

## THE ROLE OF SENIOR MANAGEMENT IN NATURAL HAZARDS: A EUROPEAN BANKING INDUSTRY CASE

Tamas Somogyi\* and Rudolf Nagy

*Doctoral School on Safety and Security Sciences, Óbuda University, Budapest, Hungary*

*(Received 14 June 2024; accepted 17 April 2025)*

---

### Abstract

The issue of natural hazards is a major area of interest within the field of security and business management. Proper risk management has been found to be fundamental, thus has received considerable attention. However, very little attention has been paid to the role of senior management within an enterprise's risk management framework. This paper seeks to explore this special role in the risk management process, especially when dealing with the risks related to natural hazards. The appropriate role of senior management in managing the risks related to natural hazards is a key issue. The European banking industry's approach is presented, based on the publicly available sector-specific regulations and guidance. Some recommendations are provided to further enhance the key role of senior management in natural hazards. Our result is considered as a solution that can be adopted by enterprises, organisations and institutions in any sector.

*Keywords:* senior management, risk management, natural hazards, banking industry

---

### 1. INTRODUCTION

In 1995, Feuer published a paper in which he demonstrated the essential role of quality in businesses (Feuer, 1995). According to Denning, it is still believed that the main goal of business is to make profit instead of enriching customers' life by creating a resilient and sustainable firm (Denning, 2022). Whether or not concentrating solely on profit, business is jeopardised by multiple

factors. As it has been revealed, economic policy uncertainty and political instability negatively affect the performance of any business (Jia & Li, 2020). Moreover, terrorist groups can threaten managers and the operation of business (Sinkó & Besenyő, 2023). By the same token, the rivalry among the leading powers has an impact on the national economy and businesses (Besenyő, 2021; Štrucl, 2022). In addition to this, digital technologies nowadays are more and

---

\* Corresponding author: [somogyi.tamas@uni-obuda.hu](mailto:somogyi.tamas@uni-obuda.hu)

more important (Csiszárík-Kocsir & Varga, 2023; Czékmann & Cseh-Zelina, 2023), however, the increased usage of technology and presence in the cyberspace unavoidably increase the level of risk (Bederna & Rajnai, 2022; Kovácsné & Michelberger, 2018). Thus, the need for efficient security measures relating to IT services is increasing (Kemendi et al., 2021; Bederna et al., 2021). Moreover, customers seem to expect the proper level of security (Szucs et al., 2024). In addition to these examples, the effect of the so-called black swan events e.g., the coronavirus pandemic, make the economic situation difficult and even lead to the failure of business (Besenyő & Kármán, 2020). Extreme environmental events also can precipitate business failures (Amankwah-Amoah et al., 2021). These examples suggest that there are several major concerns in business management, and one of them is undoubtedly the issue of natural hazards.

He et al. showed how climate change affects business management and confirmed that this is a topic of global concern (He et al., 2023). The effects of climate change have a negative impact on the smooth operation of infrastructure and services, thus business is threatened, e.g., business in agriculture (Nugroho et al., 2023). The importance of appropriate regulations (Földi et al., 2022), environmental planning and sustainable policy making has already been revealed (Papagiannis et al., 2020; Földi, 2019; Sondhi et al., 2023). Thus, innovation and digitisation became essential in today's business management (Csiszárík-Kocsir & Dobos, 2023). For instance, it has been confirmed that appropriate IT solutions can lead to a reduction in carbon emission (Han et al., 2023). So, digital solutions are introduced, especially if the service is heavily used, e.g., financial services (Porfirio

et al., 2024) or public services (Nyári & Kerti, 2024). Circular Economic model is considered as a solution to the overuse of natural resources, climate change and negative environmental impact, and according to Ahmad et al. senior management has a key role in translating this model into practice (Ahmad et al., 2023). Practice with procedures and organisational culture are key elements in safety and risk management (Milijić et al., 2022).

Management can be divided into more levels. Ideally, middle managers serve as coaches, connectors, talent managers and strategists, while senior leaders shall put middle managers at the forefront and give them space to grow (Leavy, 2023). As senior management is responsible for the strategy, they have a positive and statistically significant influence on the innovation and moving to sustainability (Gonzales-Bustos, 2020). The corporate social responsibility can be emphasised, as investing in it enhances customer satisfaction (An et al., 2024). In addition to this, the question of sustainability, climate change risk management and the protection of environment is a moral duty for the future generations, as Bándi has found (2022). These examples underpin the notion that appropriate business management is essential when facing to the issues of climate change, natural hazards, sustainability and risk management.

It should be emphasised that a connection has been established between sustainable business and regional security (Chehabeddine & Tvaronavičienė, 2020), climate change and security (Berek et al., 2020; Nagy et al., 2023). The perception of security depends on the practical and visible countermeasure against the danger, as it has been demonstrated (Rácz, 2018). Thus, the

importance of the usage of sustainable solutions and the appropriate risk management of natural hazards is even greater, which clearly shows the responsibility of the senior management. This responsibility in the banking industry is particular and significant, since promoting financial literacy and supporting financial inclusion are undoubtedly enrich customers' life (Csiszárík-Kocsir & Lentner, 2023) and increase the financial stability. On the other hand, the poor quality of financial services may increase financial exclusion and foster shadow banking which in turn may weaken the economic and political stability (Somogyi & Nagy, 2023).

The banking industry has a wide service portfolio and is present in different markets, e.g., savings and loans, commercial banking and retail banking. However, all of these are affected by natural hazards, since all digitalised services can be disrupted. This study does not focus on particular services or markets. Thus, the result could be easily adopted by enterprises looking for the proper role of senior management within their risk management framework in other sectors as well.

## 2. METHODOLOGY

The role of the senior management in managing risks is a key issue. The European banking industry's approach will be presented, and some recommendations will be provided to suggest a management practice that can be adopted even in other sectors as well.

The banking industry has been chosen as case study, since it has a crucial role in mitigating climate-related risks, both as a catalyst for transition to climate-friendly

solutions and as a service provider of critical services to the society. Through targeted funding for catalytic projects, banks can help bankable business proposals to come to fruition. However, it is also a service provider whose critical infrastructure could be adversely impacted by climate-related natural disasters. In this regard, the banking industry must put in place appropriate risk management process and business continuity measures in order to ensure the smooth operation and stability of the sector (Stolbova et al., 2018).

Due to the strictly regulated nature of the banking industry, sector-specific regulations and recommendations are available. Thus, relevant literature on business management has been explored, and the European financial sector's regulations and guidelines have been analysed in this study in order to achieve our objectives. In May, 2024 the website of European Central Bank (ECB) and European Banking Authority (EBA) was searched for regulations and guidelines in force:

- [www.ecb.europa.eu](http://www.ecb.europa.eu)
- [www.eba.europa.eu](http://www.eba.europa.eu)

Regarding to the guidelines, it should be noted that European financial institutions are expected to make every effort to be compliant with them. Therefore, in this study regulations and guidelines were examined equally.

This exploratory study used elements of content analysis within the qualitative research framework. Having collected the regulatory documents, relevant content has been extracted. The key aspect that was looked for was the role of senior management according to the relevant documents. This method has been used by scholars (e.g., Asif et. al, 2024) and offers an effective way to gain insights into risk

management of the banking industry. The content analysis was limited only to the risk management questions and does not delve into other topics. Although a question could be raised about the effectiveness and implementation challenges of the discussed regulatory requirements, no material can be found to provide examples from the European banks. No database was queried during our research. In this study we suppose that European banks are operating absolutely according to these requirements.

As it has been mentioned above, management can be divided into more levels, therefore a clarification has to be made here. In this study, the term senior management will be used to describe the highest management body which is the ultimate decision maker. The term senior manager will be used solely when referring to a member of this management body. So, this study focuses on the role of the senior management and will not discuss the role of other managers.

### **3. NATURAL HAZARDS: RISKS TO BE MANAGED**

Before analysing the practice of the banking industry, it is necessary to describe the risk related to natural hazards, and to show that the probability of the risk of extreme weather events is growing. Natural hazards refer to all the potential threats facing human society by events that originate in, and are transmitted through the environment. These extreme geophysical events include geologic (earthquakes, volcanic eruptions, landslides, avalanches), atmospheric (tropical cyclones, tornadoes, hail, ice and snow) and hydrological (river floods, coastal floods, drought) events as well (Smith & Petley, 2009).

The Earth is warming up in an accelerating way: in the last decades it has been hotter than any other time in the last millennium (McGuire, 2014). As the World Meteorological Organisation (WMO) stated, the years 2015 to 2022 were the eight warmest in the 173-year instrumental record with record-breaking heatwaves in Europe (WMO, 2023). The impacts of global warming are most clearly felt during extreme events such as heavy rain and snow, droughts, heatwaves, cold spells and storms. These weather extremes can lead to other events such as flooding, landslides, wildfires and compound extremes. Moreover, United Nations' Intergovernmental Panel on Climate Change (IPCC) is forecasting that warming in Europe will continue to rise faster than the global mean (IPCC, 2022). So, these anomalies are likely to become more frequent in all seasons as the emission of green-house gases continues to increase (Christidis & Stott, 2022).

Several studies have shown that climate change has an effect on society and business (e.g., Deák et al., 2024; Bruneau et al., 2025). Frame has shown that natural hazards have a great effect on the choice of location for housing and business (Frame, 1998). A connection between natural disasters and the behaviour of bank customers has already been established in 1983: analysing banking data from the 1970's, a significant increase in deposit has been found right after natural disasters (Steindl & Weinrobe, 1983). Moreover, natural hazards also have a serious impact on global financial market, especially in Europe, as it has been found recently (Pagnottoni et al., 2022). Moreover, as it has been demonstrated, climate change has an economic and social impact by affecting macroeconomic indicators, such as employment, gross output, and structural

changes in national economic sectors (Spirkova et al., 2022).

Lives are threatened by extreme weather events (Bunker, 2016) and the infrastructure is also jeopardised (Forzieri et al., 2018; Hao et al., 2023). Additional to the devastating disasters, heatwaves can seriously impact digital services through service disruption or outages: data centres may face lack of power, since the higher the temperature, the higher the energy consumption (Arshad et al., 2022). Weather simulation models show that extreme weather events will likely to be more frequent, e.g., floods caused by heavy precipitations or heatwaves are very likely to occur more often in Europe (Maslin, 2021).

Thus, infrastructure and services are affected by weather extremes which are predicted to be more frequent and more serious. Therefore, business management is facing the growing challenge of natural hazards. Answering to this challenge is a great responsibility towards customers and local population. Decision makers shall look for the best practice that may lead to a creative solution, and proper strategies that can be adopted. Naturally, this kind of risk cannot be eliminated, however, its impact can be reduced by proper risk management processes. Risk management has been found to be one of the key scientific issues when preventing and reducing disaster risks (Cui et al., 2021). The following part describes the risk management model adopted by the European banking industry.

#### **4. THE BANKING INDUSTRY AND THE NEED FOR PROPER RISK MANAGEMENT**

The banking industry is undoubtedly a well-regulated and supervised sector. Banks

are generally considered the central part of the financial system: they are the intermediaries between savers, borrowers and governments (Goddard & Wilson, 2016). Financial services and products are offered to individuals and large corporations as well. However, the way of modern banking is very fragile. Since deposits are used to finance loans, banks would definitely collapse if their depositors are not satisfied, hence the importance of appropriate financial risk management (Kawamoto et al., 2023). In addition to this, the complexity of financial services has been increased. Moreover, a distressed member of the banking industry could cause the loss of confidence in the whole sector. Beyond dispute, any significant disruption of the financial services would have economic, social and political effect. Thus, maintaining the sector's stability is essential. The banking industry is rigorously regulated and supervised by central banks (Mody & Nedeljkovic, 2024). These regulators issue minimum requirements, including requirements regarding to the management of all kind of risks. It is noteworthy that the absence or poor quality of the banking industry regulations may foster the shadow banking or illicit financial activities which jeopardise the financial and political stability of the country (Ilesanmi et al., 2019).

The European Banking Authority (EBA) plays a key role in maintaining the stability of the European banking industry through regulation and supervision. Thus, the risks threatening the banking industry are analysed by EBA, moreover, the so-called EU-wide stress test is conducted regularly in order to have an overall assessment and common understanding on the sector's resilience. Among the risks threatening the

smooth operation of this sector are the risks of natural hazards.

As it has been described above, natural hazards have to concern the business management in the 21st century and should be considered as a kind of operational risk to banks (Aldasoro et al., 2023) as well. Banks do not only bear the risk of possible disruption or damage through the occurrence of climate-related physical risk events, but they are also subject to transition risks through their lending and investment activities. As it has been demonstrated, natural hazards significantly heighten financial risk in the banking industry (Zhou et al., 2025). Moreover, a link between environmental impact and banks' performance has been established. Should a bank put more focus on the environment and reduce its environmental impact, it could improve the operating and market performance (Bressan, 2024).

Overall, these risks are part of the so-called operational risks, since they can cause a serious disruption of the operation. Moreover, operational risks are potential triggers of financial risk to banks' balance sheets, and a source of reputation risk (Goddard & Wilson, 2016). Therefore, an effective operational risk management is essential in the banking industry in order to avoid (potentially extreme) large losses and loss of reputation. The latter is considered very important within the banking industry. Thus, operational resilience is a key issue and can have significant impact on the financial performance (Sobanova & Kudinska, 2024). Being resilient, being able to provide critical services through disruption depends on the risk management framework. The objective of a risk management framework is to being prepared for disruptions and incidents in order to

respond to, recover from and learn from them and minimise their disruptive impact. An effective risk management framework encompasses the proper internal governance with well-defined roles as well. Senior management is part of the risk management framework (Zentner et al., 2022), and their importance in managing the risks in banks has been clearly shown (Hickman & Brener, 2025).

Central banks as sector specific authorities, support the whole industry with regulations and supervision. The importance of appropriate institutional governance in facing the effects of climate change and managing the relevant risks has been shown (Triarchi et al., 2023). The industry's policies and regulations can moderate the negative effect of climate change on financial risk and on the financial sector (Wang et al., 2025). It should be added that a stress test has been conducted related to climate risk in 2022 (ECB, 2022) which clearly shows the sector's engagement to the proper management of the environmental risks.

Having introduced the essentiality of appropriate risk management regarding to natural hazards in the banking industry, the next section examines the role of senior management.

## **5. RISKS AND THE ROLE OF THE SENIOR MANAGEMENT IN THE EUROPEAN BANKING INDUSTRY**

Traditionally, the category of operational risks is defined as the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events. According to the European Banking Authority's latest Risk assessment report, the relevance of operational risk and resilience

in the banking industry is growing: operational risk capital requirements in 2023 account for 9.7% of total requirements (9.5% in June 2022), and they are the second most important component of banks' risk weights after credit risk (EBA, 2023). So, the risks related to natural hazards are becoming increasingly important in the banking industry. Hence the need for acting in time and proactively to manage these risks. Having realised it, the European Banking Authority (EBA) has issued relevant regulations and guidelines. Among which are those focusing on the topic of internal governance. Banks are expected to have appropriate internal governance structures, including a clear organisational structure with well-defined lines of responsibility and effective risk management processes and control mechanisms.

EBA's current guideline on internal governance (EBA, 2021) emphasises the responsibility of the senior management and underlines the need for an appropriate risk strategy and risk management framework. Moreover, defining the risk appetite is also required, which is the level and types of risks an institution or company is willing to accept. This guideline clearly distinguishes between the executive role of the senior management and the supervisory role. A written statement about the acceptance of the responsibilities is required by EBA from each senior manager. Thus, the accountability for and the role of overseeing of the governance arrangements is clearly defined. The following responsibilities of the senior management is explicitly defined by this guideline in Point 22:

- approving and overseeing the overall business strategy;
- approving and overseeing the overall risk strategy, risk appetite and risk

management framework;

- setting up an effective internal governance that includes the independent internal risk management.

Having required a risk appetite and risk management framework approved and overseen by the senior management, this guideline requires that environmental risk factors be taken into consideration within the applied risk management framework (EBA, 2021). Members of the senior management should be informed about the risk situation in order to fulfil their supervisory role. According to the above-mentioned guideline on internal governance, the supervisory role incorporates the monitoring of the implementation of the strategy, of the effectiveness of the internal governance framework, including the risk management framework and risk appetite. Moreover, this guideline in Point 34 requires that risk culture also has to be monitored by the senior management.

According to this guideline, senior managers in their supervisory role are supported by committees (EBA, 2021). One of these committees is the risk committee which cannot be composed of executive members of the management body (point 51). Moreover, the chair of the risk committee neither can be the chair of the management body, nor the chair of any other committee. It may be obvious, but should be emphasised that the members of the risk committee have the appropriate knowledge and expertise in risk management.

The role of the risk committee is clearly defined by EBA's guideline on internal governance (EBA, 2021). First, it supports the senior management in monitoring the risk appetite, and the implementation of the risk strategy for all kind of risks, including the environmental risks, and recommends

actions to be taken. Second, the risk committee review the scenarios and assesses the risks and the preparedness for disruptive events, including natural hazards. Lastly, the risk committee should monitor the implementation of audit recommendations.

It should be noted here, that the existence of a sound, diligent and integrated risk culture is also requested in the European banking industry by EBA's guideline (EBA, 2021). Point 96 declares that the risk culture should be developed through policies, training and internal communications in line with the risk strategy and risk appetite. Thus, the role of the senior management also consists of overseeing and propagating a risk culture. This enables to the staff to be aware of the values and expectations, and to act in a way that risks are taken into consideration and managed appropriately.

Regarding to the above-mentioned risk management framework, the guideline requires in Point 152 that all risk that the financial institution is exposed to should be encompassed in it (EBA, 2021). Thus, operational risks, including the risk of natural hazards, are expected to be dealt with within the risk management framework. It is important that this framework should be reviewed by internal audit and external audit as well. The risk management framework is expected to include policies and procedures, methodologies, limits and controls. According to EBA, an effective risk management framework enables to identify and assess all the relevant risks, evaluate them from the bottom up and from the top down. It is essential that significant changes and new products should be analysed by risk management in order to ensure that they are in line with the risk strategy and the risk appetite. It should be mentioned that tests, including stress tests are part of the risk

management framework, as it is stated in Point 157. Reporting is also part of the risk management framework, especially up and down the management chain which is crucial from the senior management's point of view. Therefore, in Point 173 EBA declares that control functions should directly report to the senior management.

From this description, it can be seen that the role of the senior management related to operational risk management is essential. This raises the question of suitability of managers. Realising the importance of this question, a relevant guideline has been issued by EBA together with European Securities and Markets Authority (ESMA). This joint guideline on the assessment of the suitability of the management body and key function holders regulate the suitability of staff having key roles (ESMA & EBA, 2021). It is stated in Point 33 that the suitability of the head of risk management is of utmost importance, thus a more detailed suitability elements and processes are necessary in order to ensure that the institution adheres to its risk strategy and complies with legislative requirements. Moreover, senior managers are expected to enhance their knowledge through relevant training in order to continuously carry out their responsibilities. It should be emphasised that assessment of the suitability of personnel is required to be organised by the institutions. No detailed requirements are available in the publicly accessible sector-specific documents neither for the assessment, nor for the training.

The role of the senior management in managing the risks of natural hazards has been described in this part based on the sector-specific authority's expectation. The following section will present the European banking industry's practice together with

some additional recommendations as a possible solution to the need for an appropriate management of environmental risks.

## 6. DISCUSSION

The present study was designed to describe the current practice of the European banking industry and with additional recommendations, propose it as a solution to the problem of managing the risks of natural hazards appropriately from the senior management's perspective. The results of this study indicate that the concern about environmental hazards have been realised in the examined sector, and sector-specific guidelines have been issued in order to properly address this issue. On the question of the particular role of the senior management, this study has been found the following three key points that can be considered best practice.

The first point, which may seem trivial, but perhaps this is the most significant one, is that the responsibility of senior management is clearly defined in decision taking, in setting up a risk strategy, risk appetite and internal governance framework, and finally in overseeing them. This complex role enables that risks, including environmental risks, are being considered by the senior management regardless of the service portfolio and market. Taking into consideration this crucial role, the suitability of the senior managers is very important. First and foremost, assessment of the suitability of senior managers is required in the European banking industry. Second, relevant training is also expected, thus the senior management can understand the risks better and make proper decision in an

effective and timely manner. The training itself is neither defined nor its type is identified, however, it is undoubtedly vital for decision taking and setting up a sustainable, risk averse business strategy, risk appetite and control framework.

The second key point is that an appropriate risk culture is required to be present in the financial institutions. This should be developed through policies, training and internal communications in line with the institution's risk strategy and risk appetite. The senior management should oversee the risk culture, which incorporates awareness, internal communication and effective reporting line. So, the senior management has an essential role in developing an appropriate risk culture in the organisation.

The third key point is the performed tests, which are called stress tests in the examined banking industry. As part of the risk management framework, regular tests are performed to assess the level of preparedness and explore weakness. Since the results are have to be reported to the senior management, the decision makers can react immediately, e.g., by improving the risk strategy, allocating the necessary resources or changing the internal governance. Thus, their role in testing is clear: expecting these tests and react according to the results of these tests.

These three points can be considered key points. However, some weaknesses with this risk management framework can be identified. Thus, some recommendations can be given to fill the gap and further enhance the existing risk management framework and resilience.

### *Recommendation 1*

In the regulated financial sector, a risk management framework has to be introduced

*Table 1. Summary of the existing and missing key elements of senior management's roles in natural hazards (edited by the authors)*

| <b>In the EU banking industry's current practice</b> | <b>Key elements – best practice</b>                                                                                                                                               |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| exists                                               | The responsibility of senior management is clearly defined in decision taking; in setting up a risk strategy, risk appetite and internal governance framework, and overseeing it. |
| exists                                               | Senior management oversees and develops an appropriate risk culture, which incorporates awareness, internal communication and effective reporting line.                           |
| exists                                               | Senior managers are involved in and react according to the regular tests that are performed to assess the level of preparedness and explore weakness.                             |
| not exists – can be recommended                      | Part of the risk management framework a risk register should be introduced, applied and maintained to consider all the relevant risks.                                            |
| not exists – can be recommended                      | Senior management should establish partnerships in order to develop risk management methods and work out risk mitigation solutions together with other business partners.         |
| not exists – can be recommended                      | Partnerships could be established to test service continuity solutions and risk mitigating techniques together with business partners.                                            |
| not exists – can be recommended                      | Senior management could fund scholarships and find financing methods in order to incentivise scientific researches in the field of risk management.                               |

to manage all kind of risks, including environmental risks, as it has been explained above. However, the sector-specific authority's expectation seems to be general. Thus, certain risks may be missing or not considered properly. Therefore, the definition of a sector-wide mandatory risk register can be recommended. The usage of such a risk register may guarantee the preparedness in line with the strategical goals of the business in the whole industry. Thus, sector specific authority and senior management could be urged to incentivise the creation of and approve the risk register as part of the risk strategy and risk appetite. This recommendation synergises with risk management concepts developed particularly for environmental risks (Radosavljević & Radosavljević, 2011).

#### *Recommendation 2*

Although the topic of natural hazards is a

major concern and undoubtedly should be part of the risk management framework, it could be seen as opportunity. Sector-wide cooperation could be recommended to explore the ways of cooperation in risk management and preparation. Thus, senior management might establish partnerships in order to develop risk management methods and work out risk mitigation solutions together with other business partners. Creating business partnerships has been identified as a main business opportunity (Belu & Dieaconescu, 2016), therefore it can be urged.

#### *Recommendation 3*

Based on the sector's risk register, the cooperation can be further enhanced by sector-wide tests. Thus, regular tests can be recommended, focusing on the service continuity solutions. These tests may shed light on the strengths and weaknesses of the

institutions and of the sector. Thus, the test results may help increase the level of preparation and the resiliency of the whole sector, which is undoubtedly a common goal. Therefore, senior management could seek partnerships for testing the service continuity solutions and risk mitigating techniques together.

#### *Recommendation 4*

Taking into consideration the social responsibility and the need for security and resiliency of businesses, cooperation with the academic sector could be recommended. Supporting developments, financing researches and providing scholarships aiming to seek solutions to specific business needs could help the banking industry and other sectors as well. Realising the social responsibility and business needs, senior management could fund scholarships and find financing methods in order to incentivise scientific researches. Funding scholarships is undoubtedly a valuable kind of social responsibility initiative that contributes to sustainable development (Ahmad et al., 2024).

Taken together, these three key points and four recommendations are intended to describe the role of the senior management that could be defined and played in order to manage businesses appropriately in the era of extreme events fostered by climate change (see 1. Table).

## **7. CONCLUSIONS**

This study set out with the aim of finding the proper role of the senior management in managing the risks related to natural hazards. The European banking industry's approach has been presented together with some additional recommendations. All together,

our result is considered as a solution that can be adopted in other sectors as well. However, without examples, caution must be applied, as the banking industry's approach has been explored by analysing the public documents of the sector. Specific examples of European banks cannot be included, as the details of operation and management framework is considered confidential.

To develop a full picture of this interesting subject, additional studies will be needed based on data collected from interviews with relevant experts and managers. In addition to this, further research could suggest the proper training type for senior managers, which is requested but currently not defined by sector-specific documents.

In this paper three remarkable key points have been underlined in the current practice of the European banking industry. First, stating the responsibility of the senior management in decision taking, in setting up a risk strategy, risk appetite and internal governance framework, and in overseeing these elements. Second, an appropriate risk culture in the organisation is required to be developed by the senior management. And lastly, regular tests are expected to be performed so the senior management can react and take the necessary actions to improve the resilience of the institution. Undoubtedly, the senior management's role in these three points is essential. In addition to this, four additional elements can be recommended. First, senior management could be urged to incentivise the creation of and approve the risk register as part of the risk strategy and risk appetite. Second, senior management might establish partnerships in order to develop risk management methods and work out risk mitigation solutions together with business partners. Third, senior

management could seek partnerships for testing the service continuity solutions and risk mitigating techniques together. Lastly, senior management could fund scholarships and introduce financing methods in order to incentivise scientific researches. Taken together, the three key points and the four recommendations were considered our solution that is suggested to senior management.

## References

- Ahmad, F., Bask, A., Laari, S. & Robinson, C.V. (2023). Business management perspectives on the circular economy: Present state and future directions. *Technological Forecasting and Social Change*, 187, 122182.
- Ahmad, J., Saad, S., Krishnan, M., Stancu, A. & Mogos, O. (2024). Exploring the University Social Responsibility Initiatives and Sustainable Development in Malaysia: A Carroll Model Approach. *European Journal of Interdisciplinary Studies*, 16 (1), 71-90.
- Aldasoro, I., Gambacorta, L., Giudici, P. & Leach, T. (2023) Operational and cyber risks in the financial sector. *International Journal of Central Banking*, 19 (5), 341-402.
- Amankwah-Amoah, J., Khan, Z. & Wood, G. (2021). COVID-19 and business failures: The paradoxes of experience, scale, and scope for theory and practice. *European Management Journal*, 39 (2), 179-184.
- An, H., Boasson, V., Lei, L. & Wu, Q. (2024). Corporate social performance: Does management quality matter?. *Journal of Banking & Finance*, 162, 107130.
- Arshad, U. et al. (2022). Utilizing power consumption and SLA violations using dynamic VM consolidation in cloud data centers. *Renewable and Sustainable Energy Reviews*, 167, 112782.
- Asif, M., Sarwar, F., Lodhi, R. & Akbar, R. (2024). Banking fintech adoption: systematic review with bibliometric and content analysis. *Serbian Journal of Management*, 19 (2), 293-317.
- Bándi, Gy. (2022). Sustainable Development, the Interests of Future Generations, and Moral and Legal Implications. In: *Constitutional Protection of the Environment and Future Generations. Studies of the Central European Professors' Network*. Central European Academic Publishing, Miskolc, Budapest, pp. 17-71. ISBN 9786156474223
- Bederna, Zs. & Rajnai, Z. (2022). Analysis of the cybersecurity ecosystem in the European Union. *International Cybersecurity Law Review*, 3, 35-49.
- Bederna, Zs., Rajnai, Z. & Szadeczky, T. (2021). Business Strategy analysis of Cybersecurity Incidents. *Land Forces Academy Review*, 26 (2), 139-148.
- Belu, M.G. & Dieaconescu, R.I. (2016). Strategies for internationalization of Romanian SMEs Focus on the European market. *European Journal of Interdisciplinary Studies*, 8 (2), 36-45.
- Berek, T., Földi, L. & Padányi, J. (2020). Hungary's legal efforts to strengthen climate resilience. *Contemporary Military Challenges*, 22 (3), 115-125.
- Besenyő, J. (2021). Turkey's growing interest in the African continent. *Journal of Central and Eastern European African Studies*, 1 (1-2), 70-89.
- Besenyő, J. & Kármán, M. (2020). Effects of covid-19 pandemy on african health, poltical and economic strategy. *Insights into Regional Development*, 2 (3). 630-644.
- Bressan, S. (2024). Does the environmental impact of banks affect their

## УЛОГА ВИШЕГ МЕНАЏМЕНТА У ПРИРОДНИМ ХАЗАРДИМА: СЛУЧАЈ ЕВРОПСКЕ БАНКАРСКЕ ИНДУСТРИЈЕ

Tamas Somogyi, Rudolf Nagy

### Извод

Проблематика природних хазарда представља једно од кључних подручја интересовања у оквиру безбедносних студија и менаџмента пословања. Правилно управљање ризицима показало се као фундаментално, те је стога добило значајну пажњу. Ипак, улога вишег менаџмента у оквиру система управљања ризицима предузећа остаје релативно мало истражена. Овај рад има за циљ да истражи специфичну улогу вишег менаџмента у процесу управљања ризицима, нарочито у вези са ризицима који произлазе из природних хазарда. Одговарајућа улога вишег менаџмента у управљању ризицима везаним за природне хазарде представља кључно питање. Приказан је приступ европске банкарске индустрије, заснован на јавно доступним секторским регулативама и смерницама. Дате су одређене препоруке ради даљег унапређења кључне улоге вишег менаџмента у управљању природним хазардама. Наш резултат се разматра као решење које може бити примењено у предузећима, организацијама и институцијама у било ком сектору.

*Кључне речи:* виши менаџмент, управљање ризиком, природни хазарди, банкарска индустрија

financial performance?. Journal of Banking Regulation, 26 (2), 261-278.

Bruneau, G., Ojea-Ferreiro, J., Plummer, A., Tremblay, M. & Witts, A. (2025). The interdependencies of Canadian financial institutions: An application to climate transition shocks. Latin American Journal of Central Banking, 6 (3), 100163.

Bunker, A. et al. (2016). Effects of Air Temperature on Climate-Sensitive Mortality and Morbidity Outcomes in the Elderly; a Systematic Review and Meta-analysis of Epidemiological Evidence. eBioMedicine, 6, 258-268.

Chehabeddine, M.R. & Tvaronavičienė, M. (2020). Securing regional development. Insights into Regional Development, 2 (1), 430-442.

Christidis, N. & Stott, P.A. (2022). Human Influence on Seasonal Precipitation in Europe. Journal of climate, 35 (15), 5215–5231.

Csiszárík-Kocsir, A. & Dobos, O. (2023). The place and role of research, development and innovation activities in the life of domestic enterprises along business characteristics. Pp. 279-286 in Szakál, A. (Ed.), 2023 IEEE 17th International Symposium on Applied Computational Intelligence and Informatics (SACI), Timisoara, Romania

Csiszárík-Kocsir, A. & Lentner, Cs. (2023). Financial exclusion from the perspective of financial literacy in the digital world of the 21st century through the example of Hungary. Transformations in Business & Economics, 22 (3), 266-280.

Csiszárík-Kocsir, Á. & Varga, J. (2023). The advancing role of digitalisation through the example of the Perlmutter project from the user side. Pp. 327-332 in Szakál, A. (Ed.), 2023 IEEE 17th International Symposium on Applied Computational

- Intelligence and Informatics (SACI), Timisoara, Romania
- Czékman, Zs. & Cseh-Zelina, G. (2023). Hungarian regulation of e-government in the light of EU legislation. *Balkan Social Science Review*, 22 (22), 29-49.
- Cui, P. et al. (2021). Scientific challenges of research on natural hazards and disaster risk. *Geography and Sustainability*, 2 (3), 216-223.
- Deák, Zs., Vazonienė, G. & Wojewódzka Wiewiórska, A. (2024). Understanding the attitudes towards climate change in the context of trust in selected countries of Central and Eastern Europe. *Serbian Journal of Management*, 19 (2), 449-470.
- Denning, S. (2022). Why top managements must change their fundamental assumptions. *Strategy & Leadership*, 50 (1), 3-8.
- EBA. (2021). Guidelines on internal governance under Directive 2013/36/EU. Retrieved from: [https://www.eba.europa.eu/sites/default/files/document\\_library/Publications/Guidelines/2021/EBAGL-2021-14%20Guidelines%20on%20internal%20governance%20under%20IFD/1024534/Final%20Report%20on%20GL%20on%20internal%20governance%20under%20IFD.pdf](https://www.eba.europa.eu/sites/default/files/document_library/Publications/Guidelines/2021/EBAGL-2021-14%20Guidelines%20on%20internal%20governance%20under%20IFD/1024534/Final%20Report%20on%20GL%20on%20internal%20governance%20under%20IFD.pdf)
- ECB. (2022). Results of the 2022 climate risk stress test of the Eurosystem balance sheet. Retrieved from: [https://www.ecb.europa.eu/press/economic-bulletin/focus/2023/html/ecb.ebbox202302\\_06~0e721fa2e8.en.html](https://www.ecb.europa.eu/press/economic-bulletin/focus/2023/html/ecb.ebbox202302_06~0e721fa2e8.en.html)
- EBA. (2023). Risk assessment report 2023. Retrieved from: <https://www.eba.europa.eu/sites/default/files/2023-12/ed14314d-3194-4808-935b-afc564f748ad/Risk%20Assessment%20Report%20December%202023.pdf>
- ESMA & EBA. (2021). Final report on joint ESMA and EBA Guidelines on the assessment of the suitability of members of the management body and key function holders under Directive 2013/36/EU and Directive 2014/65/EU. Retrieved from: [https://www.eba.europa.eu/sites/default/files/document\\_library/Publications/Guidelines/2021/EBAGL-2021-06%20Joint%20GLs%20on%20the%20assessment%20of%20suitability%20%28fit%26propoer%29/1022127/Final%20report%20on%20joint%20EBA%20and%20ESMA%20GL%20on%20the%20assessment%20of%20suitability.pdf](https://www.eba.europa.eu/sites/default/files/document_library/Publications/Guidelines/2021/EBAGL-2021-06%20Joint%20GLs%20on%20the%20assessment%20of%20suitability%20%28fit%26propoer%29/1022127/Final%20report%20on%20joint%20EBA%20and%20ESMA%20GL%20on%20the%20assessment%20of%20suitability.pdf)
- Feuer, L. (1995). Business management. The case manager, 6 (5), 38-41.
- Földi, L. (2019). New National Strategy Against Climate Change in Hungary and its Effects to Environmental Security. Pp. 1-4. in Krulík, O. et. al. (Eds.), *Climate Change and its Security Impacts : Proceedings from the International Scientific Conference*, 18th and 19th September 2019, Prague
- Földi, L., Berek, T. & Padányi, J. (2022). Hungary's Energy and Water Security Countermeasures as Answers to the Challenges of Global Climate Change. *AARMS – Academic and Applied Research in Military and Public Management Science*, 20 (2), 87-96.
- Forzieri, G., et al. (2018). Escalating impacts of climate extremes on critical infrastructures in Europe. *Global environmental change*, 48, 97-107.
- Frame, D.E. (1998). Housing, Natural Hazards, and Insurance. *Journal of Urban Economics*, 44 (1), 93-109.
- Goddard, J. & Wilson, J. (2016). *Banking*. Oxford University Press.
- Gonzales-Bustos, J.P., Hernandez-Lara, A.B. & Li, X. (2020). Board effects on innovation in family and non-family business. *Heliyon*, 6 (9), 2-12.

- Han, D., Teng, F. & Jia, R. (2023). Achieving the goal of net-zero requires both resource efficiency and efficient business management. *Resources Policy*, 86, 104203.
- Hao, J. et al. (2023). Impacts of Climate Change on Snow Avalanche Activity Along a Transportation Corridor in the Tianshan Mountains. *International Journal of Disaster Risk Science*, 14, 510–522.
- He, X., Xu, X. & Shen, Y. (2023). How climate change affects enterprise inventory management - From the perspective of regional traffic. *Journal of Business Research*, 162, 113864.
- Hickman, E. & Brener, A. (2025). The senior managers and certification regime in UK practice and global context. *Journal of Banking Regulation*, 26, 356-369.
- Ilesanmi, K., Tewari, D.D. & Nsiah, C. (2019). Management of shadow banks for economic and financial stability in South Africa. *Cogent Economics & Finance*, 7 (1), 1568849.
- IPCC. (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Retrieved from: <https://www.ipcc.ch/report/ar6/wg2/>
- Jia, J. & Li, Z. (2020). Does external uncertainty matter in corporate sustainability performance?. *Journal of Corporate Finance*, 65, 101743
- Kawamoto, T., Matsuda, T., Takahashi, K. & Tamanyu, Y. (2023). Franchise Value Matters: The Drivers of Bank Risk-Taking in the Post-Basel III Era. *International Journal of Central Banking*, 19 (5), 145-183.
- Kemendi, Á., Michelberger, P. & Mesjasz-Lech, A. (2021). ICT security in businesses – efficiency analysis. *Entrepreneurship and Sustainability issues*, 9 (1), 123-149.
- Kovácsné Mozsár, L. & Michelberger, P. (2018). IT risk management and application portfolio management. *Polish Journal of Management Studies*, 17 (2), 112-122.
- Leavy, B. (2023). Rethinking the role of middle management for the new world of work. *Strategy & Leadership*, 51 (6), 10-15.
- Maslin, M. (2021) *Climate change*. Oxford University Press.
- McGuire, B. (2014). *Global catastrophes*. Oxford University Press.
- Milijić, N., Stojanović, A., Mihajlović, I., Jovanović, I., & Popović, M. (2022). Safety Climate in Project-Based Organizations: Multi-Criteria Analysis. *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, 27 (3), 35-46.
- Mody, A. & Nedeljkovic, M. (2024). Central bank policies and financial markets: Lessons from the euro crisis. *Journal of Banking & Finance*, 158, 107033.
- Nagy, R., et al. (2023). The Relationship of Environmental Migration and Human Trafficking Concerning Natural Hazards at the Affected Regions of Africa. *Journal of Central and Eastern European African Studies*, 3 (1), 17-46.
- Nugroho, A.D., Prasada, I.Y. & Lakner, Z. (2023). Comparing the effect of climate change on agricultural competitiveness in developing and developed countries. *Journal of Cleaner Production*, 406 (20), 137139.
- Nyári, N. & Kerti, A. (2024). Selecting a suitable framework for modelling the spread of the Hungarian EID card. *Interdisciplinary Description of Complex Systems*, 22 (1), 129-141.
- Pagnottoni, P. et al. (2022). Climate change and financial stability: Natural disaster impacts on global stock markets. *Physica A: Statistical Mechanics and its Applications*, 599, 127514.
- Papagiannis, F., et al. (2020). An intelligent environmental plan for

- sustainable regionalisation policies: The case of Ukraine. *Environmental Science and Policy*, 108, 77-84.
- Porfirio, J.A., Felicio, J.A. & Carrilho, T. (2024). Factors affecting digital transformation in banking. *Journal of Business Research*, 171, 114393.
- Rácz, A. (2018). The effects of Hungarian Defence Forces (HDF) border security deployment on the civilian population's subjective sense of security. *Belvedere Meridionale*, 30 (4), 83-95.
- Radosavljević, S. & Radosavljević, M. (2011) ECO risk management in mining, ECO practicum. *Serbian Journal of Management*, 6 (2), 169-192.
- Sinkó, G. & Besenyő, J. (2023). More than Survival: The Role of al-Shabaab Secret Service, Amniyat, in Information-Gathering. *Connections: The Quarterly Journal*, 22 (1), 99-111.
- Smith, K. & Petley, D.N. (2009). *Environmental hazards*. Fifth edition. Routledge.
- Sobanova, J. & Kudinska, M. (2024). Managing operational risk in banks during times of instability. *Serbian Journal of Management*, 19 (1), 167-185.
- Somogyi, T. & Nagy, R. (2023). Formal banking and financial inclusion to weaken hawala and serve counter-terrorism. *National Security Review*, 2, 19-32.
- Sondhi, S., Chawla, U. & Iqbal, H. (2023). Relationship between social cause, environment conservation and environmental attitude, towards promoting green purchasing behavior. *Serbian Journal of Management*, 18 (1), 27-43.
- Spirkova, D., et al. (2022). Quantification of Economic, Ecological and Social Impacts of Climate Change in the EU. *European Journal of Interdisciplinary Studies*, 14 (2), 63-81.
- Steindl, F.G. & Weinrobe, M.D. (1983). Natural hazards and deposit behavior at financial institutions: A note. *Journal of Banking & Finance*, 7 (1), 111-118.
- Stolbova, V., Monasterolo, I. & Battiston, S. (2018). Financial Macro-Network Approach to Climate Policy Evolution. *Ecological Economics*, 149, 239-253.
- Štrucl, D. (2022). Russian Aggression on Ukraine: Cyber Operations and the Influence of Cyberspace on Modern Warfare. *Contemporary Military Challenges*, 24 (2), 103-123.
- Szucs, K.R., Tick, A. & Reicher, R.Zs. (2024). Applying attitude theory to determine user security approaches. *Serbian Journal of Management*, 19 (1), 133-148.
- Triarchi, E., Kolias, G. & Kypriotelis, E. (2023). Exploring the role of institutional governance in climate action in the Western Balkans economies. *European Journal of Interdisciplinary Studies*, 15 (2), 97-117.
- Wang, J., Narayan, P., Gunadi, I. & Hermawan, D. (2025). Climate change and financial risk: Is there a role for central banks?. *Energy Economics*, 144, 108320.
- WMO. (2023). State of the global climate, 2022. World Meteorological Organization.
- Zentner, H., Spremić, M. & Zentner, R. (2022). Effect of management's competencies and digital skills on digital business model maturity for SMEs. *Interdisciplinary Description of Complex Systems*, 20 (5), 514-532.
- Zhou, X., Caldecott, B., Shrimali, G. & Zhang, H. (2025). An empirical analysis of climate and environmental policy risk, the cost of debt and financial institutions' risk preferences. *Energy Economics*, 144, 108323.