POSSIBILITIES OF QUALITATIVE RISK ANALYSIS

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ABSTRACT – Possibilities of qualitative risk analysis
Every project or program has to deal with risks which jeopardize the success of it. The nature and the source of a risk could be clear and easily defined but often they are complex or covert. To value a risk among the factors that intensifies the uncertainty of the achievements of an activity is one of the hardest steps to make, but there are the quantitative and qualitative risk assessments. The most popular and precise method during economic calculation is the Monte Carlo analysis as quantitative approach but in many cases its adaptation is not easy because of the absence of a required database. An other way to calculate with uncertainty during investment appraisal studies is the sensitivity analysis that shows how the (discounted) net can change present value if one element would increase or decrease a hypothetical percent. The most important deficiency of it is that there are not objective explications behind the value of percents or other numerical valuation but sometimes it is not possible. It can be valued by a lot factors (as stakeholders attitude) and represented during feasibility studies by qualitative risk analysis.

Key words: qualification, risk, qualitative risk assessment methods, renewable energy sources, environment analysis

INTRODUCTION

The risk analysis can originate in two main sectors: IT and bank or financial sector. The latter uses the wide scale of quantitative risk assessments to analyze financial portfolios and the first one uses additionally qualitative methods and the keys to connect the two types.
According to some literature "the most straightforward solution will be to import data for quantitative one from qualitative risk results". (KAPUSCINSCI ET AL., 2007; WORLD BANK, 2010)
Still the biggest question is, which sector can offer a better way to renewable energy sources which is supported mainly by the EU and national governments budget. However the consumption characteristically depends on choice which is based on the participation in the supply chain. After identification of attitude or motivation, it can be possible to represent qualitative phenomena in economic calculation through qualitative risk analysis.
Traditionally the IT and the energy sector are different but the theoretical frames of methods are usable because these assessments are often suggested by governments as general state of the art achievements.
The definition of risk can be simply "an effect of uncertainty on objectives" (ERA NET, 2009) or more complex "uncertainty which effects undesired event and there is often economic consequences".
An other question is the difference between risk analysis and risk management which is defined by two main conceptions: on one hand these two actions completing with risk

evaluation are a cycle wherein every component relate and interact. (BELL-GLADE, 2004).

As it can been seen on the *Table 1*., there is numerous approaches to define their connection and parts or actions. Generally, the risk analysis is a part of risk management, it focuses on one specific phase, tries to handle one very well identified problem that can originate to one stakeholder and the useable method during the process is determinate. In front of analysis, the risk management is multidisciplinary and it resides in every phase of project or program. On the centre of management is the whole organization with multi or all stakeholders and it can be characterized by multi problem approach.

Table 1. represents three European partition of way to handle risk. Basically the definition depends on the focus of project and the expected and required result. For example, in case of climate change the main problem is to identify and to describe the uncertainties and theirs effects but because of sometimes inconsistent scientific indicators the quantitative calculations are not realizable. And an additional part of project likes it, to reflect the financial consequences is rarely required by government decision makers.

Table 1. Relation of risk management, analysis and its possible contents

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="2">Swedish Road Administration</th><th rowspan="2">Four steps</th><th rowspan="2">Five steps</th></tr>
<tr><th>Stage</th><th>Part</th></tr>
<tr><td rowspan="5">Risk management</td><td rowspan="3">Risk analysis</td><td rowspan="2">Risk identification</td><td rowspan="2">– Inventory
– Description</td><td>1. Determination of analysis objectives,</td><td rowspan="2">1. Describe analysis object, purpose and criteria for assessment
2. Identify safety problems</td></tr>
<tr><td>2. Risk identification

3. Risk classification</td></tr>
<tr><td>Risk evaluation</td><td>– Rough estimate
– Order of precedence
– Calculation
– Action proposal</td><td></td><td>3. Assess the risk</td></tr>
<tr><td colspan="2" rowspan="2">Implementation</td><td rowspan="2">– Decision
– Execution
– Follow-up
– Evaluation</td><td>4. Determine risk remediation measures</td><td>4. Propose measures</td></tr>
<tr><td></td><td>5. Documentation</td></tr>
</table>

Source: ERA NET, 2009; p. 15, 17, 19.

The selected method should be compatible with the database and it has to allow further calculations if it is required. In the literature it can be available three elementary group of methods. The most objective is the quantitative risk analysis which is use wide scale of mathematical and statistical frame of theories. If the information about the project, the organisation or the environment where the object of analysis exists is not numerical

or it can not be transformable to number, use of the qualitative one is better decision. Selected combination of two previous and less numerically intensive method, it is so called modified qualitative or semi-quantitative analysis.
The database can made from questionnaire survey or one of possible environment analysis as RISMAN method that it is used during environmental projects, as climate change projects. It advises four steps to realize risk management and an underlineable part of it the risk matrix that base on stakeholder analyses or RISMAN-glasses. (*Table 2*., ERA NET, 2009)

METHODS OF QUALITATIVE RISK ANALYSIS

To identify and to classify risks in a systematic way which bases on stakeholder analyses or 7 identified aspects it is useable the RISMAN-glasses. (*Table 2*.) Its components represent strong similarity to generally used PEST analysis or its variations. The only difference is the organisational aspect but to solve this difference it can be applied SWOT analysis covering the internal environment of enterprise or program.

Table 2. Compare of RISMAN-gasses and traditional PEST analysis

RISMAN-glasses	**PEST analysis (also in other form)**		
Political/governmental	Political/governmental	**PESTL**	**STEEP**
Financial	Economic		
Social	Social		
Technical	Technical		
Legal	Legal		
Spatial planning	Ecological		
Organizational			

Source: Own construction by ERA NET, 2009 and Salamonné, 2000

To determine the risk level, the most known tool is the Risk Matrix based on different dimensions. It shows one possible combination of result of multiplication of probabilities and strength of incidents occurrence (*Table 3.)*

Table 3. Risk Level Matrix

Probability of threat appearance	**Results**		
	Low (10)	Medium (50)	High (100)
High (0,1)	Low	Medium	High
Medium (0,5)	Low	Medium	Medium
Low (0,1)	Low	Low	Low

Source: ROT, 2008

Through this matrix the whole risk can be defined for every identified threat.
An other way to evaluate the risk of a program or project is to use risk ranking along the identified risk factors and project versions or activities within one project (*Table 3*.)

Table 4. Risk factor evaluation matrix

Risk factor	Activities of a project or project possibilities			Risk factor total
	A	B	C	
I.	Low (1)		None (0)	
II.		Medium (2)		
III.		High (3)		
Activity total				

Source: Kindinger-Darby, 2000

The final step to summarize every column and row that shows the relevance of not only the risk factors but also the place of possible activities or projects.
It is also used graduation is the very high, high, medium, low, very low ordinal scale and the numerical scale that can be linear or non-linear to show the individual preference of project or organisation.
ACCORDING SEGUDOVIC (2006) it can four main type of Risk Assessment Matrix and a modified one reducing the disadvantage of previous ones.

Table 5. Qualitative risk assessment matrix

Method	Dimension horizontal	Dimension vertical	Assessed risk
Predefined value matrix	Threat Vulnerability	Resource value	$R = f(AV_I, V_{I,P}, T_{I,V,P})$ $R = AV + V + T$
Threat ranking by risk evaluation	Impact, Realisation probability, Risk, Threat ranges	Threat	$R = f(I_{AV,T}, P_{V,T})$ $R = I * P$
Assessment of the probability of a threat being realized and it's consequences	M1: Threat Vulnerability	Realisation probability	$P = f(V,T)$ $R = f(P_{V,T}, AV_{I,T})$ $P = V + T$ $R = AV + P = AV + V + T$
	M2: Resource's value		
Acceptable and unacceptable risk separation	Resource's value	Realisation probability	Risk can be acceptable (0) or unacceptable (1)
Modified risk assessment matrix	Probability Consequence	Resource value	$R = f(AV, P_T, I_T) = f(V)$ $R = AV * P_T * I_T$

Source: Own construction by Segudovic, 2006

As it can been seen the methods develop to the usability for quantitative assessment and take into the analysis other and other element to make more and more complex them.
The final step of risk analysis to refer *1.* combinations of probability and impact result and *2.* the own preference of enterprise which is signed by colours and they can help to make risk response actions.

CONCLUSION

This paper has represented and summarized the most important qualitative risk assessment methods and their content with the possible overlaps.
In many cases the expectation is only the identification of key risk factors but if the investment portfolio contents private capital, it is indispensable to consider them during economic calculations. Applying the qualitative risk assessment methods the most important, not numerical uncertainty factors became expressible in standard formulas as for example in net present value or cost-benefit analysis. Finally it can be revised as the weakest area of project documents (BELLI – GUERRERO, 2009).
However, it is typically problematic that the base information of qualification shows only a present status of the topic and the objectivity and replicability is controversial. This doubt is not reasonable in the Hungarian energy sector because it is a developing sector in view of renewable energy sources. The information level of consumers has been better than it was in 2006 but the share of renewable energy sources in total energy consumption does not increase significantly.
The most important advantage of the presented methods is the flexibility because there are used intervals which can represent not only the difference between qualitative indicators without information loss but also their priorization.
The input of qualitative risk analysis could be the result of traditional environment analyses, as PEST and SWOT analysis. This is a very important support for those interested projects in use renewable energy sources which know well their environment and the mode of action that is why the can classify these uncertainties on ordinal scale. These results are useable not only independently but also a database to refine and to make more complex previous Cost-Benefit Analysis or Life Cycle Analysis.

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