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Risk as an Element of Safety Management

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Abstract:

Purpose: *The purpose of this paper is to examine the hypothesis that risk in safety management arises not only from various security threats but also from the management process itself. The broader aim of the publication is to identify the role of risk within safety management and demonstrate that it constitutes one of its essential elements.*
Design/Methodology/Approach: *The study is structured around the central research question: Does risk in safety management originate solely from security threats? The research hypothesis assumes that risk in safety management results not only from diverse security threats but also from the entire management process. The paper adopts a theoretical methodology grounded in a critical analysis of the relevant literature.*
Findings: *Security is constantly exposed to various forms of threat. Threats in general are of particular interest to safety management. They can be characterized by their probability of occurrence and potential consequences. Such a data set helps determine the likelihood of both military and non-military threats, providing a basis for key decisions on countermeasures and resilience-building efforts. Therefore, the level of risk constitutes a fundamental element and baseline for effective safety management. Safety management comprises a set of actions aimed at achieving a defined state or level of safety. This objective cannot be achieved without an effective decision-making process. In practice, this process often occurs without complete information, which itself constitutes a risk that must be taken into account. Thus, risk is an inherent element of all management processes, including safety management. Safety management should account for various types of risks—including those related to quality, personnel, resources, and information—that influence decision-making at every phase of the management process. Risk in safety management is associated not only with security threats (both military and non-military) but also with management processes that require decision-making in threat-driven environments. Taking the aforementioned arguments into account, risk should be recognized as an integral element of safety management.*
Practical implications: *The findings of this paper may support the enhancement of safety management systems by emphasizing that risks can arise not only from external threats (military and non-military) but also within the management process itself. The study offers practical guidance by identifying specific managerial risks — such as insufficient competencies, ineffective communication, and limited resources — that can negatively affect security. The information presented in this paper may be useful to public administration bodies, crisis management specialists, and decision-making authorities. Implementing risk assessment tools — designed not only for security threats — at all phases of safety*

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management can enhance decision-making processes and strengthen an institution's resilience to uncertainty. The conclusions of this paper could serve as a framework for training programs and educational initiatives focused on decision-making and risk assessment.

Originality/Value: *This paper offers a new perspective on the existing literature, broadening the understanding of risk in safety management beyond traditionally analyzed external threats (military and non-military) by emphasizing risks inherent in the management process itself. While current research focuses primarily on security threats, this paper draws attention to decision-making uncertainty and internal risks, such as those related to resources, competencies, and communication.*

Keywords: *Risk, safety management, decision-making, uncertainty.*

JEL codes: *F52, D81.*

Paper type: *Research article.*

1. Introduction

Every aspect of human life is associated with some form of risk. Risk is inherent from the earliest stages of human existence. Different types of risk manifest in various human activities. Risk may be perceived as an opportunity when it offers potential gain, or as a threat when it involves the possibility of loss.

Some individuals attempt to avoid risk entirely, while others accept it willingly or remain indifferent to it. Therefore, the attitude toward risk can vary. However, risk awareness is essential for efficient and effective functioning, regardless of the nature or scale of potential threats.

In safety management, risk is often examined primarily in the context of military and non-military threats. The available literature states that safety management predominantly addresses these external risks[2], often overlooking other threats that emerge in the early stages of managerial decision-making, such as issues related to resources, legal requirements, and organizational procedures.

[2] *"The effectiveness of public safety actions is built on recognition of threats and their sources, eliminating or mitigating their effects, and achieving a controlled state. The underlying threats against public safety are considered to be criminal offenses, anti-social behavior, and crises (Fig. 1). Such threats encompass violation of both written laws and unwritten rules applicable in a given community, the so-called anti-social behaviors. The other threats, like technical disasters (such as malfunctions of chemical or nuclear facilities, construction disasters), originate from the development of modern civilization, and an increased intensity and scale of natural disasters." (Sienkiewicz- Małyjurek, 2011, p. 136).*

Such a narrow approach fails to capture the complexity of modern management systems, in which decisions are frequently made with limited information and significant uncertainty. Viewing risk only as an external factor might reduce the effectiveness and resilience of safety management's decision-making processes.

This paper proposes a more comprehensive understanding of risk, suggesting that in safety management it arises not only from external threats but also from internal organizational and decision-making processes. The central research question is therefore: *Does risk in safety management originate solely from security threats?*

The research hypothesis assumes that risk in safety management results not only from diverse security threats but also from the entire management process. In order to verify the hypothesis, specific objectives were defined:

1. Conduct an analysis of the evolution of the term “risk” and its multidimensional nature;
2. Examine the definition and process-oriented approach to security and safety management;
3. Identify types and sources of risks associated with internal safety management processes;
4. Determine the role of risk in the decision-making procedures of safety management systems.

The research methodology is based on a critical analysis of literature on risk theory, decision-making under uncertainty, and safety management. The study utilizes scientific publications, terminology dictionaries, and theoretical works in safety and management, including classical concepts developed by Maslow, Beck, Giddens, and others.

The innovative approach adopted in this paper shifts the focus from traditional models of external threat-based risk assessment toward a more holistic perspective that incorporates additional risk factors arising within organizational structures and managerial decision-making processes. This design puts the notion of risk in safety management in a new light, which may improve operational and strategic practices.

The validity of the topic arises from the increasing complexity of contemporary threats, a dynamic technological development, and a high degree of uncertainty that accompany actions in crisis environment. Highlighting internal risk in decision-making processes contributes to the development of security studies, crisis management, and public administration by promoting a more comprehensive approach to risk and safety management.

The scope of the research is limited to conceptual and theoretical analysis with no empirical study. It has been conducted for exploration purposes and may constitute a groundwork for further application or empirical analysis.

2. Risk: A Companion of Human Life and Actions

Societies of the 20th and 21st centuries have lived, and continue to live, within an atmosphere of uncertainty and risk. This phenomenon occurs on various scales and affects nearly every dimension of human activity. It is argued that John Kenneth Galbraith's "Age of Uncertainty" has given way to the "Risk Society," a concept introduced by Ulrich Beck (Sienkiewicz, 2015).

The Risk Society is particularly vulnerable due to the dynamic technological developments of the modern world. It should be noted that such risks may manifest on a large scale and, in some cases, are unpredictable, making effective mitigation difficult. This characteristic of risk is regarded as an inherent side effect of technological progress and cannot be completely eliminated. Given the extensive reach of modern risks, escaping the Risk Society is virtually impossible.

Beck argues that society is exposed to risks generated by others, regardless of whether individuals are aware of them[3]. In this context, Anthony Giddens remarks: "Modernity is a risk culture. Modernity reduces the overall riskiness of certain areas and modes of life, yet at the same time introduces new risk parameters largely or completely unknown in previous eras" (Sienkiewicz, 2015, p. 6).

Therefore, it is necessary to consider both real and potential risks associated with the possible positive and negative outcomes of emerging threats. Risk is indiscriminate and may materialize in various ways. There are several strategies to cope with risk. Some individuals attempt to avoid risk entirely, while others accept it willingly or remain indifferent. Nevertheless, the key to effective operation is being aware of risks.

The notion of "risk" originated in ancient times, but it still lacks a comprehensive definition. In Persian, the word "rozi(k)" referred to "fate" or "daily wage," while in Greek ("riza") and Italian ["ris(i)"] it denoted a reef to be avoided. English borrowed the word from French "rizique", which meant "hardships to overcome."

Initially, the term carried negative connotations, but over time it acquired a positive dimension due to major geographical discoveries and the development of intercontinental trade routes. From the 16th century onward, "risk" became synonymous with courage, entrepreneurial initiative, and successful economic outcomes (Gładysz, 2006, p.31).

The broader term encompassing both positive and negative aspects of risk derives from the Latin "risicum," meaning the probability of success or failure and the potential for both beneficial and adverse events (Gładysz, 2006, p. 31). Moreover, the Old-Italian "risicare" meant "to dare."

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[3] *https://www.socium.pl/spoleczenstwo-ryzyka.html — retrieved January 22, 2025, at 13:59.*

The contemporary understanding of risk emerged alongside the development of decision-making processes and conscious economic reasoning. As economic awareness evolved, it became clear that not all future outcomes of a decision could be predicted. This realization marked the recognition of uncertainty stemming from insufficient information for informed decision-making.

According to Krzysztof Janasz, uncertainty arises when the possible outcomes of a decision are known, but the probability of each outcome occurring is not (Noga and Noga, 2024, p. 12). The risk emerges when one tries to assess the recurrence probability of a particular outcome. Thus, risk becomes assessable when the likelihood of a particular outcome can be estimated. It is worth noting that when the probability of an outcome falls between 1% and 100%, the decision is made under conditions of partial confidence (Table 1).

Table 1. *A comparison of decision-making requirements*

Confidence	**Risk**	**Uncertainty**
The action, that has to occur	Probable action	Unpredictable action, almost impossible to occur
Complete data	Incomplete data	No data
Defined, known consequences	Known set of possible consequences	Unknown consequences of a given decision
Decision-based consequences recurrence probability equal to one	Defined distribution of consequences recurrence probability based on individual decisions	Unknown distribution of consequences recurrence probability based on a given decision

Source: *Noga B., Noga M. (2024), p. 22.*

It is worth emphasizing that risk may lead to either loss or gain, and therefore should be considered in both dimensions. This is followed by the Institute of Risk Management (IRM) definition of risk as "a combination of event probability and its consequences. The consequences can fluctuate between positive and negative" (Woźniak and Wereda, 2022, p. 45). In other words, the consequences can be perceived as chances or threats. This understanding corresponds with the Old Italian interpretation: a reef may threaten sailors, yet may also offer safety to shipwreck survivors (Makowski, 2018).

3. Safety Management

When examining safety management, one first needs to define the concept of management itself. Although the term may seem easy to define, in reality it is considerably more complex. The available literature provides both descriptive and functional definitions.

One of the most widely cited functional definitions is provided by Griffin: "Management is a set of activities (including planning, organizing, leading, and controlling) directed at organization's resources (human, financial, physical, and

information), with the aim of achieving organizational goals effectively and efficiently in the changing environment" (Griffin, 2005, pp. 36-39). The author adopts the definition introduced by dr hab. Barbara Kaczmarczyk: management is "a system of actions governing the means and rules of organizational functioning with the aim of achieving a specific target or multiple targets" (Prochwicz, 2016, p. 324).

Activities undertaken within safety management aim to ensure and maintain safety. Safety is one of the most fundamental human needs. According to Maslow's Hierarchy of Needs, safety ranks directly after physiological needs. This means that safety is one of the basic and existential needs. Without safety, individuals cannot meet higher-order needs such as belonging, esteem, and self-actualization. Therefore, a society that lacks safety cannot achieve genuine well-being.

Safety can be approached in two dimensions—static, as a state, and dynamic, as a process (Wyrębek, 2022). As a state, safety denotes freedom from threats and fear, or a condition of relative peace. As a process, safety consists of actions that help achieve and sustain the desired threat-reduced state. The process approach assumes that the state of safety and its organization are subject to continual change driven by "natural safety requirements."

This implies continuous actions undertaken by international organizations and by national and local communities to build and maintain a desired state of safety. Scholarly publications increasingly describe safety as both a state and a process considered jointly. This dual perspective is operationalized through regular actions to build and maintain safety.

Consequently, safety may be regarded as the product of all responsible entities. Importantly, safety is the outcome of regular, deliberate action. Attributing safety to individual action alone, divine providence, or favorable fate is an oversimplification.

As Frederick the Great's well-known maxim suggests, "Providence is on the side of the big battalions" (Nowak and Nowak, 2015, p. 14). While the dual perspective is widely supported, it continues to prompt theoretical debate. This raises the question: "Can the actions taken to provide a particular state be the state itself?" (Szulc *et al.,* 2024, p. 30).

According to a dictionary of safety-related terms, safety is "a priority need, value, and goal of every living being, which ensures its survival, functioning, and growth, as well as the fulfillment of its goals" (Pawłowski *et al.,* 2020, p. 20; Afolabi and Bodunde, 2020). It is worth noting that the need for safety functions as a motivating factor that fosters action and growth.

People seek safety across domains such as financial security, personal security, and the capacity to cope with the consequences of adverse events (e.g., fire, illness, or traffic accidents) (Modrzejewski, 2022). Bogdan Szulc cites Kitler, who in turn

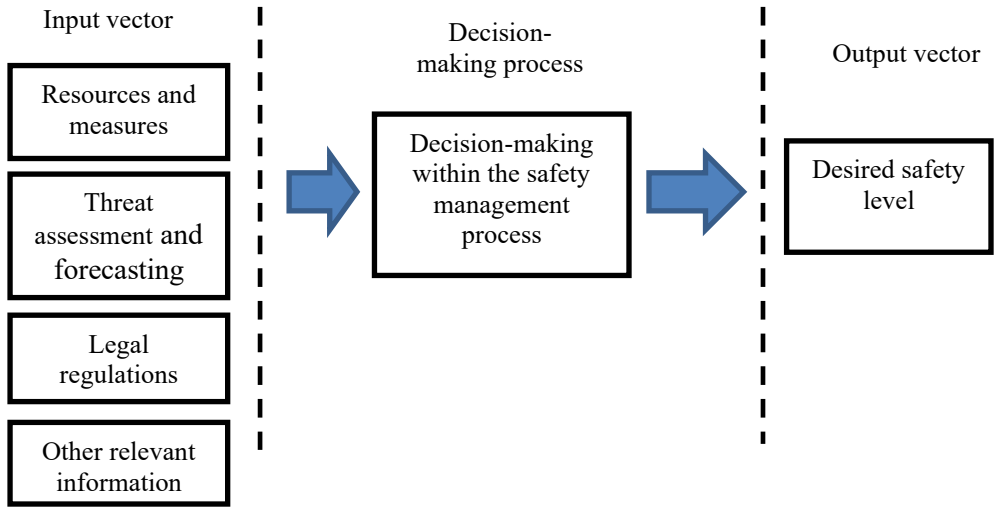
references Delumeau, describing safety as "internal trust, peace of mind, and confidence, which are correctly or falsely justified in uncertain circumstances. It is also a belief, justified better or worse, that in the face of various hardships, weaknesses, challenges, and threats, or their mere manifestations, the reality of a given being may induce the feeling of safety" (Szulc *et al.,* 2024, p. 30).

Stańczyk emphasizes the essence of safety as follows: "the essence of safety, based on the assurance of survival and freedom of development, is certainty" (Nowak and Nowak, 2015, p. 16). Thus, certainty again emerges as a central element in the concept of safety. This has practical implications for entities responsible for ensuring safety: their actions should aim to create a decision-making environment characterized by confidence and minimal uncertainty.

Accordingly, safety management can be defined as a structured system of continuous actions aimed at achieving a planned level of safety and ensuring its long-term sustainability.

Each management phase requires decisions based on inputs such as available resources and measures, information on existing threat levels, and applicable legal requirements. These inputs are fundamental to decision-making within management processes and should ultimately lead to the desired state of safety (Figure 1).

Figure 1. *Input and Output Vectors of the Decision-Making Process*



Source: *Author's own elaboration.*

In general, the level of safety can be influenced by decisions such as:

- preventing threats,

- preparing to counteract threats through education and the availability of required
- resources and measures,
- increasing the effectiveness of available resources and measures,
- effectively neutralizing the consequences of adverse events.

The safety management process consists of four phases:

- Planning and decision-making—establishing safety-related objectives,
- Organizing—selecting the most appropriate methods and resources for the task,
- Controlling—monitoring activities and adjusting plans to improve effectiveness,
- Personnel coordination—motivating and coordinating personnel to undertake
- safety-oriented actions.

4. Risk in Safety Management

Risk in safety management is often regarded by experts primarily in the context of military and non-military threats to safety.

In the authors' view, because safety management is a system of actions aimed at achieving a planned level of safety and ensuring its long-term sustainability, it necessarily involves decision-making. However, it is not always possible to obtain all the required information; therefore, many decisions across the phases of the management process must be made with incomplete data.

As a result, managerial decisions are made under conditions of risk. Risk relates not only to military and non-military threats but also to other input factors used in decision-making within the management process.

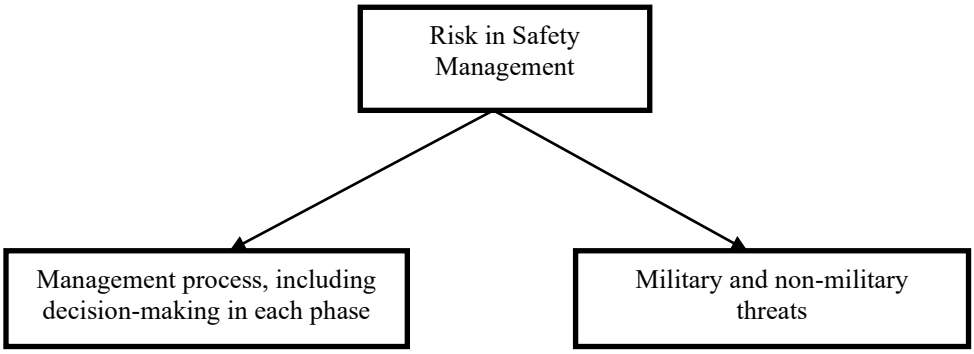
Overall, managerial efforts should aim to minimize the likelihood of undesirable events, including those arising from the management process itself, and to develop the ability to control and monitor them through risk identification and assessment.

Safety management should take into account various types of risks—including those related to quality, personnel, resources, and information—which are fundamental to effective decision-making. Risks associated with the management process aimed at achieving and maintaining a desired level of safety may include:

- risk of low competence among safety management personnel,
- risk of ineffective coordination among public administration and enforcement agencies,
- risk of ineffective communication among safety management personnel,

- risk of ineffective collaboration between safety-related organizations,
- risk arising from insufficient quantity of resources and measures required to counter threats,
- risk arising from insufficient quality of resources and measures required to counter threats.

Figure 2. *Risk in Safety Management*



Source: *Author's own elaboration.*

Therefore, risk is an inherent element of safety management, positioned alongside other factors that influence security and affect decision-making within the management process (Figure 2).

5. Conclusions

Humanity as a whole has always been confronted with risk, and as a result, we must constantly navigate conditions of uncertainty. This stems from the need to solve emerging problems and challenges. To address such challenges, decision-makers must make sound and informed decisions. However, decision-makers rarely possess complete information during the decision-making process, and therefore certainty cannot be assured.

Consequently, most decisions must be made under conditions of risk, making risk inseparable from decision-making. Threats relevant to safety management can be characterized by their likelihood of recurrence and their potential severity. This information helps determine the likelihood of both military and non-military threats, forming the basis for decisions regarding countermeasures and resilience-building efforts.

Therefore, the level of risk constitutes a fundamental element and baseline for effective safety management. Safety management consists of actions undertaken to achieve and maintain a defined level of safety. This objective cannot be achieved without an effective decision-making process. In practice, this process often occurs

without complete information, which itself constitutes a risk that must be taken into account.

Thus, risk is an inherent element of all management processes, including safety management. Safety management should account for various types of risks, including those related to quality, personnel, resources, and information, that influence decision-making at every phase of the management process.

To summarize, the hypothesis presented in the introduction has been validated: risk in safety management is linked not only to security threats but also to management processes that require decision-making under threat-driven conditions. Therefore, risk should be recognized as an integral element of safety management.

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