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Some techniques for the treatment of business risks: an important element that the company must be able to treat to be able to achieve success in the market

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Abstract

The assessment of business risk is the basis of any decision-making and business process. Risk Manager's task is to identify, evaluate, manage and control business risks and concerns all possible types of risk. The efficacy of risk management also depends on the information available for the decision: more information available, the better risk response. To effectively manage risks, a systematic and organized approach is required, it is necessary to resort to specific methodologies and techniques. In this document we will propose some techniques to deal with business risks, thus limiting its negative effects on society.

Keywords: risk management, techniques for the risk treatment

1. Introduction:

The business risk is a theme of which we speak very little, but instead it is fundamental for those who can represent a company's guide. The unexpected events, in any entrepreneurial activity, are always around the corner and learn a correct management of business risks is essential for not risking to be caught unprepared. The business risk is the set of possible negative effects, as well as those of potentially positive ones, which occur due to an unexpected economic, financial, asset or image event. Basically important is the assessment of business risks to better manage them. In fact, to activate a correct management of business risks, in fact, it is first necessary to identify what are the risks. The techniques in this regard are numerous, but all have the same goal: to identify external and internal factors that could affect somehow on the company. This research, clearly, has a cost in economic, time and working terms on the company. In the end, however, it allows to trace a business risk profile and to be able to better manage it by minimizing the negative economic reflexes that would affect the company if the risks would materialize. In this paper we will examine some techniques or methods for the treatment of risks, and that allow the Company to the best managing the risks with which it is to interact and thus reach corporate objectives.

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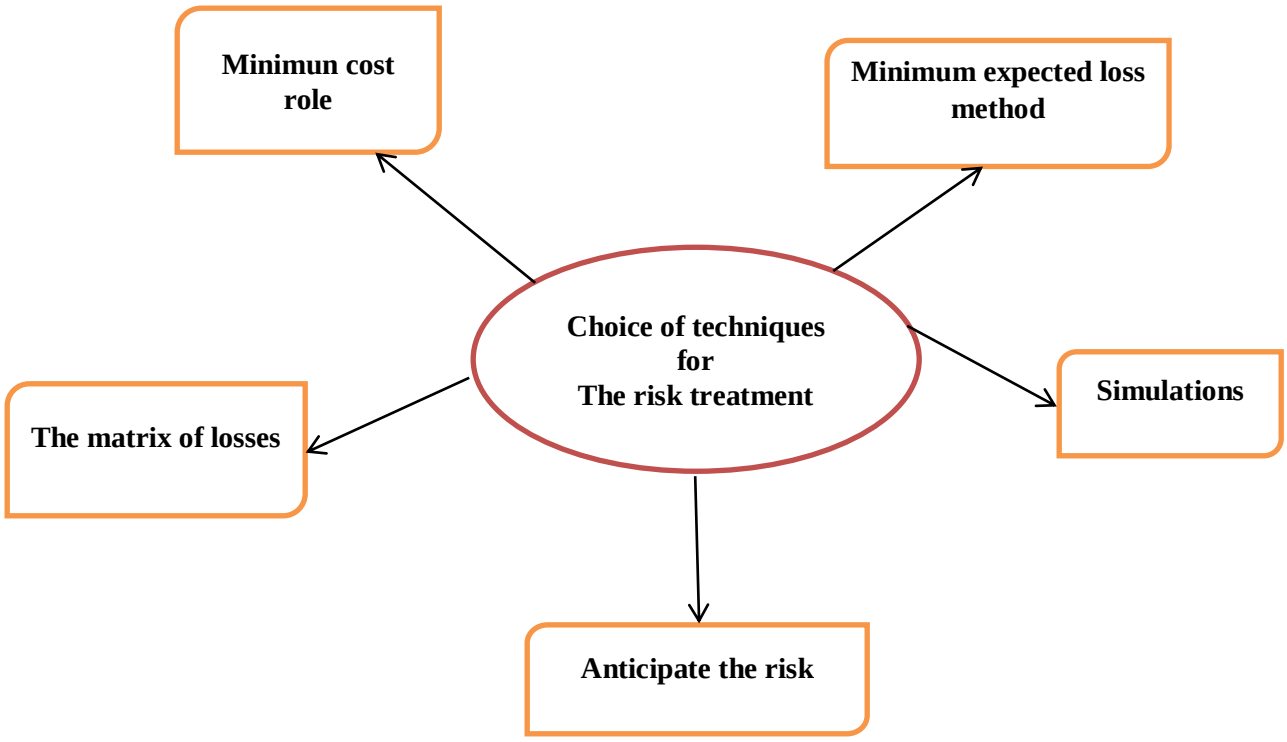

2. Minimum cost rule

This method is due to Hofflander A.E. and Schade L.L, who developed it in relation to motor vehicle accidents, but which can be of general application. In all cases in which it is possible to estimate with sufficient reliability the annual frequency of unfavorable events, it becomes a valid tool for determining the level of deductible to be fixed in insurance contracts. This method is based on the assumption that the total cost of the risk, in the case of transfer with partial retention, is equal to the sum of the premium paid to the insurer and the losses suffered within the amount of the deductible. So it will be:

$$CT\,A = P + pF$$

With:
CTA = Total expected cost;
P = Insurance premium;
p = Estimated frequency of the event;
F = Amount of the deductible

The alternative that will determine the minimum CTA will be the one chosen, taking into consideration the costs inherent in the premiums and the relative deductibles

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For example, if we had the following five alternatives:

A) Premium of € 600,000 with a deductible of € 1,000,000
B) Premium of € 240,000 with a deductible of € 2,400,000
C) Bonus of € 200,000 with a deductible of € 5,000,000
D) Premium of € 140,000 with deductible of € 10,000,000

While the probability of the event was estimated at 0.15, the following corresponding CTA values would be obtained:
A) CTA = 750.000
B) CTA = 600.000
C) CTA = 950.000
D) CTA = 1.640.000

Consequently, the decision should be in the sense of carrying out an insurance transfer with an excess of € 2,400,000. It should be noted that the rule is implicitly prudential, since it assumes that whenever the event occurs, the consequent loss is at least equal to the amount of the deductible. This of course is not always realistic and if the decision maker is able to estimate not only the frequency of the event, but also its severity, a corrective could be introduced, in the sense of considering an average entity of the expected loss lower than the limit of deductible.

3. Minimum expected loss method

According to this technique the administrator chooses the particular risk management technique, or the opportunity of various techniques, which minimizes the expected loss in the long run. The business loss is understood, according to this method, as the sum of disbursements referring to each of the identified exposures, ranging from the payment of insurance premiums to the costs of prevention measures, to unexpected expenses incurred in the event of a claim, to the cost for the reduction. uncertainty and anxiety and so on. Calculating the average loss associated with each technique or these techniques, once implemented, requires evaluations:
- of an *objective type*, albeit with varying degrees of accuracy, such as the cost of a fire extinguishing system or the probability of failure of a heat exchanger,
- *subjective* (for example the assessment of the vulnerability of an asset to a certain risk or the totally subjective assessment of the costs incurred to avoid personal anxieties).
To carry out the aforementioned calculations and assessments, there are engineering or mathematical/statistical tools such as probability calculation, financial analysis and predictive models. Some of these tools are very sophisticated and can only be used by specialists. Also in this case, therefore, the possibility is offered to provide the entrepreneur with decision-making support. The object is to optimize the choice between the purchase of insurance coverage or the use of control or financing techniques.

4. Anticipate the risk

Identifying the change in advance is a prerequisite for assessing the level of risk. Of course, not all changes in the environment have the same potential consequences. Determining the worst risk

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is conceptually based on the probability of a particular negative outcome, or one that is thought to be negative. It is, as is evident, a standard concept of economic theory for calculating events with known or estimated probabilities in an uncertain world. Translating it into the real world faced by strategic risk analysts, however, is anything but simple. In real life, for example, it is difficult to calculate the probability of a change in market conditions such as to significantly change the strategic situation of the agent concerned. Indeed, very often evaluating the probability of this kind is a completely hypothetical exercise since the events are unique and no history is available to trace any kind of probability distribution. For example, when assessing the harm that can result from a marketing decision - for example the launch of a certain product - one must consider the gap between the existing strategy and the expected development of the market. The wider the gap, the higher the potential loss. Another example: although an event with a small probability can be classified as high risk if the expected loss is significant. Palm, the largest manufacturer of portable computers, around 1998 estimated the likelihood that Microsoft would decide to enter the industry and be able to change the "rules of the game" with its enormous marketing potential almost non-existent. It is instead Microsoft decided to enter, with consequences for competitors to say the least devastating

5. The matrix of losses

It is a quantitative approach which consists in bringing together in a single table all the possible actions with the related costs and results. For example, assuming that in relation to a certain event the alternatives at stake are retention, retention combined with preventive measures, insurance transfer, it is possible to construct the matrix of the exemplified losses reported in tav.1.

Subsequently, decision-making rules will have to be established which may be based on different criteria, including:

- *The minimax criteria*, according to which the maximum potential loss must be minimized. In the example shown, if the event occurs, the smallest loss occurs with the insurance transfer.
- *The criterion of minmin*, on the basis of which the minimum potential loss must be minimized. In the example considered, the application of the rule would lead to the choice of retention.

The application of the above mentioned rules is, in our opinion, of little help in the decisions in question. One (minimax) would in fact almost always lead to the choice of transfer insurance, while the other (minimum) would inevitably favor the more favorable situation, that is, the one in which the event does not occur, which appears to be excessively optimistic. It is true that a disturbance factor[1] could be introduced among the costs, but it would slightly shift the terms of the decision: in fact, on the one hand, it would have zero value in relation to the insurance transfer, while on the other hand it would be difficult to it may be worth more than the insurance premium. However, it should be noted that the decision maker, especially in this type of alternative, almost always has the ability to make an assignment of probabilities to the various

[1] The disturbance factor represents a cost, which added to the premiums due to partial insurance transfers, will allow to determine the total cost of each of the alternatives available.

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possible results. Thus, suppose he estimates 0.04 the probability of the event occurring without prevention measures and 0.02 with prevention. The matrix can be reconstructed by associating the relative probability to each possible result (Tav. 2).

Tav. 1: Loss matrix of event X

Actions	**Types of cost**	**Results**	
		X happens	**X does not happen**
Retention	Insurable losses	200.000	0
	Uninsurable losses	20.000	0
	Total cost	220.000	0
Retention with measures of prevention	Insured losses	200.000	0
	Unseluable losses	20.000	0
	Cost of prevention	10.000	10.000
	Total cost	230.000	10.000
Transfer	Award	16.000	16.000
	Total cost	16.000	16.000

Tav. 2: Statistical matrix of losses for the event X

Actions	**Results**				**Expected medium value**
	X happens		**X does not happen**		
	lost	**p**	**lost**	**q=1-p**	
Retention	220.000	0,04	0	0,96	8.800
Retention with measures of prevention	230.000	0,02	10.000	0,98	14.400
Insurance Transfer	16.000	0,04	16.000	0,96	8.000

In the presence of this situation the criterion for the decision could be that of minimizing the expected loss. In the example this criterion would bring to decide for retention. Also in this hypothesis it is necessary to consider the disturbance factor in a subjective way, which, in this case, could significantly affect the decision.

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6. Simulations

A very important technique for reducing risks - and more generally, to predict the evolution of systems or processes - is that of simulation. In general terms, a simulation consists in the study of a physical, biological, economic or social system, through an approximate mathematical model that reproduces the structure and behavior with an adequate degree of fidelity and without creating it or analyze it directly. The simulated system is qualified based on precise hypotheses. The simulation is therefore an explanatory model of reality. In a simulation they are distinguished:

- *The type of simulation*, which depends on the data detection procedure, which can in turn continuously or discreet in a mathematic sense.
- *The characteristics of the model*, which can be *static*, or *dynamic*, depending on whether you do not analyze the steps of a date of a given situation to another.
- *The assumption*, depending on whether the model is deterministic or stochastic (probabilistic) depending on the fact that they are absent or present of the random or random variables, that is, which can take different values according to the probability of known.

The econometric models for the analysis of the alternative behavior of economic systems in relation to different hypotheses about the evolution of the factors that influence them constitute one of the most important applications of the simulation technique. In the company field the most frequently used simulations concern budgetary results, variations in tax incidence, sales evolution and also the entire corporate strategy. After 1980, in fact, the attention of the simulation models for companies has moved from the relatively well-structured problems of the tactical and operational level to those less than the tactical and operational level to those much less structured than the global level. A mathematical or symbolic model represents both the most important components of a system as the structure of their interaction. Models can serve multiple purposes. They can help describe, understand and control the behavior of a system. In their analysis of Kahnemann and Tversky simulation olifference (1982) they observe that it can be bound or controlled in different ways. The initial conditions before making a date processing (RUN) can be left as are or the values can be modified to take some particular connotations; The result can be left free or you can predetermine one and then the goal of the simulation is to find the path between the initial conditions and that result. A simulation does not necessarily produce a unique story, which starts at a given point and ends with a given result. Rather, the result of a simulation is an assessment of the model's ability to produce different results, given the initial conditions and the operating parameters. An advanced development of simulation methods consists of the so-called acting simulations. They allow the analysis of the consequences of multiple individual behaviors: they are based on the use of models consisting of "artificial individuals" rather simple and capable only to react in a predetermined way to a number of situations by applying selected rules from a set coded by the external. Artificial individuals, ie

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agents, are then left free to act and interact. The behavior of the individual agents in the model depends on the choices of those who establish the set of rules and is therefore rather limited. However, by adopting the methods of artificial intelligence such as artificial neural networks and evolutionary algorithms, they are inserted in the agents of particular abilities it is possible to obtain more realistic and therefore more interesting results. The techniques are based on the imitation of the processes of natural evolution: the rules that constitute the regulatory heritage of the agents and determine its behavior are subject to procedures for reproduction and extinction. The cyclical repetition of proceedings allows the gradual improvement of regulatory heritage and therefore ensures the gradual growth of model reliability. However, the technique of agent simulation starts to be a very effective tool for the evaluation of economic, corporate choices and in fact of any kind.

7. Conclusion

At the end of work, we can certainly highlight that the attention paid by companies to the preventive assessment of strategic risk is insufficient. This probably depends on the fact that in the past they have developed in a relatively stable or at least predictable context with a reasonable degree of reliability. The rapid increase in uncertainty and complexity of the current environmental context, however, constantly increases the level of strategic risk they run. Hence the need to pay constant attention to it, providing the appropriate tools to analyze it and, as far as possible, prevent it. The risk assessment phase is a fundamental phase of the risk management process. Without it, the risk manager would have no directive towards which to direct their choices in terms of risk management. The multiplicity of variables, the systematic nature of the company and the risks associated with it, the influencing factors related to the external environment are very often unpredictable and do not respond to precise probability distributions. Therefore, we can affirm that the measurability of risk appears inapplicable with reference to the corporate field, in line with what is authoritatively stated in the doctrine regarding the difficulties associated with the application of mathematical models for the prediction and determination of corporate risks but certainly to have available valid risk treatment tools are really important and fundamental for limiting the negative events connected to the risks with which the company must interact to a minimum.

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