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The evolution of risk management

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Abstract: The aim of this paper is to present the evolution of approaches towards risk management, starting from the beginnings of this field and ending with modern times. The article provides an overview on the applied approaches towards risk management. It allows to understand the basics of contemporary risk management concepts in enterprises and can provide guidance for further research on risk. The author analyzes in detail the change in approaches towards risk management over the years, focusing in particular on traditional, silo risk management and on the most modern concept—ERM, currently considered the most mature and the most perfect, proactive approach towards risk management in an enterprise. Silo risk management treats individual risks independently and focuses on minimizing risk exposure, while the essence of ERM is the integrated management of all risks to which the organization is exposed and the inclusion of risk management in the organization's strategy.

Keywords: ERM, history of risk management, proactive risk management, silo risk management

1. Introduction

Making decisions in the face of uncertainty has accompanied the mankind since its very beginnings. The survival of *Homo sapiens* has always been closely related to the development of a continuous and instinctive desire to protect oneself against risk, which is an inherent element of human existence (Kloman, 2010). This genetic tendency to avoid risk has become the basis of the field of risk management that has recently developed.

The development of risk management is closely related to the emergence of new types of risk and is a consequence of technological and economic development in the world. In the past, tools and devices that were applied, as well as systems and organizations that were established, were significantly simpler, and the effects of possible breakdowns, crises or fail-

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ures were also definitely less severe. Currently, the degree of complexity of the tools used and numerous connections among individual elements of economy mean that the occurring crises or failures may be much more extensive, often entailing catastrophic consequences. Today, all this necessitates the development of awareness related to the occurring risk as well as more effective management thereof. Moreover, the ability to manage risk, and thus to consciously define the appetite for risk, as well as to make the right decisions are the key elements contributing to the development of the entire economy (Bernstein, 1996).

Due to the increasing volatility of the economic environment, risk management is a field that is constantly changing. This leads to the emergence of new approaches towards risk management and the introduction of new risk management principles in organizations. The aim of this article is to analyze and systematize approaches towards risk management, starting from the beginning of this field and ending with the modern times. The author focused primarily on the newest and the most frequently used approaches: traditional, silo risk management and on the most modern concept—ERM. To achieve the aim of the research, which was to analyze the evolution of risk management, a detailed review of the literature on the subject was applied—in particular Polish and English-language risk management books, scientific articles and existing risk management standards. Systematization of knowledge in the field of risk management will allow for more conscious implementation and use of risk management systems by enterprises.

2. The origins of risk management

The first works on risk date back to the Renaissance, when research regarding the theory of probability began. Two outstanding scientists, Blaise Pascal and Pierre de Fermat, are considered to be the forerunners in the field which constitutes the mathematical basis of the conception of risk. Their discoveries, dating back to 1654, originally developed for purposes related to gambling, changed the perception of uncertainty, risk and decision making, and became the basis for the further development of risk science (Ross, 2004). Over the years, mathematicians have developed the theory of probability into a powerful tool used for information processing and decision making. From among the well-known scientists who have contributed to the science of risk, it is worth mentioning the following ones:

- Girolamo Cardano—calculated the probability on rolling the dice;
- Blaise Pascal—his deliberations on the theory of gambling (together with Pierre de Fermat) constituted the basis for the development of the probability theory; he proposed that the fear of harm should be measured not only by the size of potential losses, but also by the probability of a given event occurring;
- Jacob Bernoulli—the creator of the law of large numbers; he created the foundations of the probability theory;
- Abraham de Moivre—he dealt with the calculus of probability, he was the creator of the concept of normal distribution and standard deviation;
- Daniel Bernoulli—the author of the expected utility theory;
- Thomas Bayes—the author of the Bayes' theorem;

- Francis Galton—the creator of the conception of correlation and regression to the mean (Bernstein, 1996);
- Friedrich Leitner—the author of the work *Die Unternehmensrisiken*, published in 1915, dealing with risks and responses to them, including insurance;
- Frank Knight—defined the difference between uncertainty and risk; the author of the book *Risk, uncertainty and profit*, published in 1921; he analyzed the impact of risk on classic economics; he introduced the first universally recognized definitions of risk and uncertainty, analyzing the impact of these phenomena on people's economic decisions (Staniec and Klimczak, 2008);
- John von Neumann—the main developer of the game theory;
- Stanisław Ulam—the author of the Monte Carlo method;
- Harry Markowitz—the author of the portfolio theory;
- Kenneth Arrow—he conducted research on the problem of information asymmetry in the economy and the risk-bearing capacity (Kloman, 2010);
- Fisher Black, Myron Scholes, Robert Merton—the authors of the option pricing model.

The knowledge of probability and risk allowed to develop the field of risk management. Although the first known cases of conscious risk management date back to ancient times (the first forms of insurance) (Polish Chamber of Insurance, 2017), the real development of this field began in the 20th century and was a response to numerous painful economic, military and political events, natural disasters, as well as the very rapid development of science and technology (Przetacznik, 2018).

For centuries, risk management, known as insurance management, was merely equated with the use of insurance against losses caused by accidents (attacks, thefts, damage, adverse weather conditions, etc.). It was not until the mid-1950s that new forms of dealing with potential threats emerged. The emerging risks, which were costly or uninsurable, made some insurance unprofitable and often unavailable. In order to limit the negative consequences of certain events, new methods of self-insurance and protection against potential risks were developed (Dionne, 2013). The simplest form of self-insurance was to create special, possibly most liquid reserves or funds to cover potential losses. In turn, protective measures were aimed at preventing accidents, limiting negative consequences caused by them and influencing the distribution of potential losses (Ehrlich and Becker, 1972). The publication of the book *Risk Management in the Business Enterprise* in 1963 by R. Mehr and B. Hedges (Mehr and Hedges, 1963) had a significant impact on the development of the field of risk management. The authors proposed a five-step risk management process: identifying potential threats, measuring the size of these threats, assessing possible reactions, selecting an appropriate response and monitoring the effects. The said publication also contained a description of three basic methods of risk management, that is, acceptance, transfer and risk reduction. Also in 1963 the first person received the title of risk manager—Doug Barlow at Massey Ferguson (McShane, 2018). In 1966 Barlow introduced the "cost of risk" concept, which included also risk costs related to risk avoidance, risk mitigation, and risk retention (Kloman, 1992). It was the beginning of significant changes in the approach to risk management, which was revolutionized in the 1970s.

3. Traditional, silo risk management—an active approach towards risk

Until the 1970s risk management mainly focused on managing pure, insurable risks. The development of the Black-Scholes option-pricing model in the mid-1970s gave an analytical tool to price options and therefore enabled companies to start managing financial risks, often using structure and derivatives (McShane, 2018). New methods of risk management have been developed and new types of risk started being managed.

The 1970s are considered the beginning of the risk management trend, currently known as traditional or silo. Changes in the approach and the implementation of new methods of dealing with threats were caused by economic changes, and the growing importance of risks that could not be increased in market risk (mainly currency risk, interest rate risk, share price and commodity risks), largely due to the collapse of the Bretton Woods system and the transition to the system of floating exchange rates, as well as due to changes in interest rates in the financial market and increased volatility of goods prices, contributed to the development of new risk management tools. These tools were proposed by the financial market, offering derivative instruments as a form of protection against increasingly significant market risks (Jajuga, 2015).

As of the 1970s, enterprises began to apply new methods of risk management on a large scale, such as loss control, safety improvement, as well as other strategies aimed at avoiding, reducing or transferring risk. Managers dealing so far only with purchasing insurance, which was the dominant form of risk management, became risk managers. In addition to insurance, they were expected to develop programmes aimed at reducing potential losses (Hampton, 2009). Moreover, decisions related to risk management also became financial decisions, as the size of risk began to be assessed by its impact on the value of an organization (Dionne, 2013).

However, risk management methods applied by enterprises were still very narrow and selective. Only a few of the main threats to which an organization was exposed were managed, without taking into account the remaining risks and possible links that could exist between the individual risks. What is more, the traditional approach to risk management is characterized by perceiving risk only in a negative way and by disregarding its impact on the goals and strategy of an organization (Hunziker, 2019; Krysiak, 2011). The main objective of risk management is to minimize risk exposure.

In accordance with the traditional approach to risk management, individual risks are treated independently and analyzed separately, and risk management is only one of many functions in a company. Certain risks are managed independently by specific business unit leaders, who are responsible only for risks within their silo (Hunziker, 2019). Risk management is a separate, individual function, and risk-related actions are often unstructured and uncoordinated. Among the characteristic features of the silo approach, it is also worth mentioning the poorly developed infrastructure related to risk management and the lack of a risk manager.

4. Enterprise risk management—a proactive approach

Significant changes in the approach towards risk management took place in the early 1990s when the new conception of Enterprise Risk Management (ERM) was born. It was proposed then that organizations should start managing risk by means of one comprehensive programme (Hampton, 2009). In 1993, James Lam was the first one to use the title of "Chief

Risk Officer" (CRO), indicating the person responsible for managing all aspects of risk in an enterprise (Kloman, 2010), and the G30 published a document containing a detailed analysis of risk exposure for the derivatives market: *Derivatives: Practice and principles*. The document authored by G30 also contained recommendations on risk management, including credit, operational, market and accounting risks, which constituted a significant contribution to the ERM conception that was developed (The Group of Thirty, 1994). In turn, two years later, in 1995, the first risk management standard developed by Standards Australia and Standards New Zealand appeared—AS / NZS 4360: 1995 (AS / NZS 4360: 1995).

In the mid-1990s, a number of works on a new approach towards risk management were published. The new conception was initially created to satisfy the needs of the financial and insurance sectors, but quite quickly it began to be developed also for enterprises (Schiller and Prpich, 2014). The authors of publications on ERM emphasized the need to take into account all risks faced by an organization (not only specific ones, which are relatively easy to quantify) and the need to manage risk in a comprehensive manner, managing the whole risk portfolio for the entire organization (Fraser and Simkins, 2016). The need to limit the impact of operational risk on the operations of enterprises started to be emphasized, and the CRO began to function as a person fully responsible for the functioning of the ERM system (Lam, 2016). The new approach was to combine the management of various types of risk into one common framework, enabling the assessment of the impact of risk on the implementation of strategic goals of an organization (Schiller and Prpich, 2014).

The beginning of the 21st century saw major changes and a significant revival in risk management. The terrorist attacks of 11 September 2001 increased the awareness of previously ignored risks, such as the risk of terrorism or the risk of concentration, and also highlighted the complexity of risk and the need to use an integrated approach to its management (Segal, 2011). Additionally, the collapse of such giants as Enron and WorldCom shortly thereafter made the world realize that nothing is too big to fail (Kloman, 2010). The said event highlighted the risks of neglect and fraud, which led many organizations to implement measures to detect and prevent fraud (Lam, 2016). State institutions also reacted to these events. In 2002, the United States passed the Sarbanes-Oxley Act (SOX), aimed at ensuring the integrity and fairness of the entire process of creating financial statements among listed companies (Sarbanes-Oxley Act of 2002), and, two years later, the Basel Committee on Banking Supervision published the Basel II, indicating the framework in accordance with which financial institutions should manage financial and operational risk (Basel Committee on Banking Supervision, 2004). The two above-mentioned documents significantly influenced the direction of development of the ERM conception.

A significant impact on the development and popularization of the ERM conception was also exerted by the publication of risk management standards, which are a set of guidelines, sample tools and scenarios, helpful in implementing and using risk management systems in organizations. Among the most important and popular ones are the following three standards:

– FERMA risk management standard (A Risk Management Standard) published in 2003 by British industry organizations: the Institute of Risk Management (IRM), the Association of Insurance and Risk Managers (AIRMIC) and ALARM the National Forum for Risk Management in the Public Sector (FERMA, 2003);

– COSO Enterprise Risk Management Framework—the American standard, published in 2004 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO 2004) and a newer version of the standard, published in 2017 (COSO, 2017);
– ISO 31000 standard—a standard created in 2009 by the International Organisation for Standardisation (ISO 31000:2009). In 2018, the latest version of this standard was published (ISO 31000:2018), which replaced the standard of 2009.

The 1990s and the beginning of the 21st century were characterized by a relatively rapid development in the field of risk management. Numerous publications, studies and legal acts on this subject mainly were focused on financial and operational risk management (Lam, 2016). Changes were brought about by the global economic crisis that began in 2007. The events related thereto highlighted the weaknesses of risk management systems in many organizations and inspired reflection among both state institutions and organizations around the world. In response, new legal regulations were proposed to reduce risk exposure and improve the quality of risk management in organizations, mainly banks and financial institutions, including Basel III (Basel Committee on Banking Supervision, 2010) for the banking sector, Dodd-Frank Wall Street Reform and Consumer Protection Act adopted in the United States for financial institutions (Dodd-Frank Act, 2010), or the Capital Requirements Directive CRD IV (Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013) and the Capital Requirements Regulation CRR (Regulation [EU] No 575/2013 of the European Parliament and of the Council of 26 June 2013) concerning financial markets in the European Union. Moreover, the use of ERM systems has been increasingly promoted in order to manage risk better and more efficiently (Fraser and Simkins, 2016). The above regulations have largely influenced the organization and supervision of risk management in many enterprises. Compliance with legal regulations and the need to meet the requirements of the environment in many cases has become one of the main goals of the risk management function. This has increased the possibilities and importance of risk management not only in financial institutions but also in other sectors of economy (Lam, 2016).

5. Enterprise Risk Management—the basic assumptions of the conception

Enterprise Risk Management (ERM) is a relatively new, currently considered the most perfect approach to risk management. It was initiated in the 20th century and has been developed until today. In accordance with the ERM conception, risk in an enterprise is treated in a comprehensive and multi-faceted manner (Malinowska, 2011, p. 69). This means the necessity of coherent and comprehensive management of all risks to which an organization is exposed, including all business units, taking into account the links that may exist between individual risks (Bohnert et al., 2017; Bromiley et al., 2015).

One of the basic assumptions of the contemporary approach to risk management is ERM integration. Research shows that integration of management systems leads to a more coherent, consistent, comprehensive and harmonized risk identification and reduction of the size of risks affecting the key business aspects of an organization (Rebel, Silva and Santos, 2017). Therefore, risk management should be integrated with all processes in an organization and

be an integral part of all organizational activities (ISO 31000:2018; COSO, 2017). ERM processes must be embedded in the organization and dynamically adapt to the changing internal and external environment (Gorzeń-Mitka, 2011).

What is more, the key to the effective functioning of the risk management system is its integration with the strategy and strategic planning of an organization (Fraser and Simkins, 2016; Frigo and Anderson, 2011; Driscoll, Walker and Torok, 2011; Beasley and Frigo 2010), as well as with business planning. In order for the implemented risk management system to bring benefits to an enterprise, it must be integrated with the most important business processes, such as strategic management or strategic planning, and also be an element of financial and investment decisions in an organization (Sprčić, Kožul and Pecina, 2015). Hence, risk management should be an integral part of management and decision making. It should help to make aware decisions, set priorities and identify alternative courses of action (ISO 31000:2018; COSO, 2017). Risk culture and risk management should be clearly and unambiguously embedded in the process of developing and implementing the organization's strategy so as to form a mindset in which the strategy and risk are integrated with each other. It is both a challenge and an opportunity for an organization (Beasley and Frigo, 2010).

ERM is a holistic approach that treats the system as an integrity, which embraces the need to consider all risks together as a risk portfolio (Corning, 1998; Lee and Green, 2015). Risk portfolio management takes into account common features of individual risks and the interdependencies that may exist between them (Sharman, 2002). This enables the diversification of risks, the use of natural hedging and the reduction of the total amount of risk to which an organization is exposed (Lam, 2014). For this reason, risk portfolio management is more effective than managing individual risks separately (Bromiley et al., 2015), which affects the effectiveness of the entire ERM system and positively affects the results achieved. Studies confirm that implementation of ERM has a positive impact on company's performance and financial results (Saeidi et al., 2021; Ul Hameed et al., 2020; Hanggraen et al., 2019; Kakiya, Mose and Rono, 2019; Yang, Ishtiaq and Anwar, 2018; Eckles, Hoyt and Miller, 2014; Hoyt and Liebenberg, 2011) as well as on the value of the company (Silva, da Silva and Chan, 2019; Bohnert et. al., 2018; Lechner and Gatzert, 2018; Florio and Leoni, 2017). ERM implementation has also a positive impact on firm's competitive advantage (Saeidi et al., 2019).

For the risk management system to function well, it is also necessary to continuously identify, monitor and manage all major risks to which an organization is exposed (Stulz, 2008), identifying all types of risks (strategic, operational, financial, reputational, legal, etc.), concerning all functions of an enterprise (Decker and Galler, 2013). Risk management is a continuous and repeatable process. It is a series of successive, cyclically repeated, interrelated activities, which usually include the following: identification of potential risks, analysis of the effects and probability of their occurrence, control and minimization of the effects of these risks, as well as their monitoring and communication.

Also, ERM is characterized by the most perfect, proactive attitude towards risk (Adamska, 2009). Therefore, this approach requires continuous identification, analysis and proactive planning of responses to all potentially significant risks faced by an organization (Chapman, 2003). It requires initiative and willingness, as well as the ability to plan and predict future risks, even before they appear. Companies should create business continuity plans as well

as establish a risk management team and develop a risk appetite or risk tolerance statements (Tan and Lee, 2022). An important element of the conception under discussion is also taking into account not only negative risks, but also opportunities (Hunziker, 2019). Hence, apart from minimizing the negative impact of threats, enterprises should also focus on the best possible use of potential positive risks (Lam, 2016).

Importantly, the purpose of a properly functioning ERM system is not to minimize the company's exposure to risk, but rather to optimize it. An organization can consciously take a risk, but when such a risk arises, the organization should be able to take an appropriate action (Elahi, 2013). Risk management is aimed at improving the ability to adapt the business model and company strategy to the changing business environment (Hamel and Valikangas, 2003), by constantly following changes and responding to them. A well-functioning ERM system is therefore aimed at continuous improvement (ISO 31000:2018) and can be an important source of its competitive advantage.

6. Discussion

The evolution of approaches towards risk management is strongly related to the social and economic changes we have witnessed over the centuries, as well as to the ever-increasing volatility of the economic environment. Both scientists and organizations are still working on creating the best possible risk management system that will meet the needs of modern enterprises as much as possible, taking into account the environmental conditions in which these organizations operate.

In practice, the approaches that are most often used by enterprises are traditional silo risk management and the integrated, proactive ERM approach. Although the ERM approach is currently considered to be the most perfect, giving enterprises the most benefits, many enterprises still follow the traditional (silo) approach to risk management, focusing only on purchasing insurance policies and managing at most a few basic types of risk (Przetacznik, 2022). In order to summarize the described concepts of risk management—traditional and ERM—and to emphasize the differences between them, it is worth comparing the two approaches. The table below summarizes the most important characteristics of the ERM concept, comparing them with the features typical of the traditional approach to risk management (Table 1).

Table 1. Summary of the most important features of ERM in comparison with the features of the traditional risk management

Characteristics of ERM	Characteristics of traditional risk management
Consistent and comprehensive management of all risks to which the organization is exposed, taking into account the links that may exist between them, joint management of the risk portfolio.	Individual risks are treated independently and analyzed separately, their management is only one of many functions occurring in the enterprise, not all risks are taken into account.
Proactive attitude towards risk, risk seen as both a threat and an opportunity.	Risk is seen only as a threat, an active or reactive attitude towards risk.

Risk management is a continuous, repeatable and constantly improved process, implemented throughout the enterprise, an integral part of all processes occurring in the organization, fitted into the organizational structure of a given enterprise.	Risk management is a separate, single function, actions taken are often unstructured and uncoordinated.
An appropriate risk management culture, the involvement of all employees, and responsibility for risk at every workplace.	No risk management culture.
Well-developed risk management infrastructure (policy, procedures, risk indicators, reports, IT systems).	Poorly developed risk management infrastructure.
Clearly defined division of responsibilities, duties and competences, designated risk owners, risk manager position.	No risk manager.
Risk management is part of strategic planning and an integral part of management and decision making.	The impact of risk on the implementation of the strategy is not considered.
The goal is to optimize the level of risk.	The goal is to minimize risk exposure.

S o u r c e: Author's own elaboration.

The above summary highlights some of the most important features that distinguish the ERM concept from the traditional approach towards risk management. It is worth emphasizing, however, that despite significant differences, both traditional risk management and an integrated approach, due to the fact that they reduce the degree of uncertainty in the enterprise, have a positive impact on the functioning of the organization. However, in the case of the ERM approach, this impact is much stronger and more comprehensive. Therefore, it is crucial to continue work on improving the approaches towards risk management proposed by scientists and organizations, and it is worth promoting the latest concepts of risk management to raise awareness among managers and enable companies to manage risks as effectively as possible.

7. Summary

Technological development and ever stronger globalization mean that enterprises are now exposed to completely new, often still poorly understood risks, such as the Internet of Things, cybercrime, climate change, terrorism, and many others. This involves the necessity to constantly develop the field of risk management in order to create the best possible risk management systems, providing an organization with the best possible protection against threats and enabling an effective use of potential opportunities. The conception of ERM is therefore constantly evolving, and works, books or reports on this subject enable its improvement, and thus better adaptation of risk management systems to the changing environment. Therefore, when conducting further research on the ERM concept, it is worth focusing on determining how the risk management system in the organization should function and how it should be implemented. It is worth continuing to modify existing approaches towards risk management in order to find the most important and desirable features of risk management systems and to adapt existing concepts to the changing environment. A significant problem with the con-

cept seems to be the necessity to adjust the risk management system to a given organization. Different organizations may have different needs and requirements, so the implemented system should always be adapted to a given entity in accordance with the concept of "one size doesn't fit all".

Summarizing the described evolution of risk management, it is noteworthy that, regardless of the development of science, the approaches to risk management presented by enterprises are in practice characterized by a different level of maturity. Many companies still apply the traditional, silo approach to risk management, but, at the same time, more and more companies decide to implement modern ERM systems.

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Ewolucja zarządzania ryzykiem

Abstrakt: Celem artykułu jest przedstawienie ewolucji podejść do zarządzania ryzykiem, począwszy od początków tej dziedziny, a skończywszy na czasach współczesnych. Artykuł zawiera przegląd stosowanych podejść do zarządzania ryzykiem. Pozwala zrozumieć podstawy współczesnych koncepcji zarządzania ryzykiem w przedsiębiorstwach i może stanowić wskazówkę do dalszych badań nad ryzykiem. Autorka szczegółowo analizuje zmiany w podejściu do zarządzania ryzykiem na przestrzeni lat, skupiając się w szczególności na tradycyjnym, silosowym zarządzaniu ryzykiem oraz na najnowocześniejszej koncepcji – ERM, uważanej obecnie za najbardziej dojrzałe i najdoskonalsze, proaktywne podejście do zarządzania ryzykiem w przedsiębiorstwie. Zarządzanie ryzykiem silosowym traktuje poszczególne ryzyka niezależnie i koncentruje się na minimalizacji ekspozycji na ryzyko, natomiast istotą ERM jest zintegrowane zarządzanie wszystkimi ryzykami, na które narażona jest organizacja, oraz włączenie zarządzania ryzykiem w strategię organizacji.

Słowa kluczowe: ERM, historia zarządzania ryzykiem, proaktywne zarządzanie ryzykiem, silosowe zarządzanie ryzykiem