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Managing Uncertainty: Using AI to Effectively Reduce Risk

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Abstract: *In today's world, businesses encounter threats at any given moment, regardless of their nature, industry, or location. They must stay relevant in a competitive marketplace in order to preserve their position, accomplish their objectives, generate profits, and put objectives into practice to remain viable in the ever-changing environment in which they run their business. Businesses need to leverage the newest technologies in their operations to achieve all of this. Artificial intelligence is the newest and most controversial one.*

Key Words: *Risk, management, Artificial Intelligence, organization.*

***JEL Classification**: G32, D83, L23*

Introduction

In the current economic environment, operating at the national level is no longer enough for many companies. Every company that wants to expand, to have as much profit as possible, must venture into the international market. But, this adventure does not come without risks. Any new market that a company intends to conquer comes with great challenges. There are many risks, so any minor mistake may lead to significantly adverse results for those multinational enterprises.

According to the Latin meaning, the term risk refers not only to the chance of loss, but also to the chance of winning. However, the term "risk" tends to be used in everyday language to mean the danger of loss. The Latin word "*riscum*" had both negative and positive connotations.

Risk management processes are very important in assuring the best possible results for a company in general, and very importantly for an international organization where risk rate is very high. Therefore, managing risk is of great use and significance in all levels of strategy alike, such as functional, business and corporate, and as an optimization tool for any firm.

The world is currently undergoing a rapid digital revolution. Thus, AI started generating an impact in numerous fields as healthcare, education, marketing, retail or finance. According to Forbes (Forbes, 2021), expanding available data and AI capabilities force companies to get an AI strategy. Or they will face the risk of falling behind their more digitalized rivals.

1. Literature review

Risk management appeared more or less independently in certain fields, such as: safety, insurance, banking, investments, medical, mathematics, internal control.

The concept of risk has a long history. More than 2400 years ago, the Athenians offered their capacity of assessing risk before making decisions (Bernstein, 1996).

The earliest record of risk management comes from Babylon in the Code of Hammurabi, dating from around 2100 BC (Field, 2003). This refers to the term "bottomry", a form of marine insurance whereby the owner of the ship can borrow money to buy cargo and is not obliged to pay the debt if the vessel is lost at sea. The term refers to pledging the bottom of the boat to the lender.

At the beginning of the 20th century, the first significant studies in business risk management were developed by Willet (Willet, 1901), Knight publishes book that becomes a keystone in the risk management library. (Knight, 1921), Oberparletier (Oberparleiter, 1930), Stadler, (Stadler, 1932) and Sassi (Sassi, 1940). It is important to note that in 1915 Friedrich Leitner publishes *Die Unternehmensrisiken* in Berlin a dissertation on risk and some of its responses, including insurance. (Leitner, 1915). These authors for the first time treated risk as an independent topic of study, and described it as a measurable uncertainty in contrast with the concept of non-measurable uncertainty.

Between the two world wars the Austrian, the Viennese school and the Italian school from Florence were the most relevant ones in Europe, particularly with Oberparletier (Oberparleiter, 1930) and Leitner (Leitner, 1915).

The Journal of Finance (No. 7–, 77–91) publishes "*Portfolio Selection*," by Dr. Harry Markowitz, who later wins the Nobel Prize in 1990. It explores aspects of return and variance in an investment portfolio, leading to many of the sophisticated measures of financial risk in use today.

In 1956 The Harvard Business Review publishes "*Risk Management: A New Phase of Cost Control*," by Russell Gallagher, then the insurance manager of Philco Corporation in Philadelphia.

In 1979 Daniel Kahneman and Amos Tversky publish their "prospect theory," demonstrating that human nature can be perversely irrational, especially in the face of risk, and that the fear of loss often trumps the hope of gain. (Kahneman & Tversky, 1979).

An important definition of risk is "*the threat that an action or event will adversely affect an organization's ability to achieve its objectives and successfully execute their strategies*" (Griffiths, 1998).

Nassim Nicolas Taleb's The Black Swan is published by Random House in New York and it states that a black swan is a highly improbable event and that people are hardwired to learn specifics when they should be focused on generalities (Taleb, 2007).

In 2009, ISO, through ISO Guide 73: 2009, led to the definitions of generic terms related to risk management. In that Guide risk, is defined as the ''*effect of uncertainty on objectives''*.

Through a compelling combination of real-world examples, case studies, and humor, Savage demonstrates how the common reliance on averages can lead to significant misjudgments in risk assessment and decision-making. In *The Flaw of Averages*, Sam Savage, known for his creative exposition of difficult subjects, describes common avoidable mistakes in assessing risk in the face of uncertainty (Savage, 2012).

In 2015, using examples from the 2008 credit crisis, natural disasters, engineering disasters, Hubbard reveals critical flaws in risk management methods and shows how all of these problems can be fixed (Hubbard, 2015).

2. Risk types

Risk cannot be eliminated. Even the simplest business decision involves some risk. Recent events around the world have brought risk into higher profile. Terrorism, extreme weather events or the global financial crisis represent the extreme risks that society and commerce are facing. Therefore, companies need to manage all the influences that increase and reduce those risks so that they can pursue strategic advantage at minimum costs.

A. Strategic risks:

- *Business Environment*: Country Risk, Financial Markets, Economic Environment, Investors, Competition, Changes in Industries, Business Partners.
- *Legislative environment*: Regulations on tariffs, taxes, Licensing bodies.
- *Brand and commercial relationships*: Reputation, Licensing bodies, New product, Marketing

B. Finnancial risks:

- *Prices*: Interest rates, Currencies, Stock market, Energy market risk, non-energy market risk.

C. Operational risks:

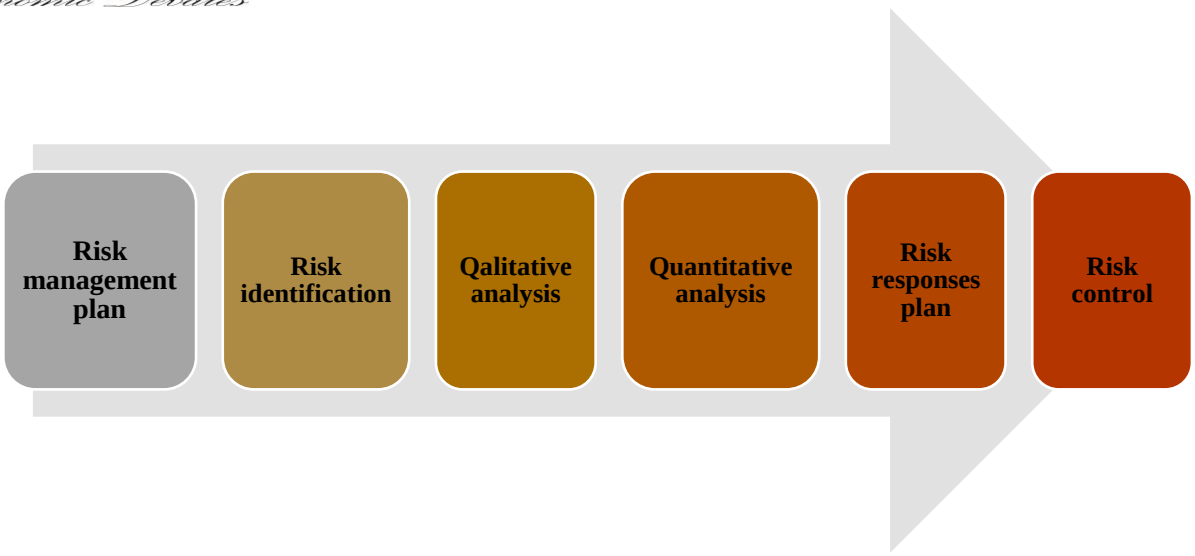
- *Maintenance*: Business interruption technology, Contract negotiations, Contract management, Industrial accident, Environmental damage, Security.
- *Human resources*: Health and safety, Competence, Key people, Culture, Social climate, Performance incentives.
- *Security*: IT Security, Intellectual Property, Financial Reporting.
- *Natural risks*: Extreme climate, Natural disasters.
- *Governance and Ethics*: Non-Compliance, Ethics, Fraud.

Risk can be seen as representing the inability of a firm to adapt in time and with minimal cost to environmental changes. Looking from this point of view, the risk that affects the activity of a company has as its main source the disruption of the business climate (external element) and the inability to minimize in a timely manner and at minimum costs the effects generated by this continuous evolution of the environment. Thus, an activity that is currently profitable may become unprofitable in the future as a result of unfavorable changes in environmental conditions.

3. The risk management process

Risk management is a technique which is increasingly used in organizations and by public bodies to increase safety and reliability and minimize losses. It involves the identification, evaluation and control of risks.

According to ISO 31000 Risk management process, "*the risk management process involves the systematic application of management policies, processes and procedures to the tasks of identifuing, analysing, assessing, treating, monitoring and communicating risk"* (www.iso.org).



Source: (Pritchard, 2015)

Figure 1. Risk management processes

Risk management process has six step set of practices. In the first one, it is established the risk infrastructure including risk language, tolerances and thresholds. The second step consists in the event description where the impacts can be negative or positive. Then we evaluate risk according to nonnumeric assessment protocols, followed by the most important risks evaluation based on their numeric probability and impact. To assess risk with more precision, artificial intelligence (AI) can be used because one of its main competencies is data aggregation and interpretation. In the next step are determined, evaluated and communicated the used strategies in risk dealing. The last step is when risk management and response plan are put into action.

Risk management offers a structured way of evaluating and dealing with future uncertainty. Traditionally, it has been concerned with the implications of events and changes in the future social, psychical and economic environment. But companies carry out their activity in a complicated and very fast-moving environment. This is the reason why, today, traditional threat management techniques may not be the answer. To accomplish more, enterprises need to incorporate AI into their strategies from the beginning.

4. AI and the risk management process

The most significant technological advancement is artificial intelligence. It can automate routine processes, lower expenses, and increase productivity for businesses.

We define AI Risk Management as being *the process of identifying, assessing, and managing risks associated with using AI technologies*. It includes comprehending the possible drawbacks as well as advantages of artificial intelligence, creating plans and guidelines to reduce such risks, and keeping an eye on and reacting to developments in the AI landscape.

The use of AI in risk management will define the next era of technological advancement and become essential to companies' AI strategies. Because of Artificial Intelligence's quick expansion and many applications, AI risks are continuously changing and evolving, meaning that comprehensive risk management strategies are needed to avoid reputational damage and facilitate legal agreements.

AI is on the verge of transforming the way organizations operate. In Figure 2, we can analyze a few of the areas where data is already being used to optimize performance.

Source: authors

Figure 2. Domains in which AI is used for optimizing performance

As we can see, in the field of automated transportation AI is beginning to be used more frequently in both public and private transportation, in fraud detection and prevention businesses rely on AI to identify transaction patterns that diverge from a client's past purchases, in the gaming industry AI is used to anticipate player behavior, strategies, and to learn from every given piece of data. Also, in the investment process, AI analyzes vast volumes of financial data to forecast shifts in the market and in prices, in healthcare, by using AI technology, medical professionals may diagnose a lot of ailments far earlier than they otherwise would, in marketing, AI technologies are used, for example, to examine a user's online activity and in Monitoring Social Networks for bogus News, text recognition companies that use a variety of algorithms and machine learning techniques can identify bogus news. At the same time, companies use s*mart devices* to collect data regarding the usage and personalize the operation based on some specific patterns and *virtual assistants* that answer to the customer questions. And, when it comes to the *risk management process*, companies use AI to identify, assess and manage the risks.

Although Artificial Intelligence implementation is increasing, risk management is lagging. The problem is that many organizations need help to notice that they may have a problem. According to a report released by MIT Sloan Management Review and Boston Consulting Group (Mit Sloan Management Review, 2022), AI was a top strategic priority for 42% of the report's respondents but only 19% of them said their company had

implemented a responsible-AI program. This gap can increase the possibility of failure and exposes firms to regulatory, financial, and reputational risks.

But, although Artificial Intelligence can be a powerful tool for risk reduction, it also has a dark side. Similar to humans, AI can be affected by preconception. An algorithm that is set up without proper human oversight can make use of predictions that are discriminatory, are violating legal and ethical standards. Suitable risk and benefit tradeoffs need to be included in model designs as safeguards against predictions that could be unsafe in the long run (McKinsey, 2019).

Risk management is a process that should be controlled by experienced human professionals and Artificial Intelligence shouldn't be seen as a substitute for the human element.

5. Conclusions

Digital transformation continues to change the world we operate in. Although it is believed that Artificial intelligence represents the new future for the companies, no matter their industry, there are doubts if AI is the right technology for the highly regulated and inherently cautious risk management departments, where data and complex statistical models must be carefully validated.

Artificial Intelligence improves the efficiency of operational processes, improves data management, and facilitates decision-making. That's why many experts consider AI for risk management as a game-changer. It's expected to significantly change the risk management domain as it will become more mature. Effective implementation of AI in firm entails comprehensive risk management to make sure it is trustworthy and it has ethical use.

Risk management is a organization department that has become very important over the past decades as the environment that is constantly changing, with new risks to manage and mitigate. AI can help firms manage new and potential risks more effectively and efficiently through the automation of complex tasks, improved accuracy and actionable insights for the decision-making processes.

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