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DEVELOPING THE MECHANISM OF QUALITATIVE RISK ASSESSMENT IN STRATEGIC CONTROLLING

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A mechanism has been developed for assessing a company's strategic risks and selecting the risk factors on which the risk management actions of the company must be focused. The risk factors are projections of the company's internal and external environment which create its competitive advantages but are exposed to the most dangerous threats. The mechanism is an integral part of strategic risk controlling, the application of strategic controlling to risk management, and was built as a set of interrelated procedures which perform the selection of risk factors. The design of the mechanism is based on the integration of strategic analysis of fthe company's value chain and failure mode and effects analysis (FMEA). This design, unlike that of the alternatives, allows maximum accounting for the majority of links and correlations among strategic goals, projections and risks. The paper elaborates on the main tasks and functions of strategic risk controlling and shows the advantages of integration of value chain analysis and FMEA in a single risk assessment mechanism. It works out the flow chart of the mechanism of assessment of the company's strategic risks. It develops the procedure of calculation of FMEA's risk scores (risk priority numbers (RPNs)) for individual end-risks; at the level of each strategic perspective and at the level of the entire strategy. It develops the procedure of selecting the optimal strategy among the strategic alternatives using the Hurwicz minimax criterion in which strategy-level PRNs are utilized as the measures of risks. Finally, the paper works out the procedure for choosing the risk factors among strategic perspectives and develops the key tool of this procedure, the risk-factor positioning matrix. This matrix allows searching for the optimal ways and tools of risk control. The mechanism allows increasing the efficiency of risk management in strategic controlling and concentrating the management's attention on the company's strategic factors which are exposed to the most dangerous risks.

Keywords: risk management; strategic controlling; risk controlling; analysis of company value chain; failure mode and effects analysis (FMEA); strategic risk assessment

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РАЗРАБОТКА МЕХАНИЗМА КАЧЕСТВЕННОЙ ОЦЕНКИ РИСКОВ В СТРАТЕГИЧЕСКОМ КОНТРОЛЛИНГЕ

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Разработан механизм оценки стратегических рисков компании и отбора факторов риска, на которых должны быть сосредоточены основные усилия по управлению рисками в компании. Под факторами рисками понимаются проекции внешней и внутренней среды компании, которые создают ее конкурентное преимущество, но при этом подвергаются наиболее опасным угрозам. Механизм является неотъемлемой частью стратегического риск-контроллинга, приложения стратегического кон-

троллинга к управлению рисками и представляет собой набор взаимосвязанных методик, обеспечивающих пошаговый отбор факторов риска. Он построен с помощью интеграции метода стратегического анализа цепочки ценностей компании и метода анализа видов и последствий отказов (FMEA). Такой подход, в отличие от альтернатив, позволяет максимально учесть связи и корреляции между стратегическими целями, проекциями и рисками. Рассмотрены основные задачи и функции стратегического риск-контроллинга в компании, а также исследованы методы анализа цепочки ценностей и FMEA и обоснованы преимущества их интеграции в едином механизме оценки рисков. Подготовлена блок-схема механизма оценки стратегических рисков компании и отбора факторов риска. В ходе разработки механизма выработана методика расчёта показателей критичности проявления рисков (ПЧР) как для отдельных рисков, так и на уровне каждой стратегической проекции, а также стратегии в целом. Предложена методика выбора базовой стратегии из имеющихся альтернатив с помощью критерия пессимизма − оптимизма Гурвица, в котором в качестве меры риска используются ПЧР. Разработана методика отбора факторов риска и её ключевой инструмент − матрица позиционирования факторов риска, которая также позволяет определить оптимальные способы и инструменты контроля над рисками. Механизм позволяет повысить результативность управления рисками в стратегическом контроллинге и сконцентрировать внимание руководства компании на ее стратегических проекциях, подверженных наиболее опасным угрозам.

Ключевые слова: управление рисками; стратегический контроллинг; риск-контроллинг; метод анализа видов и последствий потенциальных дефектов (FMEA); метод анализа цепочек ценностей; оценка стратегических рисков

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Introduction. Improving the framework and tools of strategic risk management (SRM) is a problem of today's primary importance. This is due to the growth of uncertainty, dynamics and turbulence of the business environment [1, 6, 21]. The review of literature [2, 6, 7, 9, 16, 21] shows that the effectiveness of SRM can be significantly enhanced if the management focuses only on those factors of competitiveness (FCs) which are the exposed to the most dangerous threats (these FCs are called risk factors (FRs)). One of the most efficient approaches to selecting FRs is to apply the mechanisms integrating the methods of strategic analysis and the methods of risk assessment from engineering science (e.g., failure mode and effects analysis (FMEA)) [2, 15, 20]. For example, in [9], Sutrisno et al. developed a mechanism which integrated strength, weaknesses, opportunities and threats analysis (SWOT) and FMEA. However, it has a number of issues: it is static, it does not account for the correlation between the strategic goals and FRs and, more importantly, it does not segregate the factors of success or failure from the basic conditions of competitiveness. At the same time, the analysis of Russian literature revealed that even though there were a large number of papers on SRM [15], only few of them applied the integrated mechanisms described above. Consequently, these few studies concentrated on very narrow fields, e.g., assessment of risks in research and development of new equipment, quality management or qualitative risk assessment of small investment projects [3−5, 15, 20].

The scope of the paper. The goal of this paper is to develop a mechanism for assessing a company's strategic risks and for selecting the FRs on which SRM's activities will be focused. The risk assessment with the mechanism is qualitative because it is performed with application of a discrete ordinary scale with 10 grades (see discussion below).

The mechanism integrates strategic analysis of the company's value chain (VC) and FMEA and is an integral part of the company's process of primary strategic risk analysis. It is applied in strategic risk controlling (SRC) which is the application of methods of strategic controlling to SRM [21]. The advantages of SRC over «conventional» SRM are listed in [13]. Among them, the most important advantages are flexibility and efficiency. The suggested mechanism enhances these qualities because it helps optimizing the usage of the company's management resources.

Table 1

FMEA rating scale

Scale	Severity of losses (Y)	Probability of occurrence (P)	Probability of detection (C)
1	None	Remote: failure is unlikely	Almost certain
2	Very minor	Low: very few failures	Very high
3	Minor	Low: relatively few failures	High
4	Very low	Moderately low: infrequent failures	Moderately high
5	Low	Moderate: occasional failures	Moderate
6	Moderate	Moderately high: frequent failures	Low
7	High	High: failures occur often	Very low
8	Very high	Very high: repeated failures	Remote
9	Extremely high	Extremely high: failures occur almost as often as not	Very remote
10	Dangerously high	Dangerously high: failure is inevitable	Absolute uncertainty

The company's VC is the synergetic sum of all of the company's FCs; the primary purpose of VC is to create competitive advantages for the company [2, 21]. By FCs we understand the important and interrelated business operations (both internal and external) which, taken as a system, create the products with the value for the customers [21]. After performing the strategic analysis of VC and relationships among them, the managers understand which FCs contribute to the company's success, which FCs are in line with those of the competitors; and which FCs are the source of the company's strategic weaknesses [14]. In turn, FMEA is a method of qualitative analysis aimed at early detection and assessment of causes and effects of risks. It is also applied as a tool for risk remediation planning in complex systems [2]. By using FMEA, managers can (1) identify the end-risks in FCs and their causes; (2) evaluate the potential losses from these risks; (3) assess if the company's control systems are able to timely detect these risks; and (4) select the FRs to focus on. In FMEA, the criticality of risks is assessed by the risk priority numbers (RPNs). In turn, each RPN is a multiplication of three sub-ratings: the severity of potential losses from the risk (Y); the probability of the risk's occurrence (P); and the probability of early detection of the risk (C (Tab. 1).

We worked out a flow chart of the mechanism (Fig. 1). It shows that the mechanism is an inherent part of the company's business process of primary analysis of its strategic risks. It consists of the following key steps (highlighted in the flow chart): (1) analysis of the company's value chain and selection of strategic perspectives defining the company's strategic success or failure; (2) identification of end risks and their assessment with FMEA; (3) selection of the master strategy from the alternatives; and (4) selection of risk factors from strategic perspectives on which the activities in SRC will be focused on.

The inputs of the mechanism are alternative strategies of the company [10, 11] which are documented in the company's strategic plan. The key elements of the plan are:

a) The main strategic goal of the company (MSG). This goal describes the company's future in the best possible way. To measure the level of achievement of the MSG, a special control indicator is developed, the indicator of main strategic goal (SGI); for example, the economic value added [6] or the net present value of incremental cash flows [21];

b) Strategic goals (SGs) of FCs which are necessary to achieve the MSG. To measure the achievement of each SG, the sets of control indicators (CIs) are developed [21];

c) The targets for SGs and detailed plans of achievement of each SG;

d) The strategic map. This is a diagram documenting the complete system of SGs, FCs, CIs and the relationships between them [21].

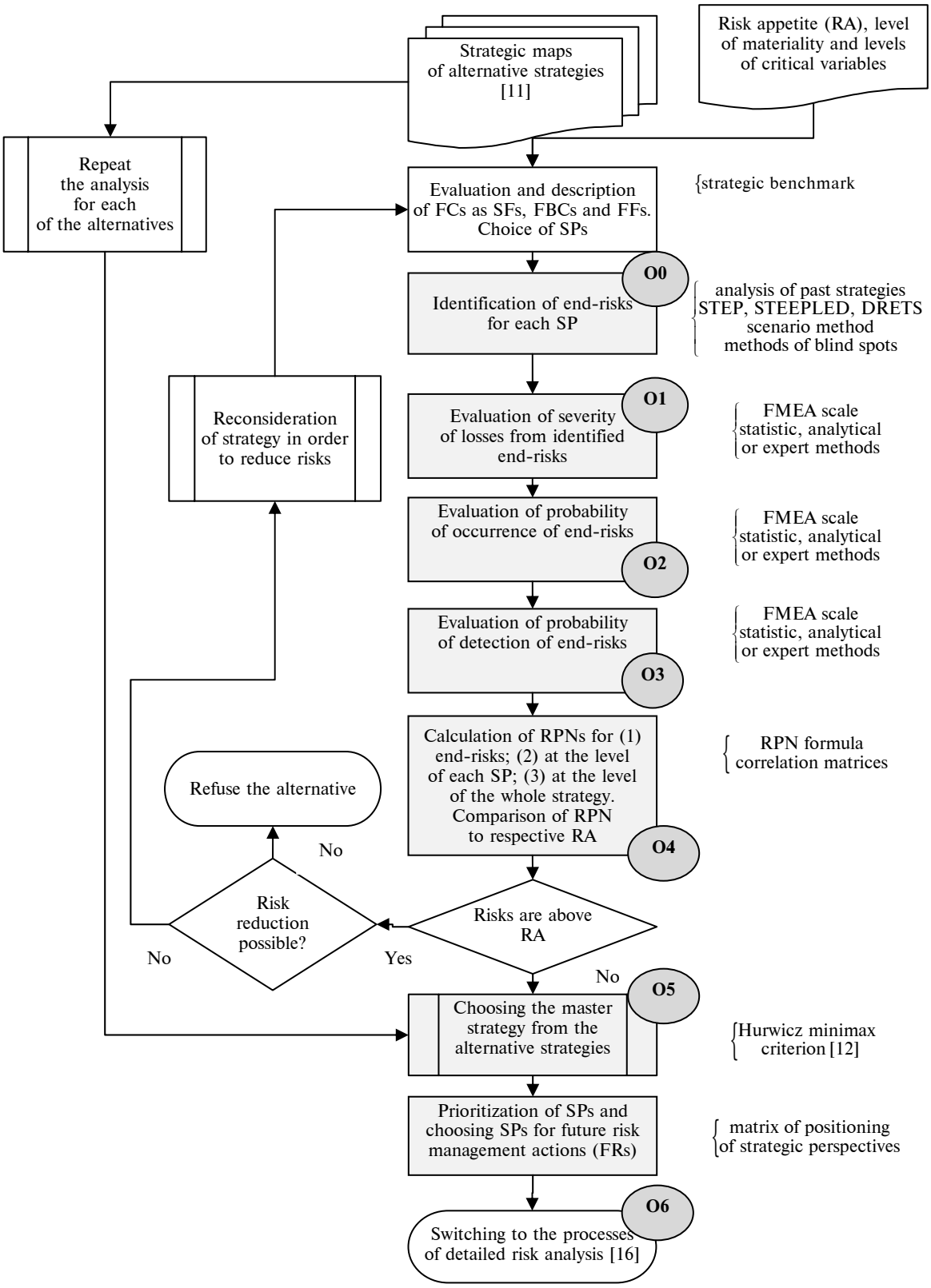

Fig 1. Flow chart of the mechanism of assessment of the company's strategic risks and selection of risk factors

The first step of the mechanism (operation O0) is to analyze the company's VC and to classify all FCs on the map as success factors, factors of basic competitiveness and factors of failures. Factors of success are the key drivers of the company's competitive advantage. Factors of basic competitiveness are the FCs whose levels of maturity coincide with those of the company's peers and sufficient to maintain the company's competitiveness against peers. Factors of failure are the company's weak links and/or the bottlenecks which likely to be the source of the company's future troubles. The company's management focus must be on factors of success and factors of failure (we called these FCs strategic perspectives (SPs) because these FCs determine the company's ability to withstand the competition in long-term perspective. Consequently, the operating risk controlling (ORC), the operating arm of risk controlling, should focus on factors of basic competitiveness because they determine the company's competitiveness on a day-to-day basis [21]. The above classification is performed by methods of strategic benchmarking [21]. The second step of the mechanism is to identify the end-risks which can preclude the company from achieving its strategic goals. At this step, the full list of the end-risks impacting the SPs should be developed. To identify the risks of external environment, strategic analysis methods such as STEP, STEEPLED or DRETS [10, 21], as well as the method of blind spots are applied. Conversely, to identify the internal end-risks, business process analysis is applied [10, 21].

The next four steps of the mechanism consist of qualitative assessment of the end-risks by using FMEA (operations O1-O4). The results of this assessment are passed to the seventh step at which the managers select the master strategy out of strategic alternatives [10] (operation O5). Finally, the managers evaluate the FCs of the master strategy, select FRs (operation O6) and identify the framework and tools of the risk control and detection system.

Application of FMEA to assess the end-risks. The incoming information for these steps is:

a) The strategic plan and the list of SPs chosen at step O0;

b) The set of end-risks emerging at the level of each SP, $R = \{r_{ij}\}$, i is the number of the SP, I = 1,N; j is the number of the end-risk; and the sets of CIs which are impacted by risks from the set R. The sets of CIs form vectors X_{ij};

c) The critical variance of SGI from the target set in the strategic plan V^{cr}. Exceeding this critical value means the failure of the strategy;

d) The minimal possible variance of SGI from the target (V^{min}). If the variance is below V^{min} than it is considered non-material.

To perform all the procedures in the mechanism, the team of the company's experts and specialists (the expert team) is formed. Initially, the team defines and approves: (1) the policies and procedures for decision making and communication both inside the team and between the team and decision makers (DMs); (2) the sources of information for analysis; and (3) methods of risk assessment (e.g., statistic, analytical or expert methods) [16, 18, 20].

The evaluation of severity of losses (procedure O1). In the current setting, by the severity of losses we understand the variance of CIs and SGI from the strategic targets. The expert team, in co-operation with the strategic management teams, using the selected method of risk assessment, estimates the variances of CIs in case of occurrence of r_{ij}. These variances form the vectors of CI variances, VX_{ij}. By using VX_{ij}, the team estimates the expected variance of SGI from the strategic target as a result of occurrence of each risk r_{ij}.

$$V_{ij}^{r} = SG_{ij} - SG_{f}. \quad (1)$$

V_{ij}^{r} is the expected variance of SGI from the target

SG_{ij} is the expected value of SGI as a result of occurrence of r_{ij}.

SG_f is the target value of SGI.

Then the V_{ij}^{r} value is correlated with the ranking of the deviation significance by the FMEA scale (Tab. 1). The same analysis is repeated for all r_{ij} and all SPs.

$$Y_{ij} = \begin{cases} 1 \, if \, V_{ij}^{r} \le V^{min}, \\ \left(\dfrac{V_{ij}^{r} - V^{min}}{V^{cr} - V^{min}} \right) 10, \\ 10 \, if \, V_{ij}^{r} \ge V^{cr}. \end{cases} \quad (2)$$

Assessment of the probabilities of the occurrence of individual risks (operation O2). The expert team, in co-operation with the company's strategic planning units, assesses the probability (p_{ij}) of occurrence of each risk r_{ij} by using the selected method of analysis. In case of applying statistical methods of data analysis, the team uses the ratio of frequency of failures to the size of the sample [21]. For new and/or emerging risks (for which the data do not exist or are unreliable), expert methods can be applied. Examples of such methods include: the additive multiplication model developed by Orlov [15, 19] or modifications of the Elmery method [10]. After the exert team assesses p_{ij}, it determines the corresponding rating of the probability of occurrence by using formula 3 and the FMEA scale (Tab. 1). This analysis is repeated for all risks r_{ij} in all strategic perspectives.

$$P_{ij} = \begin{cases} 1, if\ p_{ij} \in [0; 0.1), \\ p_{ij} \cdot 10, if\ p_{ij} \in [0.1; 0.9], \\ 10, if\ p_{ij} \in (0.9; 1]. \end{cases} \quad (3)$$

Assessment of probability of risk detection at the level of SP (operation O3). The probability of risk detection is a complex rating:

$$c_{ij} = c_{ij}^1 c_{ij}^2 \ . \quad (4)$$

c_{ij} is the probability of detection of risk r_{ij}

c_{ij}^1 is the probability of early detection of risk by existing control tools;

c_{ij}^2 is the adjusting coefficient taking into account the cost of detection system.

By early risk detection we understand that the time period between the moment of detection of the first signals about the risk's occurrence and the end of the risk's remediation must not exceed the time period during which the risk is fully realized. In the opposite case $c_{ij}^1 = 0$. To evaluate c_{ij}^1, if past empirical data is sufficient, the expert team can use the ratio of the frequency of prevented risks to the total number of risks occurred. However, if the risk is new or emerging and empirical data are not reliable, then c_{ij}^1 can be assessed by expert methods and/or with the analogy method. In turn, we suggest using the indicator of the risk detection capability of the company's control system as a proxy for the adjusting coefficient c_{ij}^2. The detailed formula and an example of calculating this coefficient are presented in [21].

After the expert team assesses $c_{ij,}$, it identifies the corresponding rating of the probability of risk detection (by the FMEA scale (Tab. 1)). Formula (5) is applied:

$$C_{ij} = \begin{cases} 1, if\ (1 - c_{ij}) \in [0; 0.1), \\ c_{ij} \cdot 10, if\ (1 - c_{ij}) \in [0.1; 0.9], \\ 10, if\ (1 - c_{ij}) \in (0.9; 1]. \end{cases} \quad (5)$$

The same analysis is repeated for all risks r_{ij} in all strategic perspectives.

Calculation of risk priority numbers at different levels of the company operation O4). The RPN for each risks r_{ij} (RPN_{ij}) is calculated by the following expression:

$$RPN_{ij} = Y_{ij} P_{ij} C_{ij} \ . \quad (6)$$

The expert team determines and approves with the DMs the following boundaries: (1) the materiality level RPN_{ij}^{min} below which the risk r_{ij} can be considered non-material; and (2) the risk appetite RPN_{ij}^{ra}, describing the maximum quantity of risk r_{ij} which the company is ready to accept. The DMs can decide to set unified levels of materiality and risk appetite for all risks from the set R. In this case, the expert team operates by only two boundaries: RPN^{min} and RPN^{ra}.

To calculate the consolidated RPNs at the level of each SP, the correlation between the risks from the set R should be considered. We recommend to estimate these correlations by using the expert methods [9]. However, it is possible to apply the statistic methods in this case if the company has the sufficient pool of data to evaluate these correlations [15]. Let us define the matrix of pair correlation between the risks at the level of strategic perspective with the number i.

$$\widehat{A}_i = \begin{pmatrix} a_{11}^i & \cdots & a_{1M}^i \\ \vdots & \ddots & \vdots \\ a_{M1}^i & \cdots & a_{MM}^i \end{pmatrix} \quad (7)$$

a_{jm}^i is the pair correlation coefficient between risks j ($j \in [1, M]$) and m ($m \in [1, M]$)

$a^i_{jm} = \mp 0.3$ if weak positive or negative correlation exists between risks j and m;

$a^i_{jm} = \mp 0.6$ if medium positive or negative correlation exists between risks j and m;

$a^i_{jm} = \mp 0.9$ if strong positive or negative correlation exists between risks j and m;

$a^i_{jm} = 0$ if there is no correlation between risks j and m

Let us denote $\widehat{PN_i} = \begin{pmatrix} RPN_{i1} \\ RPN_{i2} \\ \cdots \\ RPN_{iM} \end{pmatrix}$ as a vector of RPNs for the risks r_{ij} at the level of SP with the number i. The consolidated RPN at the level of SP with the number i (RPN_i) equals:

$$RPN_i = \widehat{PN_i}\,\widehat{A_i}\ . \quad (8)$$

The materiality level and the risk appetite at the level of SP with the number i are calculated by using the following expressions:

$$RPN_i^{min} = \widehat{PN_i^{min}}\,\widehat{A_i};\ \widehat{PN_i^{min}} = \begin{pmatrix} RPN_{i1}^{min} \\ RPN_{i2}^{min} \\ \cdots \\ RPN_{iM}^{min} \end{pmatrix}; \quad (9)$$

$$RPN_i^{ra} = \widehat{PN_i^{ra}}\,\widehat{A_i};\ \widehat{PN_i^{ra}} = \begin{pmatrix} RPN_{i1}^{ra} \\ RPN_{i2}^{ra} \\ \cdots \\ RPN_{iM}^{ra} \end{pmatrix}. \quad (10)$$

To calculate the RPN for the strategic alternative as a whole, we define the matrix of pair correlation between the SPs. The same rules as in (7) are applied to define the correlation coefficients b_{il}

$$\widehat{B} = \begin{pmatrix} b_{11} & \cdots & b_{1L} \\ \vdots & \ddots & \vdots \\ b_{L1} & \cdots & b_{LL} \end{pmatrix}. \quad (11)$$

The RPN at the level of the strategic alternative is calculated by using the following formulas:

$$\widehat{TPN} = \begin{pmatrix} RPN_1 \\ RPN_2 \\ \cdots \\ RPN_N \end{pmatrix};\ RPN = \widehat{TPN}\,\widehat{B}; \quad (12)$$

$$RPN^{min} = \widehat{TPN^{min}}\,\widehat{B};\ \widehat{TPN^{min}} = \begin{pmatrix} RPN_1^{min} \\ RPN_2^{min} \\ \cdots \\ RPN_N^{min} \end{pmatrix}; \quad (13)$$

$$RPN^{ra} = \widehat{TPN^{ra}}\,\widehat{B};\ \widehat{TPN^{ra}} = \begin{pmatrix} RPN_1^{ra} \\ RPN_2^{ra} \\ \cdots \\ RPN_N^{ra} \end{pmatrix}. \quad (14)$$

To estimate the risk exposures of each strategic alternative, the members of the expert team compare the strategic alternative's RPN with the risk appetite RPN^{ra}. If $RPN < RPN^{ra}$, then the strategic alternative is qualified in the list from which the master strategy will be then selected. If $RPN > RPN^{ra}$ than this strategic alterative is either rejected or returned for reworking in the strategic planning department. If $RPN < RPN^{ra}$, but the strategic alternative contains one or several SPs for which $RPN_{ij} > RPN_{ij}^{ra}$, the following options are possible: (1) to accept this strategy for further consideration but, if it were selected as a master strategy, to develop and implement for it the reinforced methods of control in those SPs where $RPN_i > RPN_i^{ra}$; or (2) to return the strategy for reworking.

The sixth step of the mechanism is to select the master strategy from the set of strategic alternatives. We suggest using the Hurwicz minimax [12] for this purpose. In combination with RPNs for each strategic alternative, this criterion can be written as:

$$max\left\{CrG_z\right\}_{z\in[1,Z]} = \\ = \max\left\{\frac{RPN_z}{1000}SG_z^{pess} + \left(1 - \frac{RPN_z}{1000}\right)SG_z^{nr}\right\}_{z\epsilon[1,Z]}. \quad (15)$$

CrG_z is the value of the Hurwicz criterion for the z-th alternative strategy

RPN_z is the risk priority number for the z-th alternative strategy

Z is the total number of analyzed alternative strategies

R_z is the set of end-risks for the strategic alternative z

SG_z^{pess} is the value of SGI for the alternative z, if all the risks are from the set R_z

SG_z^{nr} is the value of SGI in risk-free environment

To choose the master strategy, the expert team, together with the strategic planning unit, develops scenarios and calculates SG_z^{pess} and SG_z^{nr}; and then calculates CrG_z for each strategic alternative from the set Z. In the next step, the expert team finds the strategic alternative s from Z alternatives with the maximum value of CrG_z. This strategic alternative is presented to the DMs for review and approval as the master strategy.

Selecting the risk factors (FRs) from the SPs of the master strategy (operation O6). At the first step, the expert team, compares RPN_i for each SP_i $i \in [1, N]$ with $RPN_i^{\min}$. If $RPN_i < RPN_i^{\min}$, then SP_i is excluded from future consideration. Conversely, SP_i for which $RPN_i > RPN_i^{min}$ should be selected as FR. Let us denote the set of FRs as F. At the second step, the expert team decides upon (1) to split the responsibility for managing each FR from F between operating and strategic risk-controlling (ORS and SRC); (2) to define the framework of the control system over risks for each FR and to choose the most suitable control tools. To assist in solving these tasks, we have developed the matrix of risk factor positioning (Tab. 2). This tool is based on the matrix developed by Lambin [17]. Before working with the matrix, the expert team subjectively determines the qualitative scale (high or low) of the ratings comprising the RPN (the ratings Y, P and X) for each FR from the set F, and gets it approved by the DMs.

Area 1 is an area of retrospective controls or area of minimal hazard. The probability of risk occurrence in this area is low; for the FRs qualified into this area, only feedback controls of ORC are employed. These controls compare the actual performance of strategic goals to the targets set in the strategic plans after the end of the covered period in order to detect variances.

Area 2 is an area of reduced operating controls. Risks are still low in this area while the ability to control the risks is high. Therefore, for the FRs qualified into this area, it is sufficient to use only two types of ORC controls [21]: (1) preliminary controls (to reveal the potential variances from targets before the business processes in FR have started); and (2) feedback controls.

Area 3 is an area of plausible strategic hypothesis. For the FRs qualified into this area, two types of controls are used. Firstly, they are the preliminary controls from the SRC arsenal and employed for selection of the most plausible strategic scenario [21]. Secondly, they are ORC feedback controls.

Area 4 is an area of full operating control. The probability of risk detection is higher in this area than that in area 3 which implies more through control. For the FRs qualified into this area, we suggest using (a) the SRC preliminary controls; and (b) all types of controls from the ORC arsenal.

Table 2

Matrix of risk factor positioning

№	Value of FMEA components (ratings)			Name of the positioning area	Responsibility
	Y	P	C		
1	low	low	low	Area of retrospective control	ORC
2	low	low	high	Area of reduced operating control	ORC
3	low	high	low	Area of plausible strategic hypothesis	Combination of ORC and SRC
4	low	high	high	Area of full operating control	Combination of ORC and SRC
5	high	low	low	Area of rare dangerous events	SRC
6	high	low	high	Area of reduced strategic control	SRC
7	high	high	low	Area of full strategic control	SRC
8	high	high	high	Area of strategic vulnerability	SRC

Area 5 is a zone of rare hazardous events (or "black swans" [6]). These events can lead to significant deviations from the strategic targets, but are quite rare and come unexpectedly. The possible control strategies for these FRs are [21]: (a) to ensure (transfer) the risks to third parties; (b) to build the reserves to mitigate the potential losses; (c) to use contingency planning; (d) to use the simplified SRC controls (concurrent and signaling); or (e) to localize the business exposed to these risks in the project company.

Area 6 is a zone of reduced strategic control. Unlike area 5, the probability of risk detection is much higher in this area. We suggest using here (a) SRC preliminary controls; (b) SRC controls by weak signals (with the goal to detect the risk probability as precisely as economically possible); and (b) SRC feedback controls. We also suggest using here the same control strategies as those in area 5 (maintenance of reserves, contingency planning, localization of business units, etc.).

Area 7 is an area of full strategic control. Risks in this area are the most dangerous; but the probability of detection of these risks is also high. We suggest employing here all types of controls from the SRC arsenal [21]. Consequently, we suggest considering contingency planning and reserve maintenance.

Lastly, **area 8** is a zone of strategic vulnerability [21]. These FRs are exposed to the most dangerous threats which are almost impossible to detect, but, at the same time, these areas are also the sources of maximum competitive advantages. The main strategies here are to localize such FRs or to transfer the risks. It is possible to use simplified control models by weak signals from the SRC arsenal for the maximum possible reduction of risks [21].

The results of the study. In this paper, we developed a mechanism of assessment of the company's strategic risks and selection of the risk factors on which the risk management activities should be focused. To build this mechanism, we integrate the method of strategic analysis of the company's value chain and FMEA. The mechanism is the integral part of the company's SRC system and it is embedded into the process of primary analysis of the company's strategic risks. The mechanism is designed as a set of interrelated procedures which provided step-by-step selection of FRs. In particular:

1. We analyzed the possibility of integrating the strategic analysis of VC and FMEA in one mechanism of assessment of the enterprise's strategic risks and considered the advantages and disadvantages of such integration;

2. We developed the flow chart of the mechanism and described its main steps. These steps include: (1) analysis of the company's VC to select the SPs which determine the company's strategic success or failure; (2) identifying the end-risks and performing their qualitative assessment by FMEA; (3) selection of the company's master strategy among the strategic alternatives; and (4) selection of the FRs from the SPs as well as the identification of the most suitable methods and tools to control the risks in the selected FRs.

While working out the mechanism, we developed the following procedures and instruments:

1. The procedure of calculation of the RPNs and their components for assessment of (a) individual end-risks; (b) consolidated risk exposures at the level of SPs: and (c) consolidated exposures at the level of each strategic alternative;

2. The procedure of the company's master strategy selection from strategic alternatives. That procedure employed the Hurwicz minimax criterion, in which we used consolidated RPNs of alternative strategies;

3. The procedure of selecting the FRs from the set of SPs. That procedure compared the consolidated RPNs at the level of SPs to the predetermined risk thresholds.

4. The matrix of SP positioning employed for selecting the methods and tools of control over end-risks.

Conclusion. The developed mechanism of assessment of the company's strategic risks and the selection of risk factors aimed at focusing the risk management activities in the SRC only on those factors of competitiveness of the company which are exposed to the most dangerous threats. The usage of that mechanism would increase the efficiency of risk management and improve the utilization of the company's management resources. The mechanism integrated the strategic analysis of the company's value chain and FMEA and, unlike the other approaches such as integration of SWOT and FMEA,

allowed taking into account all correlations and links among strategic goals, strategic risks and factors of competitiveness. Unlike other studies on this topic, which were often very descriptive, we have developed the detailed procedures aimed at (1) assessing the risk exposures of FCs; (2) selection of the company's master strategy which is balanced between the company's competitive advantages and risks in the best possible way; and (3) selection of the most efficient methods and tools of strategic controls to employ in the selected FRs.

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