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FROM SILO APPROACH TO RISK PORTFOLIO MANAGEMENT – A NEW WAY OF ANALYZING RISK IN AN ENTERPRISE

OD KONCEPCJI SILOSOWEJ PO ZARZĄDZANIE PORTFELEM RYZYKA – NOWE PODEJŚCIE DO ANALIZY RYZYKA W PRZEDSIĘBIORSTWIE

Abstract: The paper presents the concept of risk portfolio management – a holistic approach to risk analysis. It summarizes current state of knowledge regarding examined topic. Assessment of the suitability of portfolio management approach in the enterprise risk management was based on review of the subject literature. The author makes an attempt to confirm the hypothesis of risk portfolio management being a necessary and key part of proper enterprise risk management. The first section of the article provides a brief overview of the evolution of risk management. In the succeeding sections, descriptions of two latest risk management approaches: the traditional, silo risk management and the Enterprise Risk Management (ERM) approach are followed by a presentation of the risk portfolio management concept, which is compared to stock portfolio management. The paper focuses on the kinds of dependencies between certain risks which should be particularly considered and the ways in which portfolio analysis can be used to enhance a company's understanding of its risks and enable it to make better management decisions. The last section of this paper presents potential effects of the implementation of the portfolio approach, focusing on benefits of portfolio management in a company's activities.

Keywords: Enterprise Risk Management, ERM, risk portfolio management, risk analysis, evolution of risk management

Streszczenie: Artykuł prezentuje koncepcję zarządzania portfelem ryzyka – holistyczne podejście do analizy ryzyka. Ma charakter poglądowy, podsumowujący aktualny stan wiedzy w badanym obszarze. Na podstawie analizy literatury przedmiotu dokonana w nim została ocena przydatności zarządzania portfelem ryzyka w funkcjonowaniu przedsiębiorstwa. Autorka podejmuje próbę potwierdzenia hipotezy, iż zarządzanie portfelem ryzyka jest kluczowym i koniecznym elementem zarządzania ryzykiem w przedsiębiorstwie. Pierwsza część artykułu zawiera krótki przegląd ewolucji zarządzania ryzykiem oraz opis dwóch najnowszych podejść do zarządzania ryzykiem: tradycyjnego (silosowego) oraz zintegrowanego (ERM). Następnie zaprezentowana została koncepcja zarządzania portfelem ryzyka, będąca jednym z kluczowych elementów podejścia ERM. Zostały tu wyróżnione rodzaje współzależności mogących wystąpić pomiędzy poszczególnymi rodzajami ryzyka, na jakie warto zwrócić szczególną uwagę, opisano także, jak analiza portfelowa może zostać wykorzystana do poprawy świadomości ryzyka oraz podejmowania lepszych decyzji biznesowych w przedsiębiorstwie. Na koniec zaprezentowane zostały potencjalne efekty implementacji podejścia portfelowego, z uwzględnieniem korzyści, jakie może przynieść organizacjom jego stosowanie.

Słowa kluczowe: zintegrowane zarządzanie ryzykiem, zarządzanie ryzykiem w przedsiębiorstwie, zarządzanie portfelem ryzyka, ERM, analiza ryzyka, ewolucja zarządzania ryzykiem

Preface

The paper describes the concept of risk portfolio management, which is a relatively new, holistic approach to risk analysis. As opposed to traditional risk management, the portfolio approach aggregates the impact of the complete spectrum of

risks and handles them as a portfolio of interrelated risks. The portfolio approach is a crucial element of the Enterprise Risk Management (ERM) concept, which has been becoming increasingly popular among enterprises in the last few years.

The following paper provides an overview of the evolution of risk management, focusing on the traditional, silo approach and the ERM concept. Brief descriptions of both risk management approaches are followed by a presentation of the risk portfolio management concept, which is compared to stock portfolio management. The paper focuses on the kinds of dependencies between certain risks which should be particularly considered and the ways in which portfolio analysis can be used to enhance a company's understanding of its risks and enable it to make better management decisions. The last section of this paper presents potential effects of the implementation of the portfolio approach, focusing on benefits of portfolio management in a company's activities.

1. Brief history of risk management

Making decisions in the face of uncertainty has always been a part of human existence. Developing an instinctive and constant will to protect oneself from risk is the determinant of human survival. This genetic predisposition became the beginning of the risk management discipline[1].

The development of risk management is strictly connected with the emergence of new risks and is a consequence of economic and technological development. Currently, the high level of complexity of many applied tools, as well as the number of connections between individual elements of the economy, are the causes of even more severe consequences of the occurring crises or breakdowns. That is the reason for the rising level of risk awareness and the emerging need for even more effective risk management[2].

The first papers regarding risk appeared during the Renaissance period, when research on probability theory began. The precursors of this field, which is the basis of the mathematical concept of risk, are two distinguished scientists – Blaise Pascal and Pierre de Fermat. Their discoveries, initially developed for hazard games, changed the way people perceived risk and uncertainty and turned out to be the beginning of risk management development[3]. Over the years, mathematicians transformed the probability theory into a powerful tool used for information processing and decision making[4].

Even though early forms of risk management (insurance) appeared during the ancient times, the real and dynamic development of this field began in the 20th cen-

[1] J. Fraser, B. Simkins (ed.), *Enterprise Risk Management: Today's Leading Research and Best Practices for Tomorrow's Executives*, John Wiley & Sons, Hoboken, New Jersey 2010, p. 19.
[2] P.L. Bernstein, *Against the Gods: The Remarkable Story of Risk*, John Wiley & Sons, New York 1996, p. 2-3.
[3] J.F. Ross, *Pascal's Legacy*, EMBO reports 2004, vol. 5, p. 7-10.
[4] P.L. Bernstein, *Against…*, p. 4.

tury[5]. This rapid development was an answer to a number of harmful economic, political and military events and natural disasters, as well as fast progress in science and technology. The first forms of risk management, other than common insurance, appeared in the 1950s. Expensive and sometimes even uninsurable risks which then appeared made some kinds of insurance economically viable. To protect companies from the negative consequences of some events, new forms of self-insurance and loss prevention were introduced[6].

Starting from the 1970s, enterprises began introducing new ways of risk management, such as loss control, safety improvement, risk avoidance, reduction or transfer[7]. What is more, risk management decisions became at the same time financial decisions, because the level of risk started to be evaluated through its influence on a company's value[8]. This was the beginning of the so-called traditional approach to risk management – the "silo" approach.

Crucial changes in the risk management approach arose in the beginning of the 1990s, when the new Enterprise Risk Management (ERM) concept was introduced. Companies started to manage their risks through the comprehensive program[9]. The function of a "Chief Risk Officer" was proposed by James Lam, and several documents, standards and papers regarding Enterprise Risk Management were published[10].

2. Traditional risk management – "silo" approach

According to the traditional "silo" approach, various types of risks (financial, operational, market, etc.) are handled separately. Managing those risks is only one of many individual functions in an enterprise[11]. Companies manage certain risks selectively and independently, without considering any relations which may exist between those risks. The "silo" risk management concept is characterized by a negative attitude towards risk[12], which means that traditional definitions of risk deal mostly with injury, loss or other negative events, omitting possibilities seen as the upside of

[5] *Historia ubezpieczeń*, An article available on the Polish Insurance Association website, https://piu.org.pl/public/upload/ibrowser/historia_ubezpieczen_-_na_swiecie_i_w_polsce.pdf [access: 10 Jan. 2018].

[6] G. Dionne, *Risk Management: History, Definition and Critique*, "Risk Management and Insurance Review" 2013, Vol. 16, No. 2, p. 149-150.

[7] J.J. Hampton, *Fundamentals of Enterprise Risk Management*, AMACOM, New York 2009, p. 11.

[8] G. Dionne, *Risk Management: History, Definition*…, p. 150.

[9] J.J. Hampton, *Fundamentals*…, p. 17.

[10] J. Fraser, B. Simkins (ed.), *Enterprise Risk Management*…, p. 25- 27.

[11] J. Lam, *Enterprise Risk Management: From Incentives to Controls*, John Wiley & Sons, Hoboken, New Jersey 2014, p. 51-52.

[12] U. Malinowska, *Charakterystyka kluczowych koncepcji zarządzania ryzykiem w przedsiębiorstwie*, [in:] S. Kasiewicz (ed.), *Zarządzanie zintegrowanym ryzykiem przedsiębiorstwa w Polsce*, Wolters Kluwer Polska, Warszawa 2011, p. 67.

risk[13]. This implies that the main purpose of risk management is to mitigate risk by reducing the impact of negative events. What is important, the traditional approach does not include any influence of risk management on an organization's objectives or strategy[14]. There is no overall, holistic view of risk factors which can jeopardize an enterprise as a whole[15].

Traditionally, enterprises delegate the risk management function to personnel with adequate knowledge and experience in dealing with a certain risk. For example, the finance department manages financial risk, the IT department deals with cyber risk, etc. As a result, an individual department is responsible only for a narrow group of risks which falls within the scope of its duties[16]. People responsible for managing certain risks operate independently, striving to mitigate specific hazards. They focus on identifying and managing only the types of risks that can be the source of a significant loss from the individual department's point of view, while all other risks are ignored. What is more, risk identification is based on an employee's experience, their knowledge of the given company and historical data analysis[17]. Practical abilities and intuition of responsible employees play an important role in the risk identification process[18]. Companies eagerly focus on managing easily measurable types of risk. As a result, financial risk management, as well as buying insurance, play an important role in traditional risk management[19].

The silo risk management concept has both positive and negative aspects. Undoubtedly, the fairly simple structure of traditional risk management, in comparison with less conventional approaches, is easy and cheap to implement. Moreover, sharing responsibilities between existing departments does not require engaging any additional employees and does not call for any organizational changes.

On the other hand, traditional risk management is quite selective. There is no complete list of all potential hazards, which implies that some risks might be overlooked. What is more, risks are identified and managed separately and independently – there is no selected person responsible for the coordination of the risk management process (i.e. a risk manager). This may cause significant problems in communication and information flow between people managing individual risks. Moreover, when risk is analyzed within a silo, an optimal risk prioritization might be challenging, because individual departments may suffer from an inability to understand how risks which

[13] J.J. Hampton, *Fundamentals…*, p. 5.
[14] Z. Krysiak, *Silna kultura zarządzania ryzykiem jako cecha nowoczesnych organizacji*, „e-mentor" 2011, 2 (39), s. 24-33.
[15] U. Malinowska, *Charakterystyka kluczowych koncepcji…*, p. 67.
[16] P.E.J. Green, *Enterprise Risk Management: A Common Framework for the Entire Organization*, Elsevier, Oxford 2016, p. 141.
[17] U. Malinowska, *Charakterystyka kluczowych koncepcji…*, p. 67.
[18] M. Zdanowski, *Zarządzanie ryzykiem. Próba opisania procedur i określenia obszarów działalności badawczej*, „Zarządzanie Ryzykiem" 2000, issue 1, p. 9.
[19] U. Malinowska, *Charakterystyka kluczowych koncepcji…*, p. 68.

they are responsible for can affect the company's total risk[20]. All this can lead to a situation where some of the organization's crucial risks remain unnoticed or are treated as the responsibility of another function, and as a result are not managed by anyone[21]. This can also lead to the company taking inappropriate actions regarding dealing with certain risks, which may be costly or even hazardous.

3. Enterprise Risk Management concept

The ERM concept differs significantly from the traditional risk management approach. According to ERM, risk in an enterprise is treated in a holistic and multifaceted way. This indicates the necessity to manage all potential risks in a coherent and comprehensive manner, with all possible links between individual risks taken into consideration[22]. Risks are strictly connected with each other, so they should be managed together (centrally) and handled as a risk portfolio[23]. It is also important to manage all potential risks an organization faces[24]. Consequently, a company should protect all its resources – tangible and financial, as well as intangible[25]. This enables complete and conscious risk management and mitigates the probability of missing crucial hazards or chances during the risk analysis process.

Risk management is a continuous and repeatable process, which consists of determined, alternating actions[26]. It is crucial for a well-functioning ERM system to be correctly fitted in an organization's structure and culture, as well as to be rightly adjusted to all operational processes in the enterprise[27]. What is more, the risk management function should be merged with all processes within the company and implemented in the whole organization[28]. It ought to connect different management systems into a consistent enterprise management system[29].

One of the inherent elements of an ERM system is an appropriate organizational culture. Strong risk culture encourages both employees and managers to search for new risks and motivates them to consider risk factors while making operational and

[20] P.E.J. Green, *Enterprise Risk Management…*, p. 141-143.
[21] A. Decker, D. Galler, *Enterprise Risk Management: Straight to the Point*, ERMSTTP, Middletown 2013, p. 8.
[22] P. Bromiley, et al., *Enterprise Risk Management*, "Review, Critique and Research Directions, Long Range Planning" 2015, 48, p. 265.
[23] J. Lam, *Enterprise Risk Management…*, p. 51-52.
[24] A. Decker, D. Galler, *Enterprise Risk Management...*, p. 2.
[25] U. Malinowska, *Charakterystyka kluczowych koncepcji…*, p. 69.
[26] K. Cormican, *Integrated Enterprise Risk Management: From Process to Best Practice*, "Modern Economy" 2014, p. 403-404.
[27] G. Hamel, L. Valikangas, *The quest for resilience*, "Harvard Business Review" 2003, Vol. 81, No. 9, p. 52-63.
[28] Z. Krysiak, *Silna kultura zarządzania…*, p. 24-33.
[29] J. Bizon-Górecka, *Modelowanie struktury systemu zarządzania ryzykiem w przedsiębiorstwie – ujęcie holistyczne*, TNIiK, Bydgoszcz 2007, p. 14.

strategic decisions[30]. Hence, for an ERM system to be effective, besides building an appropriate infrastructure (policies, procedures, models), it is crucial to introduce a risk culture based on risk responsibility on every position[31].

Another important element of the ERM concept is including not only potential hazards (negative risks) in the risk management process, but also chances (positive risks). Therefore, besides minimizing the adverse impact of negative events, companies should also focus on benefits coming from positive risks[32]. What is more, risk management has a strong influence on pursuing strategic objectives[33]. In accordance with ERM, risk management should be an inherent part of strategic planning and decision making. It supports making mindful choices, determining priorities and identifying alternative directions[34].

Among all the above characteristics describing the ERM concept, for the purpose of this paper, it is crucial to emphasize its holistic and comprehensive approach to risk analysis. As opposed to traditional risk management, where each risk is treated separately and independently, it is essential for ERM to analyze and manage risks together. According to the ERM theory, managing risks in a portfolio is much more effective than managing each individual risk separately[35]. Hence, addressing the complete spectrum of risks, as well as managing the aggregated impact of those risks handled as a portfolio of interrelated risks, should be an inherent part of risk management[36].

It is also important to notice that even though the ERM approach is becoming more and more popular these days, many companies still manage their risks in the traditional way, focusing on buying insurance and managing only a few basic types of risk.

4. Risk portfolio management – a new approach to risk analysis

One of the main goals of ERM is to implement a holistic approach to risk analysis, which aggregates individual risks into a risk portfolio. Risk portfolio management in an enterprise can be easily compared to stock market portfolio management[37]. In a stock market, instead of managing each stock independently, which is both costly and unnecessary, it is much more efficient to control the level of risk and

[30] B. Boultwood, M. Dominus, *Developing an Effective Risk Culture*, "Electric Perspectives" May/June 2014, p. 57-60.
[31] Z. Krysiak, *Silna kultura zarządzania*…, p. 24-33.
[32] J. Lam, *Next Frontier: Performance-Based Continuous ERM*, Workivia 2016, https://www.workiva.com/resources/next-frontier-performance-based-continuous-erm [access: 11 Jan 2018].
[33] G. Monahan, *Enterprise Risk Management, A Methodology for Achieving Strategic Objectives*, John Wiley & Sons, New Jersey 2008, p. 11-13.
[34] PN-ISO 31000, Zarządzanie ryzykiem. Zasady i wytyczne, Polski Komitet Normalizacyjny, Warszawa 2012, p. 27
[35] P. Bromiley, et al., *Enterprise Risk Management*…, p. 268.
[36] RIMS, 2011. *FAQ on SRM and ERM. Why Strategic Management?*, http://www.rims.org/resources/ERM/Documents/ [access: 10 Jan 2018].
[37] See: H. Markowitz, *Portfolio Selection*, "Journal of Finance" 1952, 7, No. 1, p. 77-91.

return for the whole stock portfolio. According to the portfolio theory, a rational investor should search for an efficient relation between risk and return – maximize the level of return for the same level of risk (variance) or minimize the level of risk for the same level of return. It is also important to diversify the portfolio composition by investing in a wide variety of securities and choosing securities with the lowest covariances possible. Assuming a low level of covariance, diversification neutralizes specific risk, which means that positive performance of some securities in the portfolio equalizes negative performance of others. All this enables more efficient portfolio management and lowers the total level of risk in a portfolio.

According to ERM, a business portfolio should be managed the same way as a stock portfolio is managed by a fund manager[38]. First of all, each risk a company faces should be analyzed and used as input to build a risk portfolio. A person typically responsible for the development and implementation of the risk portfolio in a company is a Chief Risk Officer (CFO)[39]. In a risk portfolio, characteristics and interdependencies shared by individual risks are identified and serve as a basis for grouping risks based on how they relate to each other[40]. Only after all risks are incorporated into the portfolio can an analysis be started.

While analyzing a risk portfolio, all possible dependencies which may exist between individual risks should be identified. Particular attention should be paid to:

- Risk diversification – lowering the total risk of an enterprise by spreading risk between many different processes, actions or projects which are not affected by certain risk-driven events in the same manner (lower level of correlation between projects results in a greater diversification and lower level of total risk of the company). An example of risk diversification can be natural hedging. Natural hedging occurs when a certain risk-driven event results in negative performance of one of the company's functions and positive performance of another one the same time (e.g. accounts receivable and payable carried in the same, foreign currency – when analyzed separately, they seem to be a currency risk, but when analyzed together as a portfolio, they neutralize each other).
- Risks which may appear collectively:
  - simultaneously – having the same cause (e.g. heavy storms can cause floods, destruction of inventories, delays in transportation of materials, components and products, staff absence – all of those events may appear at the same time and therefore their consequences can be harder to mitigate),
  - consecutively – one risk being a consequence of another (e.g. a supplier's bankruptcy can cause problems with the delivery of materials needed for the pro-

[38] J. Lam, *Enterprise Risk Management*…, p. 99.
[39] P.E.J. Green, *Enterprise Risk Management*…, p. 146.
[40] R. Sharman, *Enterprise Risk Management – the KPMG approach*, "The British Journal of Administrative Management", May/June 2002, p. 26-28.

duction process, leading to production delays and problems with delivering products to customers, which, in the worst case, may mean losing a key customer). While analyzing risks, all possible consequences must be considered.

A detailed risk portfolio analysis enables a company to determine which risks may have the biggest impact on its earnings and cash flow volatility and therefore are the most important to mitigate. To correctly choose the most significant risks, it is crucial to consider the final level of individual risks, including all interdependencies which exist between certain risks in the portfolio. Due to risk diversification or possible collective appearance of risks, the final, overall impact of some events on the company's total risk may turn out to be significantly different (higher or lower) than the level of those risks considered in isolation. Therefore, portfolio analysis enables proper risk prioritization and simplifies defining the most effective ways of managing risks in the portfolio of a specific company. Moreover, it is possible to calculate the level of a company's total risk and select risks with the highest impact. It is also possible to set a total risk limit for a company (the total level of risk which cannot be exceeded) and risk concentration limits (the maximum level of risk for a certain project, process, action, etc. which ensures an appropriate business diversification).

An aggregated approach to risk analysis facilitates risk diversification and choosing natural hedges that can be used for a given risk portfolio. The total risk produced by a collection of various risks is less than the sum of those risks considered in isolation, so diversification significantly lowers the total risk of the company[41]. Portfolio management also prevents the company from taking unnecessary risk management actions (e.g. buying hedging instruments) when natural hedges occur. It is very important to notice that, according to ERM, companies should be viewed as portfolios of businesses, each with its individual and unique risk and return characteristics. Business portfolio managers should pursue understanding of the connections between risk causes and transfer, and should make decisions that place the overall enterprise portfolio at a desirable, optimal level of risk and return[42].

5. Effects of an aggregated approach to risk analysis

The aim of the development and implementation of a risk portfolio is to enhance a company's understanding of its risks and enable making better decisions, which will increase the company's value[43]. Portfolio management allows more aware and more effective risk analysis. The fact that all dependencies existing between certain risks are considered brings about more adequate risk assessment and prioritization and enables implementing risk diversification techniques. Moreover, it is conducive

[41] J. Lam, *Enterprise Risk Management*…, p. 101.
[42] Ibidem, p. 99-102.
[43] P.E.J. Green, *Enterprise Risk Management*…, p. 146.

to recognizing natural hedges and better evaluation of hedging instruments. This in turn results in better risk management strategies and increases the company's overall performance. According to recent research, adopting a holistic approach to risk management reduces the level of observable risk, lowers the marginal cost of risk reduction, increases the company's value and increases the ratio of return on assets[44].

What is more, the portfolio approach provides reliable information about all of the company's risk exposures and correlations between them. This enables adjusting business decisions to previously set total risk limits and to an optimal, balanced level of risk and return. As a result, the company can reduce risk better, make more aware decisions and therefore gain competitive advantage.

Even though risk portfolio management is undoubtedly beneficial for a company, it is important to implement and use this approach consciously and reasonably. To develop a sophisticated risk portfolio, it is necessary to use advanced statistical models, which are helpful, but not always perfect and faultless[45]. Therefore, the interpretation of results of statistical analyses should always be careful and should not lead to the management's overconfidence and excessive sense of security. It is essential to remember that it is impossible to precisely predict the future and all the consequences of coming events.

Conclusion

Risk portfolio management is a crucial and necessary element of the Enterprise Risk Management (ERM) concept. It is a relatively new, holistic approach to risk analysis, which differs significantly from the traditional, silo approach. As opposed to traditional risk management, where each risk is treated separately and independently, according to ERM, all risks should be aggregated into a risk portfolio, analyzed and managed together, as in the case of a stock portfolio. This enables more effective and more mindful risk management and increases the overall performance of a company.

The portfolio approach gives a big picture of all risks and interdependencies which may exist between them. This enables better risk prioritization, recognizing natural hedges and implementing risk diversification techniques. Even though a holistic approach to risk management reduces the level of observable risk and has a significant impact on a company's performance, it is essential to use this approach consciously and reasonably. Every model implemented directly, without adjusting it to a specific enterprise and with too much overconfidence in the precision of the model might turn out to be ineffective.

[44] D.L. Eckles, R.E. Hoyt, S.M. Miller, *The impact of enterprise risk management on the marginal cost of reducing risk: Evidence from the insurance industry*, "Journal of Banking and Finance" 2014, No. 43, p. 247-261; A.P. Liebenberg, R.E. Hoyt, *The value of enterprise risk management*, "The Journal of Risk and Insurance" 2011, No. 78(4), p. 795-822.

[45] P.E.J. Green, *Enterprise Risk Management…*, p. 147.

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