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A BUSINESS INTELLIGENCE INSTRUMENT FOR DETECTION AND MITIGATION OF RISKS RELATED TO PROJECTS FINANCED FROM STRUCTURAL FUNDS

Abstract: *The Structural Funds, in order to produce the intended effects, must use their specific management tools, for achieving the strategic objectives, outcome indicators and elements of added value set by each EU member state. The project portfolios must be managed properly. If risks of a project become contagious for other projects, we are witnessing a phenomenon that can compromise the chance that a program financed by Structural Funds to be well carried out. In this paper it is introduced an algorithm to reduce the project implementation risk and an IT interface is designed to serve as a control system, for the permanent measurement and monitoring of the risk indicators, in order to facilitate decision-making and prediction.*

Keywords: *IT interface, dashboard, portfolio risk management, implementation risk, structural funds*.

JEL Classification:C30, G17, O22.

I. Introduction:

In recent years Business Intelligence techniques and tools became more and more attractive, being used almost in all the large companies in the world, for analysis, measuring, monitoring, control and decision. In order to achieve the strategic objectives, the management should predict all the stable processes and should control all the unstable processes. In project management, the structural funds cannot produce the intended effects if aren't used some specific AI tools, which determines the achieving of the strategic objectives, using the structural funds, outcome indicators and elements of added value set by each EU member state.

The manifestations forms of the risk are different, from the risk of delay in preparing the documentation that highlights the economic sustainability of the project, to the risk arising from delays selecting the suppliers. All these risks have in common the time required for completion of stages in the life cycle of a project.

Whatever the delays, they will have a direct impact on the duration of the project implementation, which is important from the perspective of project budget, outcome indicators and the achievement of project objectives.[Pirciog, Ciuca, Popescu, 2015]

The control Dashboard functions by the same laws as the Dashboard of a car or airplane, including tables, graphs, figures, GPS, indicators that reflect the desired destination and route. So, the Dashboard reflects the evolution and trend of the key risk indicators and key performance indicators, by monitoring their continuous measurement. Dashboard connects the project with management in real time, providing benefits due to the large number of people who see the results every day, increasing the quality of decisions.

II. The Dashboard: An IT Interface that monitors the projects

The Dashboard can be considered a management information system, a business intelligence tool that displays all of the required information on a single screen, clearly, in order to be understood by every user. The Dashboard represents an IT interface that transforms data into information; is a cognitive tool which allows to: identify trends, patterns and irregularities for decisions and control [Delcea C., Bradea I.A., Scarlat E. 2013].

A Dashboard gives the management the insights: indicates everything the CEO needs to run the show. The dashboards created with the current software can display: graphics, trend analysis, forecasts and dynamic drill-down buttons.

The processed data can be retrieved from various sources, analyzed from several perspectives and distributed on the web and on mobile devices. The main advantage of this methodology is the simplicity of design. Thus, all information is presented as simple and concise; avoiding unnecessary graphics. The Dashboard indicates when an action is required and directly provides any additional information required to take that action.

For designing and implementing a Dashboard some steps must be followed: focus on data, know the users, tool selection, use visual design concepts, develop the indicators, develop the levels of data and threshold, create a prototype, display information on a single screen, ask for feedback and conduct trainings.

The Dashboard monitors the exposure to critical business risks by using key risk indicators (KRIs), which alerts when the accepted values of the threshold are passed. It offers a direction to follow and information regarding the risk event. It is used as an alarm signal for further actions.

III. Projects financed from structural funds

The projects financed from structural funds have become a very interesting topic, with medium and long term challenges, due to the fact that the risk identification and the subsequent implementation of strategies to reduce or even disposal the risk, are major concerns of specialists and organizations that provide structural funds management. Furthermore, the structural funds are today, for most Member States of the European Union, an instrument for: the implementation of sustainable development policies to eliminate the regional development disparities; promoting investments; creating jobs and ensuring a high standard of living for the EU citizens**.**

Structural Funds are attractive for any Member State due to their particularities; they are not refundable and have no immediate financing cost, which makes the beneficiaries of funds to lead a fierce battle between them to access these resources during the calls projects organized by organizations competent in the field. Compared to repayable funds, in the banking or capital market, the Structural Funds protect the beneficiaries' cash-flow during the project implementation, but also after that, in the post-deployment period, since they not generate payments to financial institutions and the impact on the projects sustainability is straightforward.

Often, projects that are not sustainable for fully funding from the mix of own and borrowed sources, as they cannot generate sufficient cash-flows to repay the financial liabilities to creditors, become sustainable by using structural funds through cost savings that are generated by the lack of financing costs.

The operational programs remain tools for macro management, which seek to implement strategic objectives of national and European political strategy, while projects become specific tools for the operational program that ensure the implementation of the objectives. Levels of objectives for the two instruments are different. The general rule is that any operational program includes a portfolio of projects, without the operational program cannot achieve its purpose. [Davidescu, Paul Vass, Gogonea, Zaharia, 2015]

Here comes the interest of specialists in finance and information technology, because these project portfolios must meet several prerequisites, namely: i) to be mature projects ready to be implemented, ii) to be sustainable projects or to ensure economic sustainability on medium and long term, iii) the project beneficiaries must have the administrative capacity to implement them.

IV. The project risk

Any project (P), regardless the funding source, is characterized by a life cycle that can arise from the idea stage and can be ended with the completion of implementation. Usually the life cycle of a project, important in terms of structural funds, differ according to type; the infrastructure project has the life cycle between 3-5 years, while the small value projects, the non-infrastructure projects have a lifecycle that can reach up to 3 years.

On the entire life cycle of a project, the forms of risk are different, and the interest for early detection becomes increasingly more interesting given that the risk of any kind may embarrass the successful completion of the project implementation [Cagliano A.C., Grimaldi S., Rafele C. 2015].

So the budget of a project can be distributed over different periods of time, according to the schedule of cash-flows. In the absence of compliance with these cash-flows, caused by delays in implementing the various stages of the life cycle of the project, the consequences can be diverse. The most important consequence is the loss of budgets allocated to Member States through operational programs. That is why EU Member States, which provides structural funds management, will pay special attention to risks arising from delay in project implementation, which can compromise the chance of development of the regions concerned to ensure a high standard of living for citizens. In this context, the implementation risk of a project becomes essential, having direct consequences, not only on the budget allocated to EU Member States, but also on cash-flow deficits that can lead to a project.[Boloș M.I, Sabău-Popa D.C., Filip P., Manolescu A., 2015]

V. Measurement techniques for the risk of implementation

In everyday language of specialists, this category of risk is known as physical progress. Without going into technical details, it is important to note that from the beneficiary's perspective and from the perspective of finance and information technology specialists, the implementation risk represents the situation in which the project during the implementation stage is not completed on time. A contractual deadline takes many forms: i) interim deadlines, ii) final deadlines. Whatever their nature, the project may be affected by the implementation risk if they are not respected [Hydari H. 2015].

The immediate consequence is that the planned values of the project are not realized, the project indicators are put in difficulty and what is worse, as we have noted before, the budgets of structural funds allocated to the EU stated can be lost. Regarding the implementation risk causes, they are diverse and often have a technical nature, such as: a reduced technical capacity of suppliers to execute contracts, lack of technical equipment necessary for the project implementation etc..

What arouses the curiosity of this category of risk is the quantification (measurement) method. It includes technical and financial elements that have an impact on this type of risk. The implementation risk can generate severe losses in the budget of the EU member countries, where this type of risk is not proper managed.

It is important to note that on risk measurement occurs the project implementation time(D_i), for which the information is provided from the contracts with the beneficiaries; and the actual execution time (D_r), for which the information is provided from the contracts with suppliers. These terms determines the delay degree of a project, determined as the ratio between the actual execution time and the planned time$\left(g_î = \frac{D_r}{D_i} \times 100\right)$of the project.

The degree of delay in project implementation measures the likelihood of losing a certain part of the project value, as a consequence of implementation contract failure. Therefore it is important to quantify the financial dimension of the implementation risk and for this it can be taken into account the planned value of the project in the implementation year(pVP), which is also the year of analysis for the project, adjusted with the degree of delay using a relationship of the form:

$$R_p = pVP(1 - g_i) \quad (1)$$

The intensity of the implementation risk can be expressed in a percentage form, if it is taken into account the project's value (VP), and the progression risk (R_p) according to the following relationship:

$$R_p = \frac{V_p - pVP(1-g_i)}{V_p} \times 100 \quad (2)$$

According to this measurement conditions for the implementing risk, it could be seen that whenever the degree of delay of a project has significant value, the probability of losing a part of the project budget increases, which may lead to the classification of projects into three major categories: i) projects with low risk of budget loss, ii) projects with medium risk of budget loss, iii) projects with high risk of budget loss.

$$R_p = \begin{cases} 0 \leq R_p \leq 30; projectswithlowriskofbudgetloss \\ 30 < R_p \leq 50; projectswithmediumriskofbudgetloss \\ R_p > 50; projectswithhighriskofbudgetloss \end{cases} \quad (3)$$

If the implementing risk affects one or more projects, it is probable that a part of the budget allocated to EU country to be lost by decommitment, as unconsumed budgets by European rules are lost. In this situation, with the identification of the implementing risk, it is necessary to take further measures to restore the safety of their implementation and to ensure the achievement of the planned projects.

VI. The reduction algorithm of the project implementation risk

The informational algorithm is based on specific assumptions for each project under implementation and on a number of statistical processing mechanisms specific to portfolio theory. Furthermore, the specific instruments for Structural Funds assume that the operational program is used nationwide by the Member States, while projects are part of the operational program. The rule of structural funds is that the operational program includes several projects(P); $\sum_{i=1}^{n} P_i$. The projects, that are part of the operational program, have their particularities as they are non-infrastructure or infrastructure projects.

The reduction algorithm for the project implementation risk aims to establish the structure of portfolios of projects given a level of implementation risk, considered reasonable and to establish the portions of the project value that is affected by risk. The value of projects affected by risk becomes a source of information and a decision support for the national organizations of EU Member States, as it indicates the value of the Structural Funds budget that may be at risk of losing [Tams S., Hill K., 2015].

In terms of risk mitigation algorithm, each project (P), which is part of the portfolio of projects, will be defined by: the weight that holds on the total of the projects value(x_p), the value of implementation risk $(R_p)$and the dispersion of risk compared to the average value recorded in the projects portfolio(σ_p).

The dispersion value of implementation risk from the average is important to measure its intensity, given that any departure from the average would mean an increased risk with adverse effects on the project portfolio. That is why, for the dispersion measurement is used the standard deviation, adapted to the specific of the projects:

$$\sigma_p^2 = \sum_{i=1}^{n} \frac{\left(R_{pi}-\overline{R_p}\right)^2}{N-1} \tag{4}$$

Since the measurement value of the implementation risk dispersion towards medium is measured in $(\%)^2$, it is necessary to appeal to a different notion of statistics for the dispersion measurement from the mean: the variance, that is quantified after a relationship of the form:

$$\sigma_p = \sqrt{\sigma_p^2} = \sqrt{}\sum_{i=1}^{n} \frac{\left(R_{pi}-\overline{R_p}\right)^2}{N-1} \tag{5}$$

According to the above, the project portfolio is formed as part of the operational program, in which each project will be characterized by: the weight that holds in the portfolio of projects, the implementation risk value and the risk dispersion from the mean$P\left(x_p, R_p, \sigma_p\right)$. The equations that will be the basis of the reduction algorithm of the project implementation risk will be written as:

$$\begin{cases} R_p = \sum_{i=1}^{k} x_k R_k \\ \sigma_p^2 = \sum_{i=1}^{n} x_k^2 R_k^2 + 2\sum_{i=1}^{n} x_k x_j \sigma_{kj} \end{cases} \tag{6}$$

In addition to the above equations, it is known that the project proportion in the total portfolio is equal to 1, according to an equation of the form:

$$\sum_{i=1}^{n} x_i = 1 \tag{7}$$

In these conditions will be identified the underlying assumptions of the reduction algorithm for the project implementation risk, while a risk value over 50% can lead to a risky portfolio that generates losses in EU Member States' budgets .

Rewriting these equations according to the above assumptions, which aim to reduce: the risk below 50% and the average dispersion towards the medium value of the implementation risk, using a set of equations of the form:

$$\begin{cases} R_p = \sum_{k=1}^{n} x_k R_k \leq 50 \\ \sigma_p^2 = min \sum_{j=1}^{n} \sum_{k=1}^{n} x_j x_k \, \sigma_{kj} \\ \sum_{k=1}^{n} x_k = 1 \end{cases} \tag{8}$$

To solve the optimization problem formulated above, we will write the Lagrangean problem, which will be based on the objective minimizing function of the variance from the average and the constraints for the average value of the implementation risk. The Lagrangean problem becomes:

$$\alpha(x_p, \tau_1, \tau_2) = min \sum_{j=1}^{n} \sum_{k=1}^{n} x_j\, x_k \sigma_{kj} - \tau_1 (\sum_{i=1}^{n} x_k R_k - 50) - \tau_2 (\sum_{k=1}^{n} x_k - 1) \quad (9)$$

The optimal conditions of the algorithm are obtained at the points where the first order derivatives for variables and parameters $\tau_1; \tau_2$ are zero, as follows:

$$\begin{cases} \frac{\partial \alpha}{\partial x_k} = 0; \\ \frac{\partial \alpha}{\partial \tau_1} = 0; \\ \frac{\partial \alpha}{\partial \tau_2} = 0; \end{cases} \quad (10)$$

After some computations we obtain the following optimal conditions for the informational algorithm, namely:

$$\begin{cases} \frac{\partial \alpha}{\partial x_k} = \sum_{j=1}^{n} x_j \sigma_{kj} - \tau_1 \sum_{k=1}^{n} R_k - \tau_2 = 0; \\ \frac{\partial \alpha}{\partial \tau_1} = \sum_{K=1}^{N} x_k R_k - 50 = 0; \\ \frac{\partial \alpha}{\partial \tau_2} = \sum_{k=1}^{n} x_k - 1 = 0; \end{cases} \quad (11)$$

To simplify the calculations, the above system can be written in a matrix of form:

$$\begin{pmatrix} x_1 \\ x_2 \\ . \\ x_k \end{pmatrix} \begin{pmatrix} \sigma_{11}\sigma_{12} \dots \sigma_{1k} \\ \sigma_{21}\sigma_{22} \dots \sigma_{2k} \\ \dots \dots \dots \dots \dots \\ \sigma_{k1}\sigma_{k2} \dots \sigma_{kk} \end{pmatrix} - \tau_1 (R_1 R_2 \dots R_k) - \tau_2 (11 \dots 1) = 0 \quad (12)$$

From equation (11) it can be determined the weight that each project must have in the total portfolio, according to the weights vector (X), the variance-covariance matrix (σ), and the projects implementation risks vector (R) as follows:

$$X \times \sigma - \tau_1 R - \tau_2 e = 0 \quad (13)$$

or

$$X = \tau_1 \sigma^{-1} R + \tau_2 \sigma^{-1} e \quad (14)$$

It is formed a system of two equations with unknowns $(\tau_1)$and(τ_1), which will take the following form:

$$\begin{cases} \tau_1 R^t\sigma^{-1}R + \tau_2 e^t\sigma^{-1}R = 50 \\ \tau_1 R^t\sigma^{-1}e + \tau_2 e^t\sigma^{-1}e = 1 \end{cases}$$

From solving the system of equations will be obtained the Lagrangean parameters as:

$$\tau_1 = \frac{\begin{vmatrix} 50 & e^t\sigma^{-1}R \\ 1 & e^t\sigma^{-1}e \end{vmatrix}}{\begin{vmatrix} R^t\sigma^{-1}R e^t\sigma^{-1}R \\ R^t\sigma^{-1}e e^t\sigma^{-1}e \end{vmatrix}} = \frac{50(e^t\sigma^{-1}e) - e^t\sigma^{-1}R}{(R^t\sigma^{-1}R)(e^t\sigma^{-1}e) - (R^t\sigma^{-1}e)(e^t\sigma^{-1}R)}$$

$$\tau_2 = \frac{\begin{vmatrix} R^t\sigma^{-1}R & 50 \\ R^t\sigma^{-1}e & 1 \end{vmatrix}}{\begin{vmatrix} R^t\sigma^{-1}R e^t\sigma^{-1}R \\ R^t\sigma^{-1}e e^t\sigma^{-1}e \end{vmatrix}} = \frac{R^t\sigma^{-1}R - 50(R^t\sigma^{-1}e)}{(R^t\sigma^{-1}R)(e^t\sigma^{-1}e) - (R^t\sigma^{-1}e)(e^t\sigma^{-1}R)}$$

The values obtained for Lagrangean parameters are replaced in equation (14) to obtain the final structure of the portfolio, which consists of $(x_1\, x_2 \dots x_n)$ weights of the form:

$$x = \frac{1}{(R^t\sigma^{-1}R)(e^t\sigma^{-1}e) - (R^t\sigma^{-1}e)(e^t\sigma^{-1}R)}[(50(e^t\sigma^{-1}e) - e^t\sigma^{-1}R)\sigma^{-1}R + (R^t\sigma^{-1}R - 50(R^t\sigma^{-1}e)\sigma^{-1}e)]$$

To simplify the calculations we will proceed to some additional notation as:

$$X_1 = e^t\sigma^{-1}e;$$
$$X_2 = R^t\sigma^{-1}e = e^t\sigma^{-1}R;$$
$$X_3 = R^t\sigma^{-1}R;$$
$$X_4 = X_1X_3 - X_2^2;$$

Accordingly to this, a simplified form of portfolio composition (P) will be:

$$x = \frac{1}{x_4}[(50x_1 - x_2)\sigma^{-1}R + (x_3 - 50X_2)\sigma^{-1}e] \tag{15}$$

The structure of projects portfolio (P) is thus influenced by the value of each project implementation risk, conventionally denoted $(R_p)$and the variance from the average implementation risk(σ_p), the obtained results being of the form:

$$\begin{pmatrix} x_1 \\ x_2 \\ . \\ x_n \end{pmatrix} = \begin{pmatrix} a_1 \\ a_2 \\ . \\ a_n \end{pmatrix} \quad (16)$$

The project value after the calculations is adjusted by implementation risk restricted to be less than 50%, denoted by $\left(V_p(A_p)\right)$, which will be computed as the difference between the initial project value $\left(V_{pi}\right)$ and the adjustment value with the project implementation risk $(\left(A_p\right) = V_P \times a_k$, after a relationship of the form:

$$V_p = V_{pi} - A_p \quad (17)$$

The new adjusted value of the project will provide information on the portion of the project that is not affected by risk, when there is a likelihood of implementation below 50% previously established as a value till the risk of project budget loss is below 50 %.

The value of the portfolio risk, while there is a project implementation risk below 50%, can be expressed by the relationship:

$$\sigma_p^2 = (x_1 x_2 \dots x_n) \begin{pmatrix} \sigma_{11}\sigma_{12} \dots \sigma_{1n} \\ \sigma_{21}\sigma_{22} \dots \sigma_{2n} \\ \dots \dots \dots \dots \\ \sigma_{k1}\sigma_{k2} \dots \sigma_{kn} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ . \\ x_n \end{pmatrix} \quad (18)$$

The weights $(x_1 x_2 \dots x_n)$ are the recalculated weights for projects in the portfolio, in terms of an implementation risk below 50%, determined according to the relationship (15).

This means that each project from the structure of the operational program will have the value structured into two components namely: $((V_p(A_p))$ determined as the product of the project value and value share in total project projects (a_k), obtained by recalculation according to the implementation risk and a project value at risk(V_{Rk}), so that the portfolio of projects can be rewritten according to the formula:

$$V_P = (a_1 a_2 \dots a_k) \begin{pmatrix} V_{p1} \\ V_{p2} \\ . \\ V_{pk} \end{pmatrix} + (V_{Rk1} V_{Rk2} \dots V_{Rkn}) \quad (19)$$

As the share of the value of the projects that are part of the portfolio affected by risk (V_{Rk}) is higher than the value unaffected by risk (or risk below 50%)$\left(V_p\left(A_p\right)\right)$, we can say that the Structural Funds budget that is allocated to the Member State is affected by the project implementation risk and there is a probability to lose some of the budget by decommitment risk. In the opposite situation, the probability of losing resources from the Structural Funds budget is quite limited, and that operational program management is properly implemented.

A new risk indicator is founded. It is useful for specialists in finance and information technology, and is called the global implementation risk indicator(R_{gi}), which provides information on the probability that an operational program (which includes a portfolio of projects) generates losses from structural funds of EU Member States, resulting from project implementation.

The overall implementation risk of operational programs may be determined by the formula:

$$R_{gi} = \frac{\sum_{i=1}^{n} V_{Rki}}{\sum_{i=1}^{n} a_i V_{Pi}} \times 100 \qquad (20)$$

In its simplest form, the overall implementation risk of operational programs can take values$\left(R_{gi} \geq 1\right)$, which implies that there is a risk of losing resources from the EU budget allocated to the Member State. If ($R_{gi} < 1$), implies that structural Funds budget has a management that is correctly implemented without the risk of losing the short-term financial resources.

VII. Decision-making interface for risk management of the national organisms with responsibilities in the structural funds area

In any project management authority, there is a lot of information, even computed indicators, but the information that is really needed are not known. Dashboard has the ability to calculate, communicate and provide the adequate information, relevant for policy formulation, decision making, and comparing the results with the strategic objectives**.** The mechanism through which Dashboards are used by national project management organism for decision making is reflected in the following figure:

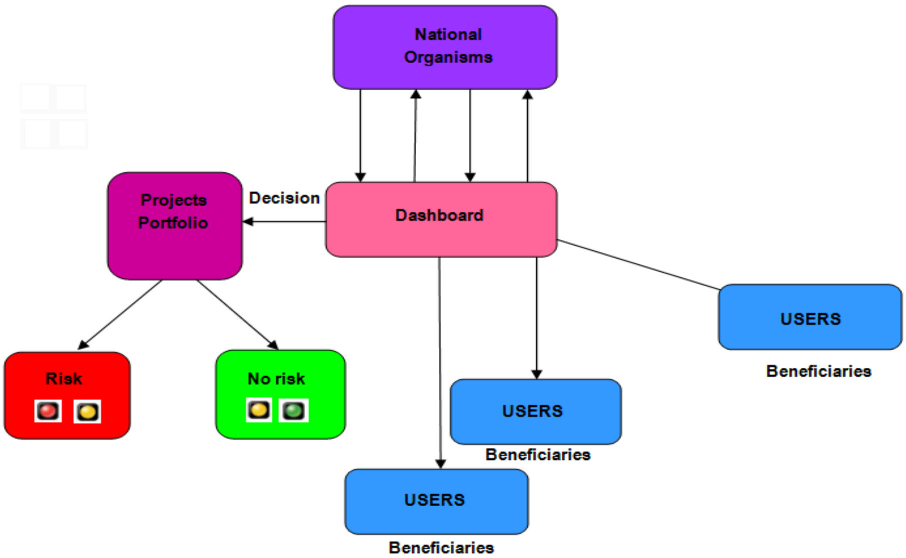

Figure 1.The correlation between Dashboard and decision making process

Further, a Dashboard is built in order to monitor the key risk indicators of the portfolio risk management. The analyzed portfolio consists of 10 projects financed by the Structural Funds, for which are calculated the main indicators reflecting the implementation risk. The projects are implemented in the North-West of Romania.

Beneficiary	The project value planned in the implementation period	Size of grant	The requested / paid	Level of achievement	The delay grade	Remaining months of implementation
1	519.794,88	3.954.174,69	484.770,54	93,26%	0,067381	4
2	3.054.588,66	6.279.264,00	3.054.588,66	100,00%	0	11
3	1.150.000,80	4.534.489,80	1.018.340,89	88,55%	0,114487	4
4	6.330.264,00	6.330.264,00	4.540.298,20	71,72%	0,282763	2
5	3.376.872,65	4.877.501,72	4.862.647,98	144,00%	0	2
6	1.167.319,00	2.376.711,00	791.478,00	67,80%	0,321969	3
7	4.527.190,65	4.527.190,65	4.516.005,26	99,75%	0,002471	10
8	0,00	6.300.091,03	2.291.664,47	100,00%	0	3
9	1.017.688,00	2.587.119,00	988.943,31	97,18%	0,028245	4
10	2.837.513,00	6.254.702,66	2.832.606,53	99,83%	0,001729	6

Figure 2.The key indicators computed within the reduction algorithm

Some thresholds were established, according to the formulas found in the reduction algorithm of the project implementation risk. If a threshold was exceeded, the risk manager automatically receives a message, to undertake urgent remedial actions. The exceeding of thresholds is indicated by the colors of the risk semaphore [Bradea I.A., Sabău-Popa D., Boloș M. 2014].

When the risk is in the red zone, are recorded significant losses, urgent actions must be taken to control these losses. When the risk is in the yellow zone, the risk manager has to take actions in order toprevent the increasing of risk exposure.

Rp - The intensity of the implementation risk	xp - The initial proportion of the project in the portfolio	xp - The final proportion of the project in the portfolio	Rp - The financial dimension of the implementation risk	The adjusted value of the project
34,00%	8,00%	9,00%	266436,5581	3.687.738,13
12,00%	13,00%	14,00%	0	6.279.264,00
44,00%	9,00%	7,00%	131659,91	4.402.829,89
78,00%	13,00%	3,00%	1789965,8	4.540.298,20
34,00%	13,00%	8,00%	0	4.877.501,72
53,00%	4,00%	6,00%	375841	2.000.870,00
89,00%	9,00%	2,00%	11185,39	4.516.005,26
0,00%	13,00%	27,00%	0	6.300.091,03
52,00%	5,00%	10,00%	28744,69	2.558.374,31
27,00%	13,00%	14,00%	4906,47	6.249.796,19

Figure 3.The key indicators computed within the reduction algorithm

For the analyzed portfolio, the initial average risk is 42.3%, being found in the yellow zone and more worryingly close to the red zone. According to the conditions of the implementing risk, it could be seen that whenever the average risk is higher than 30%, the probability of losing a part of the project budget increases.

Of the 10 projects analyzed, 3 projects have the values for intensity of the implementation risk over 0.33, reflecting a worsening of the situation, changes in trends and an increased exposure to risk, being necessary to take preventive measures.4 projects registered high values for the considered risk, project number 7 having a value equal to 0.89. It is also worth mentioning that the project number 8 is not exposed to this risk.

The overall implementation risk of operational programs is determined. The global risk of implementation takes the value of 0.5015, indicating a great exposure to this risk, the losses emerging from it being large. Its value provides information on the probability that the portfolio of projects generates losses from project implementation.

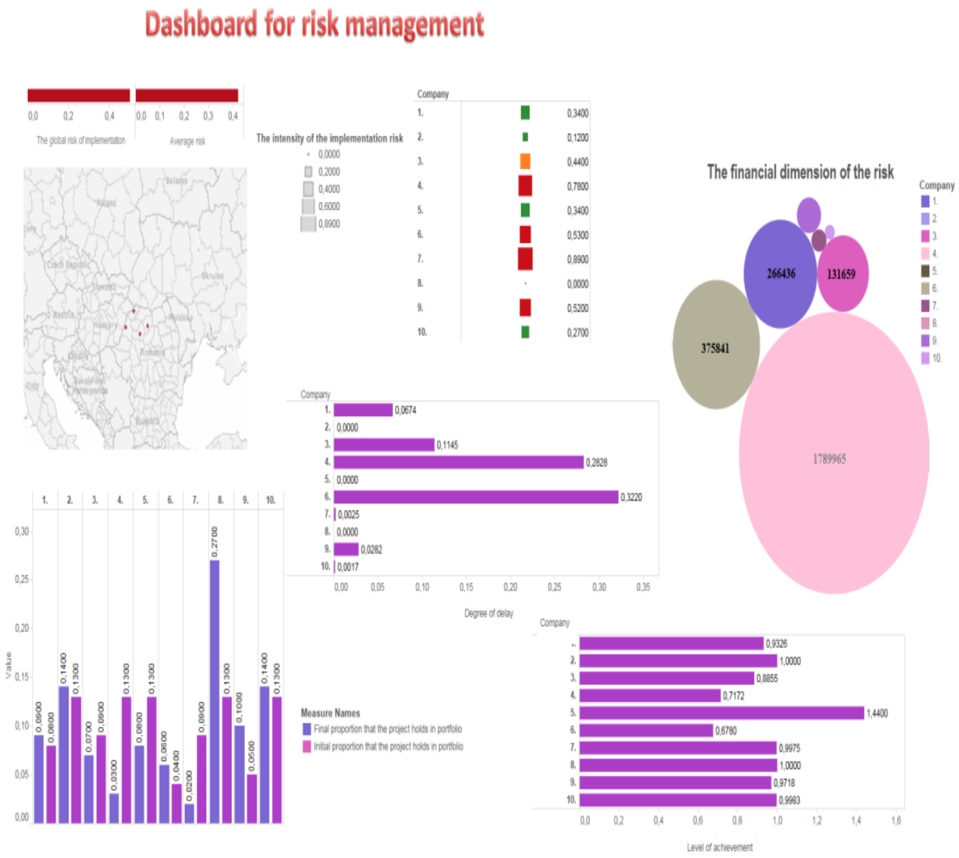

Figure 4. The Dashboard for monitoring the risk related to projects financed from Structural Funds

As it is presented in the figure above, after applying the reduction algorithm for the implementation risk, was identified a new structure of the portfolio that would reduce the risk (xp). Also, a new adjusted value of the project is computed, value that will provide information on the portion of the project that is not affected by risk.

VIII. Concluding remarks:

A portfolio with projects structure, whose implementation risk is below 50%, according to the algorithm assumptions provides the necessary conditions to ensure a prudent structural funds management of EU Member States through operational programs. Any value higher than 50% can lead to loss on long-term, unless appropriate measures are taken to reduce this risk. The conclusion is that for a certain value of projects implementation risk and its dispersion from the mean, will have to be a certain structure of the projects portfolio to ensure that the risk of budget loss for each project is within the values set as acceptable for the operational program.

The project portfolios are the key of success for using Structural Funds by EU members, so once they are implemented; there are equal opportunities to be successful. During project implementation inevitable risks emerge. If risks of a project become contagious for other projects, we are witnessing a phenomenon that can compromise the chance that a program financed by Structural Funds to be well carried out. Therefore the concern of specialists in finance and information technology should be focused on two ways, namely: i) early identification and quantification of risk, to ensure an efficient management to save these projects, ii) establishment of informational risk reduction algorithms related to portfolios of projects, falling within the structure of an operational program.

The permanent monitoring of the implementation risk should be realized with the help of a Dashboard. Thorough it, the KRIs gives information about the level and trend of the implementation risk, which may affect the budget for each project.

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