

"The mark of true professionalism is when the findings from the risk analysis feed into and add value to planning and decision-making processes."

Lieutenant Colonel Bjørn-Erik Solli
Norwegian Special Operations Command
Advisor on Special Operations
NATO Joint Warfare Centre

THE ESSENCE OF

RISK



What You Need to Know About Risk While Serving at a Joint Operational Headquarters

THE VAST MAJORITY of those who serve at a joint operational-level headquarters work within a functional area that differs from that of most of their colleagues there. What these staff members nevertheless have in common is the need to understand and communicate risk, be it peace-time finance-related risk, health and safety-related risk, understanding risk at the strategic level, analysing risk for the operational level, articulating risk, or accepting risk. Having a cross-functionally applicable understanding of

risk is not just beneficial, it can prove crucial given the severe nature of wielding military power. A common understanding of conceptual ideas has been the bedrock of human co-operation, innovation and development since the cognitive revolution some 70,000 years ago.¹ Risk is one such conceptual idea.

This article will first describe how risk extends beyond the measurements of the natural sciences. After a brief look at the origins of the concept of risk, I will present a generally applicable foundational understanding of the term. The relationship between risk and resil-

ience is also addressed, followed by a look at the differences between "risk amateurs" and "risk professionals".

Finally, an example from a simple card game and a thought-provoking idea are presented in hopes of sparking critical reflection on the question how the concept of risk should be applied facing the uncertainties of the future. All in all, this article is a humble attempt at contributing to two out of the five warfare development imperatives within NATO's Warfighting Capstone Concept: cognitive superiority and layered resilience.



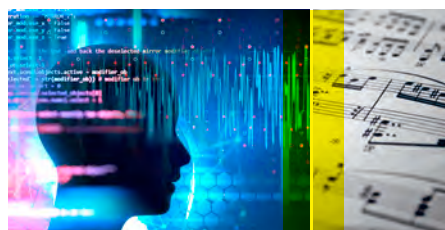
Scientists and Artists

If a tree falls in the forest and no one is there to hear it, does it make a sound? This is a classic thought experiment that scientists are more than happy to answer. According to the natural sciences, sound is variations of pressures that create soundwaves. Humans can register soundwaves ranging from 20 to 20,000 oscillation cycles per second. Additionally, there is scientific proof of soundwaves outside the limits of human perception. Using their scientific methods of measurement, natural scientists have developed knowledge in the form of a proven scientific theory that allows us to answer the "falling tree" question with certainty: Yes, it does make a sound. At the same time, sound is not just sound, but something more: Musicians create music, but the natural sciences tend to be insufficient when we try to describe the artistic expressions these artists create.

The concept of risk is subject to a similar limitation with regard to scientific knowledge produced by the natural sciences. Researchers, statisticians and other risk scientists working within the natural sciences have provided us with many tools to analyse and process risk. The natural sciences provide a sturdy foundation on which to build our understanding of risk. However, in the same way that music is more than soundwaves, risk is a lot more than precise measurements or methods of prediction. To truly understand risk, we must look beyond the limits of the natural sciences. Psychologists, social scientists and philosophers

also make valuable contributions to the understanding of risk. All of this makes risk an umbrella term that encompasses many different fields and disciplines.

However, in addition to the spectrum of these academic perspectives, we need a key human quality to comprehend risk beyond the theoretical. One needs a lively imagination to think of several potential futures of varying likelihood. For risk to be managed at a higher level of ambition than merely being able to describe risk naturalistically, one must aspire to multi-disciplinary artistry. One must balance the complexity of risk factors, appreciate uncertainties, and make rational decisions. While anyone can learn to play an instrument or analyse risk, only the dedicated and talented can become artists.



The Genesis of Risk Comprehension

The variety of conceptual understandings of risk is not limited to different scientific perspectives. Risk is defined and conceptualized differently across professional disciplines, cultures and human minds. Even risk professionals have not managed to agree on a precise definition or understanding for more than three decades.²

According to one of the world's most renowned risk scientists, Professor Terje Aven, the original understanding of risk comes from ancient Italy, but is applicable across the world. The term was used in reference to merchant sailors and fishers who, while trying to sell their goods or catch fish, had to face the possibility of their ships' hulls tearing open on jagged rocks hidden beneath the water's surface. In this context risk was understood as "to dare".³ The sailors and fishers took risk, or dared, in order to reach their objectives. If we lose this core understanding, risk is reduced to something uncomfortable and irrational. In common parlance, the term "risk" is often

used with purely negative connotations, even though risk-taking is a prerequisite for creating opportunities. This common parlance indicates a limited imagination and a lack of holistic thinking about risk amongst laypeople.

Just as the rest of the world embraced the Italian pizza and many cultures started to make their own, the concept of risk has also been exported and adapted. Most Italians will readily concede that they can get something that looks, smells and tastes like pizza all around the world. However, they are also quite likely to emphasize the original variant from Naples or politely explain when something no longer fulfils their definition of pizza. Mirroring the Italians' benevolence, risk professionals will largely acknowledge that different definitions and concepts that look, smell and taste like risk — even if it is not their preferred flavour. This is partly why the Society for Risk Analysis' Risk Glossary contains seven definitions of "risk".^{4,5}

A Modern Understanding of Risk

NATO doctrinally defines risk as "the effect [that] uncertainty has on ... objectives".⁶ NATO's definition is built on a modern, risk science-based view that is in accordance with the international standard for risk management ISO 31000:2009, which defines risk as the "effect of uncertainty on objectives".⁷ Professor Terje Aven has his own twist on the definition of risk, stating that it is "the combination of possible future events/consequences and associated uncertainty (C, U)".⁸

These science-based definitions of risk indicate that risk relates to the uncertainty of potential future events and their possible outcomes. However, such a baseline understanding has to be built upon to be practically applicable. Professor Aven does this by explaining that the equation (C, U) is a simplification of the full equation (C, C*, U, P, K). In this analytical model, C signifies the "full potential of consequences", C* stands for "expected consequence", U for "uncertainty", P for "calculated probability", and K for "quality of knowledge".⁹

In a military context, this model can be applied to an enemy attack, for instance: The attack will have a limited range of possible consequences (C). Given the knowledge of the enemy, terrain and own forces (K), there are some consequences within C that are most rea-

BELOW: Understanding of risk is essential for many different fields and disciplines. Effective risk analysis requires leadership: both practical understanding of risk management and multi-disciplinary artistry.



sonable to expect (C*). The extent to which the various consequences are likely to occur can be calculated (P). The perpetual limits of K prevent us from eliminating uncertainty (U) and force us to make necessary assumptions.^{10,11,12}

This modern science-based thinking about risk leads us to analyse both the potential adverse consequences of an attack and the associated potential gains, as the definitions are not exclusively focused on the negative. Where there is risk, there is always the possibility of opportunities to exploit. But such exploitation requires an imagination that is able to discover these opportunities, and a willingness to take or accept risk. Managing risk, therefore, requires intentional engagement with uncertainty related to potential loss in the pursuit of gains. The importance of articulating the uncertainty aspect of risk is emphasized by Hans Liwång, associate professor at the Swedish Defence University: "Not including uncertainty in the presentation of risk will obfuscate the actual level of risk and increase the possibility of flawed decisions as a consequence of being misguided."¹³

Risk and Resilience

Many find it hard to pin down the relationship between the concepts of risk and resilience. A general understanding of resilience is "the ability a system has to restore its functions after having been exposed to strain".¹⁴

Firstly, one needs to understand and be able to analyse risk in order to build a resilient organization. Without risk analysis, managing one's resources in a way that ensures the optimal level of resilience is borderline impossible. Resilience is therefore developed using what risk professionals refer to as consequence-reducing barriers or risk mitigation. In developing resilience, the results of risk analysis point to areas in which to prioritize resources.

Let us consider two findings from a risk analysis in a fictitious situation where one only has the resources to build resiliency for one of the events. Event A has mostly adverse outcomes of a medium severity but of high probability, based on substantial knowledge. An example of this could be a financially beneficial supply chain that often creates critical shortages of spare parts for the maintenance and repair of combat aircraft. Event B has only adverse outcomes of a potentially very high severity, but with very low probability, based on

"The term 'risk' is often used with purely **negative connotations**, even though risk-taking is a prerequisite for **creating opportunities**."

equally substantial knowledge. An example of this could be unforeseen and arbitrary technical issues infrequently creating gaps in the air defence of an operationally significant air base. Out of these two, the rational choice to further develop resilience would be to prioritize resources to mitigate the effect of Event A. Risk analysis enables a higher-quality foundation for such resilience-related decisions.

Second, resilience is considered part of the broad discipline of risk science. Engineering resilience focuses on creating the ability to regain full functionality of a system when it is strained. The desire to become resilient is, therefore, in reference to future events with

all their uncertainties, which at its core is risk science. Additionally, risk management is generally defined as "all efforts and activities conducted with the intent to control risk".^{15,16} This illustrates how risk and resilience are intertwined and share the same "ingredients", just as Italian pizza with a thin crust and American pizza with a thick crust share most, or even all, of the same ingredients. Resilience engineering is a proactive part of risk management.

The Differences Between "Risk Amateurs" and "Risk Professionals"

As a "risk professional", one must be able to distinguish between risk as it is articulated in common parlance and risk as a concept with its inherent risk factors.

The sign of a "risk amateur" is when the person uses the word "risk" as a synonym for terms such as "consequence" or "likelihood". Risk is, as mentioned above, more than just one such risk factor. A risk professional will go to great lengths to articulate and distinguish between different factors of risk.

As an example, the inherently hostile threat of an opponent's submarines necessitates a different type of mitigation than the non-discriminatory hazards posed by a particularly challenging sea state. Additionally, a risk analysis based on calculated probability should provide a decision-maker with different confidence than an analysis based on assumed likelihood.

"Without risk analysis, managing one's resources in a way that ensures the optimal level of resilience is borderline impossible."

Risk Terminology	
Risk Source	Element that, alone or in combination with other elements, has the potential to give rise to some specified consequences.
Consequence	Something that follows an action, or a set of conditions; outcome/result .
Probability	The degree to which something is likely — often presented numerically as it is based on calculations.
Likelihood	An assumption of the extent to which it is reasonable to expect.
Hazard	Something likely to cause damage.
Threat	An expression of an intention to hurt/punish/cause pain, etc.
Vulnerability	The degree to which a system is able to withstand specific loads.
Resilience	The ability of a system to sustain or restore its basic functionality following a risk source or an event.



Generally, risk professionals should be expected to display profound humility in their description of risk. This is particularly true for those who work with military-related risk, as "war is not a chess game, but a vast social phenomenon with an infinitely greater and ever-expanding number of variables, some of which elude analysis".¹⁷ Meanwhile risk amateurs are more likely to present the results of their analysis with unjustified certainty, and are more often than professionals prone to be affected by cognitive biases such as the Dunning-Kruger effect.

The mark of true professionalism is when the findings from the risk analysis feed into and add value to planning and decision-making processes. Lieutenant Colonel Mikael Andersen, currently serving at NATO's Multinational Corps Northeast, has written a Risk Management Handbook for NATO, based on ISO 31000:2009 and NATO doctrine. In this handbook he presents tools that help to ensure risk management is more than just a mandatory "tick the box" exercise. Among other things, Andersen lays out how risk identification and analysis can aid the "critical information requirements process" of a headquarters.¹⁸ The handbook is currently in the process of being accepted as an official NATO publication.

Perception of Risk in a Game of Cards

In the card game Texas hold 'em poker, the dealer starts every hand by dealing each player two face-down cards. Subsequently, the dealer deals three cards, one card, and finally another card face up to the centre of the table. These five face-up cards are the cards that are known to all players. To win, a player must have the best five-card combination based on their own cards and the cards on the table. Following each deal of cards, the players can place bets. The players may forfeit the hand at any time by handing in their two cards to the dealer. The hand continues until five cards are shared on the table and five rounds of betting have been completed, or until all but one player has forfeited.

Texas hold 'em is a game of risk, encompassing statistical probability and psychology. It is possible to know that you have been dealt an unbeatable hand by the time the dealer has dealt the first three face-up cards. Having a queen and nine of diamonds on hand, while sharing the eight, ten and jack of diamonds gives you a high-valued straight flush that cannot be beaten, regardless of the other players' hands or the two subsequent cards.

In the example below, we have two distinct situations of risk: the risk for the players

who, unbeknown to them, will not be able to gain a winning hand, and the risk for the player whose hand cannot be beaten. The only way the players with losing hands can win is if the player with the winning hand does not understand the strength of their hand and forfeits after being intimidated by bets placed by one or more of the other players. This is, however, something the losing-hand players do not know at this time. From their perspective, there is a large number of potential outcomes based on their knowledge of the two cards they hold and the three shared face-up cards. The unbeatable hand is just one of these potential outcomes.

The rational thing to do as a losing-hand player with a statistically good hand such as a flush, or a pair of aces with a potential flush, would be to place bets that do not intimidate other players from betting on their own hand and at the same time allow for the player to get a sense of the other players' confidence in their hands. However, every bet for the losing-hand players is a net loss, given that the winning-hand player knows the strength of their hand. For the winning-hand player, the rational thing to do is to bet in a way that emboldens the other players and encourages them to bet as much money as possible in the remaining three rounds of betting, increasing the size of the winning pot as much as possible.



The Poker Game and Associated Statistic Probability

Shared Cards Known to All Players



Player One



Probability of
Win 30.62 %
Tie 3.84 %

Player Two



Probability of
Win 60.66 %
Tie 6.87 %

Player Three



Probability of
Win 70.24 %
Tie 1.43 %

Player Four



Probability of
Win 91.61 %
Tie 0.08 %

Player Five



Probability of
Win 100 %
Tie 0 %

For the losing-hand players, the risk contains a spectrum of potential outcomes, from the highly unlikely event of the winning-hand player forfeiting their hand to the potential loss of all their money to an unbeatable opponent. The losing hands' risk lies in the uncertainty of other players' potential hands and the fact that the losing-hand players can only be certain of one combination of cards that the other players cannot have, namely their own combination. For the winning hand, the risk is in the potential sum of money won from the other players, i.e. in the uncertainty of potential gain.

Philosophical and Moral Challenges Regarding Risk at the Operational Level

Risk can be analysed and managed in a purely naturalistic manner, but as indicated, there are limits to the value of a strictly technical approach to risk. From a military perspective, one important and often undervalued aspect of risk management is the ethical evaluation of risk. Military forces are morally and legally obligated to defend the general public from aggressors. In many ways, one could argue that military personnel take risk on behalf of the population. Either by expeditionary warfare taking the fight to the enemy, or by defensively preventing an aggressor from inflicting harm or seizing parts of one's own or an ally's country.

In the excellent book "Risk: Philosophical Perspectives", seven questions of ethics are suggested for use in an ethical evaluation of risk.¹⁹

- 1) To what extent do the risk-exposed benefit from the risk exposure?
- 2) Is the distribution of risk and benefits fair?
- 3) Can the distribution of risk and benefits be made less unfair by redistributing or by compensation?
- 4) To what extent is the risk exposure decided by those who run the risk?
- 5) Do the risk-exposed have access to all relevant information about the risk?
- 6) Are there risk-exposed persons who cannot be informed or included in the decision process?
- 7) Does the decision-maker benefit from other people's risk exposure?

The first question raises an interesting dilem-

ma: To what extent must military personnel themselves benefit from the risk to which they are exposed when they take risk on behalf of someone else? How does one justify the risk to the forces conducting the fighting?

The second and third questions can be seen as a natural follow-up to the first: Is the risk distributed fairly amongst the forces? To what extent can one compensate for the potential adverse consequences of the risk exposure?

The fourth question makes an interesting delineation between potential decision-makers and people exposed to the potential adverse consequences of risk. The former are the ones to initiate the activities and to a large extent dictate the level of risk exposure. Simplistically, we can make a risk tripartite, differentiating firstly between the civilian populations who ideally only benefit from military activities, secondly the tactical units facing the threats and hazards, and thirdly the military higher-level staff and decision-makers managing risk at the operational and strategic levels. One could argue that the tactical units take risk, while the higher levels accept risk on behalf of the tactical units.

Questions five and six additionally challenge the "risk accepters" at the operational and strategic levels in how they inform or conduct collaborative planning with subordinates.

Furthermore, question seven challenges the "risk accepters" to critically reflect upon the question to what extent they themselves benefit from the "risk takers'" exposure to the risk-related hazards and threats of military operations. "Risk accepters" do not have the same consequence-based incentive for thorough risk analysis as the "risk takers", but it is the "risk accepters" who have the best analytical capacity of the two.

Conclusion

Risk is more than that which can be measured and described by numbers. It is a conceptual idea of daring to engage with uncertainties in the pursuit of gains, while at the same time accepting the possibility of loss. During the analytical parts of the process, imagination is required to identify risk potential, meaning both the negative potential and the potential opportunities and associated gains that can be achieved. Dealing with risk professionally requires humility in the analysis and articulation of risk, while being cognizant of how under-

standing risk depends on one's perception.

Additionally, one could say that for decision-makers and staff at operational-level headquarters and above, imagination must, for moral reasons, be combined with an ability to empathize with the units that take the risk the decision-makers accept. At the operational level all staff members should aspire to become risk professionals, while those serving in positions of leadership, particularly in the command group, should aspire to be risk artists and lead through the fog of uncertainty. ✦

REFERENCES

- 1 Harari, Yuval Noah. (2011). *Sapiens: A Brief History of Humankind*. Israel: Dvir Publishing House Ltd.
- 2 Adams, John. (1995). *Risk*. London: Routledge
- 3 Aven, Terje. (2016). *Risk, Surprise and Black Swans*. London: Routledge
- 4 Aven, Terje. (2022). *Risk and Risk Science: Stories and Reflections*. Oslo: Universitetsforlaget.
- 5 Society for Risk Analysis. (2018). *Glossary*.
- 6 NATO. (2019a). *Allied Joint Doctrine for the Conduct of Operations*. NATO Standardization Office.
- 7 International Organization of Standards. (2009). *ISO 31000:2009 — Risk Management*.
- 8 Terje, Willy Røed, Herman Wiencke (2008). *Risk Analysis*.
- 9 Ibid.
- 10 Solli, Bjørn-Erik. (2020). *The Norwegian Defense's Security Management System—A Self-Applied Straight Jacket That Weakens the Nation's Defense Ability*. Oslo: Norwegian Military Journal
- 11 Solli, Bjørn-Erik. (2020). *Thoughts on Military Risk*. Stratagem.no <https://www.stratagem.no/kommer-tanker-om-militaer-risiko/>
- 12 Solli, Bjørn-Erik. (2018). *Reckless Opportunists or Calculated Warriors – A Mixed Methods Study of the Norwegian Special Operations Forces' Perception of Risk*. University of Stavanger
- 13 Liwång, Hans, Ericson, Marika & Martin Bang. (2014). *Journal of Military Studies* Vol.5, No.2, P.1-27
- 14 Society for Risk Analysis. (2018).
- 15 Aven et al. (2008).
- 16 NATO. (2019b).
- 17 Galula, David (2009). *The Accidental Guerrilla: Fighting Small Wars in the Midst of a Big One*. United Kingdom: C. Hurst & Co.
- 18 Andersen, Mikael. (2021). *Risk Management Handbook*. Multinational Corps Northeast.
- 19 Hansson, Sven Ove. (2007). *Risk and Ethics. Risk: Philosophical Perspectives*. London: Routledge.