in the event of a risk.These risks evaluated by the expert or probabilistic methods.The second group - market risks, they can be taken into account in the project scenario analysis, which is based on the use of probability theory and mathematical statistics methods and involves a numerical definition of the values of individual risks and the risk of the project as a whole.Costs for other risks may be considered as a risk premium. The proposed approach for virtual enterprises requires a number of regulations, including insurance risks of economic activities in the Internet virtual environment, the government classification of the Internet business, monitoring of transactions and payments with the use of information and communication technologies.There are various investment processes management concepts, one of which is a project-based approach, considering the movement of

investment cash flows, taking into account risk. This allows you to build a predictive model for the implementation of the volume of sales, optimize capital investment, project risk assessment.

There are four stages of analysis investment risks (Glebova, 165).The first stage - is forecasting sales to formalize uncertainty.The second step is to assess the investment risk, taking into account the current activities of the individual investor's tolerance. The objective of this phase is to determine the optimal pricing strategy of the enterprise for specific conditions. The optimization criteria are, on the one hand, to minimize the risk of claims, and on the other - the maximization of revenue.The third stage of the methodological approach includes calculation of the risks of investing in the current activities of the company to introduce new production technologies using the methods of scenario analysis and simulation.The fourth stage takes into account the risk of the formation of the optimal structure of portfolio sales. The variance of sales for each product can use also as a risk indicator.This technique is used and convenient for virtual enterprises, because the using information technology can automatically records sales in any given period of time, allows us to calculate the risk index to represent him in visualized form of, for example, in the form of a graph, that contributes to the rapid and accurate management decisions for entrepreneur or a partner.

Economic risks evaluation. The economic risks of virtual enterprises can be simulation with main following elements of model.

1. Economic and statistical model of the risks of external nature, which include the uncertainty of the macroeconomic business development strategies, unforeseen changes in legislation, changes in the foreign policy of the state, changes in demand for goods and services.

2. Modelling the impact of emergencies on the activities of the company, made on indicators of economic stability, the simulation of market and financial risks, based on multivariate analysis. These models allow us to evaluate internal and external risks of virtual enterprises.

We have analyzed the activities of five commercial enterprises operating in the computer network of the Internet as a virtual enterprise. The main factors of their activity were determined: Y - income, x_1– cost price of products, x_2 - working capital, x_3 - trading margin, x_4 - advertising costs, x_5 - the number of employees. For each factor the group of experts from among business leaders was define the risk as a parameter in the range from 1 to 10 (10 is the highest risk).Risk of income in the virtual enterprise has been estimated at 6 points, the risk of cost price of products has 9 points (the highest), working capital – 8, trading margin – 5, advertising costs – 7 and the number of employees - 5. To calculate the significance of the data factors averaged and normalized (Table 1).The calculated correlation coefficients between pairs of factors and the value of the function (Table 2) have shown a high correlation factor, which makes it impossible to build a single linear regression equation for the function of the income of all factors. Therefore, we have constructed a regression equation for each pair of factors (see table 3), t-statistics calculated for each factor and coefficient of determination R^2 for each equation.In the results of calculations, the significant factors were the cost price of products and working capital.

Table 1

Normalized values of factors

Years/factors	Y	x_1	x_2	x_3	x_4	x_5
2006	0.69396	0.83036	0.79406	0.6	0.58294	0.72727
2007	0.7353	0.9053	0.86006	0.6	0.90225	0.80909
2008	1	1	1	1	1	1
2009	0	0	0	0	0	0.14242
2010	0.38002	0.26118	0.29281	0.6	0.20306	0.18182
2011	0.40763	0.31124	0.33689	0.6	0.26789	0
2012	0.48767	0.45634	0.46468	0.6	0.31804	0.03333
2013	0.24262	0.01207	0.07342	0.6	0.49542	0.03333

Table 2

Correlations between factors

	Y	x_1	x_2	x_3	x_4	x_5
Y	1	0.95859	0.97479	0.84147	0.8863	0.83894
x_1	0.95859	1	0.99797	0.65694	0.84297	0.89785
x_2	0.97479	0.99797	1	0.70297	0.85876	0.89116
x_3	0.84147	0.65694	0.70297	1	0.75268	0.49992
x_4	0.8863	0.84297	0.85876	0.75268	1	0.84809
x_5	0.83894	0.89785	0.89116	0.49992	0.84809	1

Table 3

Regression models of commercial factors, taking into account the risks

Regression equation	Coefficient of determination R^2
$Y = 0.562x_1 + 0.429x_3 - 0.018$	0.998881
$Y = 0.637x_2 + 0.355x_3 - 0.015$	0.999228
$Y = 0.527 x_4 + 0.463 x_3 - 0.021$	0.925022
$Y = 0.426 x_5 + 0.648 x_3 - 0.035$	0.970214

Table 4

The importance of commercial factors in the regression models

Factor	Point of risk	t-statistics	Importance of factor
Income (Y)	6		
Cost price of products (x_1)	9	3.782491	YES
Working capital (x_2)	8	4.420603	YES
Trading margin (x_3)	5	0.849437	NO
Advertising costs (x_4)	7	1.091264	NO
Численность работников (x_5)	5	1.378232	NO

Price risks evaluation. Virtual enterprise begins with the development of the investment project and there are first risks at this stage. In the analysis of the risk of the investment project and its implementation are invited to consider the loss of certain types of risks, the loss of one of the elements of the investment portfolio, as well as the probable maximum loss. To determine the level of risk using statistical techniques, methods appropriateness of costs, expert assessments, analogies and analytical method. In many economic and mathematical models as a risk indicator, be taken of the standard deviation of the random variable characterizing the results, but for the market environment, this indicator does not reflect the real situation. In our opinion, if the investors of trading virtual enterprise are the customers - Internet users, the investment risks at each stage of the sales (or each sale) it is advisable to measure as the index of volatility (financial statistical measure of the variability of prices), acting on the Forex financial market.

Volatility measured in order to keep track of price fluctuations as one of the components of risk. Market price changes over time tend to stock price fluctuations make 2-4% per day, less susceptible to fluctuations in property prices. Historical volatility calculated as the standard deviation of the price of the average price of this product (share). Historical volatility calculated for the year, it makes it possible to obtain the expected volatility of the index. Expected volatility is dependent on: 1) the historical volatility; 2) political and economic situation; 3) supply and demand

on the market (when supply exceeds demand, prices fall, and vice versa).Expected volatility calculated based on the current value of a financial instrument on the assumption that the market value reflects the expected risks. Volatility characterized by certain features: cyclical, consistency and desire for the middle and because it is more predictable than price, since is in a predetermined range, this quality of volatility can predict the behavior of an entrepreneur in the market.

Given that the Internet works as an auction, price fluctuations on the same goods during the day can be quite high. Prices are easily tracked by the buyer and compared among different vendors while the smallest price select from found set or the most, at the buyer's opinion, the relevant criterion of "price-quality".With falling the sales, the investments reduced and the risk of non-repayment of the core investor (the seller) will increase.To determine the indicator of volatility, you must have special software to monitor the actions of competitors in the virtual market or collection of such data must engaged the persons in the marketing service of the virtual enterprise.Volatility is a measure of a financial instrument risk and of the price in the case of the analysis of virtual market. Volatility reflects the rate of price movements, for the virtual enterprise, it allows you to adjust pricing and reflects the saturation of the market this type of product or group of products. The higher the volatility of this product, the higher the supply, and therefore, the employer must either reduce the price, or to update the assortment.

Classical calculation of historical volatility suggests the comparing prices over time and calculation the ratio of two prices of two adjacent periods. We will calculate the price pairs for virtual online shopping market for the same goods, acting on the following algorithm.

1. The construction of a triangular matrix of pairs of relations eponymous commodity prices (the dimension of the matrix (n - 1) x (n - 1), where n - the number of stores that sell this product).

2. The calculation the matrix of the natural logarithm of pairsof relations prices.

3. Calculation of the mean value logarithms of pairsof relations prices.

4. Calculation of volatility as the standard deviation (dispersion) logarithms of pairsof relations prices.

We analyzed the prices of household appliances in Internet shops in Russia and Ukraine, seven stores investigated and five types of products (TV, Fridge, Cooker, Tablet PC and Mobile phone) each product of the same brand.After the calculation and the analysis of volatilities,we see that the highest volatility, which is equal to 0,014, it is for the prices of goods Fridge and it means that the market saturates with this type of product and for sales success is necessary to reduce the price.Low volatility, which is equal to 0.001, is the Tablet PC price, which means that further sales of this product will be success at current prices. This conclusion confirmed by the actual sales.In the proposed approach, the volatility serves, as a measure of the price change is not in time, as it understood in the traditional sense, but as a gradient index of prices and price risk of virtual enterprise in the virtual space of Internet.

Conclusion. Use of the Internet in economic activity has led to a constant increase in the number of virtual enterprises and new risks for entrepreneurs. These enterprises have special principles of works and stable, their advantages are the possibility of permanent use of information technology, monitoring the behavior of competitors and consumers and methods of mathematical modeling directly in the operation of the Internet.

Risks of virtual enterprises can be united in three groups: information, technological and commercial risks. The more important is the first group:misinformation of buyers and sellers; cyber-attacks which violated the integrity of the information of the seller and her abduction; interception and use for personal gain information from the cards and leaked knowledge of the virtual enterprise and its intellectual property as a result of human error.The factors of technological group of risks are errors in the design and programming of the web site, outdated hardware and software without proper integration of e-commerce systems with internal management processes of virtual enterprise. Commercial risks associated with the lack of financial resources, transfer of personnel to competitors, marketing and logistics errors that occur because of failures in the process of communication through the Internet and infringement of the integrity the databases of the virtual enterprise.

157

Virtual enterprises are the economic activity similar to the traditional enterprise, but carried out in a computer on the Internet, so the indicators of its economic activities coincide with the traditional, but each of these indicators also reflectsthe factor of risk.Regression models for commercial factors, taking into account the risks showed that represent the greatest risk are the prime cost and capital turnover.

Internet making it possible to carry out the sale and purchase in real time, at any time and in any geographic location, influence the choice of the consumer, who can analyze the prices of different virtual enterprises at a given time.This causes the need to track virtual market prices and sellers changethe prices on specific products, depending on the saturation of the market segment.Volatility index, adapted to the space of the Internet virtual market, helped to solve the problem and to determine thereby, the goods with the highest offer and, accordingly, the goods with the lowest offer that allows the seller to adjust the own range of products and prices.

Summary, the classification of virtual enterprises risk gave the possibility to define three main groups of risks and they causes; to build the mathematical model of traditional economic indicators with risk account; to use the volatility index to Internet market for assessment of virtual enterprises risks and identify the demand, supply and the price on the commodity.

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Без рецензії.

д.е.н., д.пед.н., проф. Наталія Апатова, д.філос. Станіслав Малков

ОЦІНКА РИЗИКІВ ВІРТУАЛЬНИХ ПІДПРИЄМСТВ

Віртуальне підприємство являє собою новий тип економічної діяльності, яка поєднує в собі традиційні бізнес-ризики і ризики віртуального простору. У статті описується класифікація ризиків віртуальних підприємств, що дало можливість визначити три основні групи ризиків і їх причини; побудувати математичну модель традиційних економічних показників з урахуванням ризику; використовувати індекс волатильності ринку Інтернет-послуг для оцінки ризиків віртуальних підприємств і визначити попит, пропозиціюта ціну на товар. Модель і метод з використанням індексу волатильності ілюструється прикладами з практики.

Ключові слова: віртуальне підприємство, оцінка ризику, математична модель, індекс волатильності, інтернет-ринок, індикатор ризику, причини ризику

д.э.н., д.пед.н., проф. Наталья Апатова, д.филос. Станислав Малков

ОЦЕНКА РИСКОВ ВИРТУАЛЬНЫХ ПРЕДПРИЯТИЙ

Виртуальное предприятие представляет собой новый тип экономической деятельности, которая сочетает в себе традиционные бизнес-риски и риски виртуального пространства. В статье описывается классификация рисковвиртуальных предприятий, что дало возможность определить три основные группы рисков и их причины; построить математическую модель традиционных экономических показателей с учетом риска; использовать индекс волатильности рынка Интернет-услуг для оценки рисков виртуальных предприятий и определить спрос, предложение и цена на товар. Модель и метод с использованием индекса волатильности иллюстрируется примерами из практики.

Ключевые слова: виртуальное предприятие, оценка риска, математическая модель, индекс волатильности, интернет-рынок, индикатор риска, причины риска.