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Preface

This thesis marks the end of two years at the University of Stavanger for the both of us. Our different backgrounds in respectively business administration and criminology have brought us two very different perspectives into the thesis, which we have taken advantage of to create the best possible output. Throughout the thesis' timeline, the learning curve has been steep, and the feeling of accomplishment correspondingly great.

The journey of writing our thesis together feels like embarking on a challenging flight as co-pilots—constantly communicating, sharing the workload, and aiming for a safe touchdown now as we proudly present our thesis to the world! Just like employees within a safety-critical organization relying on each other's skills and expertise, we managed our way through research hurdles, tackled complex concepts, and celebrated the milestones as a team. Our efforts, effective collaboration, and shared determination pushed us forward, which ensured a memorable and successful thesis journey. Now that the time has come to present our work, we are sharing the thrill of accomplishment, knowing that we have truly flown high together!

We want to give a special thanks to our supervisor, Kenneth. The discussions, guidance and feedback were invaluable. We thank you for the great interest and engagement you have shown in our thesis. We further want to express our gratitude to Njål, who helped us with informants and granted us access to the organization. Moreover, we would also thank the informants and all those who have contributed to the data collection. Our sincere gratitude is also directed towards Avinor as a whole, for letting us use their organization as a case for this thesis. Without their cooperation, this process would have been challenging.

We also want to thank our families, friends, and fellow students for the continuous support and motivation throughout this process. You all made this so much better. Finally, we would like to thank each other. The work with this thesis has been challenging, educational, and very motivating. We are left sitting with the feeling of gratefulness.

Stavanger, June 2023,

Vilde and Mai-Linh

Abstract

Hybrid threats dominate our contemporary and technological society, and new risks can be challenging to predict because of today's digitization. As modern safety-critical organizations and their technologies become more complex, similar to the digitalization experienced in today's society, they become more susceptible to accidents resulting from unforeseen events. Thus, the importance of a sound and functional safety culture is deemed important. This thesis seeks to shed light on risk culture in safety-critical organizations, and whether focus on risk culture could have a positive impact on safety culture and subsequently safety. Therefore, the problem statement of this thesis is:

In what way can a sound risk culture improve an already existing safety culture in safety-critical organizations operating within compliance-based safety regime?

A qualitative research method, consisting of an exploratory case study was used to help answer the problem statement. This included interviews with the case organization, as well as document analysis of both internal and external documents. In total, 18 semi-structured interviews, with informants from different levels within the organization, were conducted. After the interviews, the informants were provided with a statement form as a part of the interviews. Here, they were asked to rank eight statements from 1 to 5 as to whether they agreed or disagreed. The document analysis consisted of five internal documents and one external.

While no organization can completely eliminate all risks, an emphasis on risk culture involves having a proactive and systematic approach to identifying, assessing, and managing risks. This could, in turn, ensure that decisions made are more likely to be the same, independently of the decision-maker. The findings of this thesis indicate that an emphasis on risk culture, as a component within safety culture, could have a positive impact, and thus improve safety.

We observed that there was a lack of a collective understanding of what risk, risk culture, and risk-based approach is, within the organization. An increased understanding of risk culture among individuals can contribute to a better systems-based understanding of how all tasks are interrelated and, thus, enhance awareness of the risks the employees may encounter in their workday. Consequently, emphasizing risk culture in light of their safety culture could have a positive influence on the existing safety culture, thus improving the level of safety.

Abstrakt

Hybride trusler dominerer dagens moderne og teknologiske samfunn, og nye risikoer kan være utfordrende å forutsi grunnet dagens digitalisering. Ettersom moderne, sikkerhetskritiske organisasjoner og deres teknologi blir mer komplekse, på lik linje med digitaliseringen man opplever i dag, blir organisasjonene også mer utsatt for ulykker som følge av uforutsette hendelser. Derfor ansees en god og funksjonell sikkerhetskultur som viktig. Denne oppgaven ønsker å belyse risikokulturen i sikkerhetskritiske organisasjoner, og hvorvidt søkelys på risikokultur kan ha en positiv innvirkning på sikkerhetskulturen og derav sikkerhet. Derfor er problemstillingen i denne oppgaven:

På hvilken måte kan en god risikokultur forbedre en allerede eksisterende sikkerhetskultur i sikkerhetskritiske organisasjoner som opererer innenfor «compliance-basert» reguleringsregime?

Det ble brukt en kvalitativ forskningsmetode, bestående av en eksplorerende case-studie, for å besvare problemstillingen. Dette bestod av intervjuer med case-organisasjonen, samt en dokumentanalyse av både interne og eksterne dokumenter. Totalt ble det gjennomført 18 semistrukturerte intervjuer, med informanter fra ulike nivåer innad i organisasjonen. Etter intervjuene fikk informantene et påstandsskjema som er en del av intervjuene. Her ble de bedt om å rangere åtte påstander fra 1 til 5 om hvorvidt de var enige eller uenige. Dokumentanalysen besto av fem interne dokumenter og ett eksternt dokument.

Selv om ingen organisasjoner kan eliminere alle risikoer, innebærer risikokultur at man har et økt fokus på å ha en proaktiv og systematisk tilnærming til å identifisere, vurdere og håndtere risikoer. Dette kan igjen sikre at beslutninger som tas er mer konsekvente, uavhengig av beslutningstaker. Funnene i denne oppgaven indikerer at et økt fokus på risikokultur, som er en komponent i sikkerhetskulturen, kan ha en positiv effekt, og dermed forbedre sikkerheten.

Vi observerte at det manglet en kollektiv forståelse av hva risiko, risikokultur og risikobasert tilnærming er innad i organisasjonen. Økt forståelse for risikokultur hos enkelte kan bidra til forbedret helhetsforståelse for hvordan alle oppgaver henger sammen og derav økt forståelse for risikoen de ansatte kan møte i sin arbeidshverdag. Derfor kan et økt fokus på risikokultur i lys av organisasjonens sikkerhetskultur ha en positiv innvirkning på den eksisterende sikkerhetskulturen, og dermed forbedre sikkerheten.

List of abbreviations

EASA	European Aviation Safety Agency
EU	European Union
FAA	Federal Aviation Authority
HSE	Health, Safety & Environment
ICAO	International Civil Aviation
IRM	The International Risk Management Institute
ISO	International Organization for Standardization
KPI	Key Performance Indicator
NAA	Norwegian Aviation Authority (Luftfartstilsynet)

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1.0 Introduction

Today's society places great emphasis on safety-critical organizations and the understanding of potential dangers due to the constantly changing environment, risk landscape, and advancements in technology. Safety-critical organizations such as nuclear power industry, health care industry, and aviation industry (Nielsen et al., 2011; Reiman, 2015) are characterized by complex, non-linear dynamics involving many interrelated actors and processes (Sharpanskykh, 2012). The consequences of an accident within such an organization may be loss of lives or serious injury, environmental damage, or harm to plants or property (Saunders et al., 2015; Wears, 2012). Hybrid threats dominate our contemporary and technological society, and new risks can be challenging to predict because of today's digitization. As modern safety-critical organizations and their technologies become increasingly complex, they become more susceptible to accidents resulting from unforeseen events (Weick, 1987). The changing risk landscape may restrain an organization's ability to prepare for all possibilities, which results in the typical challenges of organizational change, by trying to become more flexible when addressing risks (Grieser & Pendell, 2021). It is therefore believed that culture could offer a method to solving such complications (Camerer and Vepsalainen, 1988).

In later years, there has been an increased awareness of the benefits a sound safety culture provides (Cooper, 1998). Such culture encompasses organizational values, behaviors, and awareness, fostering a proactive approach toward risk management and ensuring the well-being of individuals and the overall operational environment. Safety-critical organizations have an organizational culture often based on strong adherence to rules, regulations, and policies (Wang et al., 2018). The practice of compliance and adherence to rules and regulations serves to identify and mitigate risks and hazards inherent in daily operations and tasks of organizations, such as equipment failures, adverse weather conditions, human errors, and system failures (Budnike, 2022; Pümpel, 2016; Reason, 2008). However, it is important to acknowledge that there are instances where unwavering adherence to regulations can yield unintended consequences for the organization, and according to White (2022), compliance can, for instance, create a false sense of security, and a more proactive and systems-based approach to safety is needed.

A safety culture that is overly focused on compliance can potentially result in non-compliant behavior among employees. This can occur when employees feel they have to bend the rules

to accomplish their tasks efficiently, leading them to seek shortcuts or alternative methods. Overemphasis on regulatory conformity and compliance may cause employees in safety-critical organizations to place a greater emphasis on their daily responsibilities and tasks rather than on the organization's main objectives and goals of safety. Such actions in safety-critical organizations show that there is possibly a dysfunctional safety culture in the organization.

Moreover, actors involved in regulations and regulatory regimes in safety-critical organizations perceive culture as either a challenge or a solution (Bate 1984; Schein, 1983). In this thesis, it is believed that culture and awareness of a risk culture in the organization can counterbalance the excessive concern towards strong compliance and a possibly dysfunctional culture. A risk culture is a component within a safety culture, and according to Levy et al. (2015), risk culture enhances awareness and understanding amongst individuals in an organization regarding current and future risks. Being aware of a risk culture in the organization can possibly help balance a dysfunctional safety culture, where the individuals will achieve a comprehensive systems-based approach and view toward risk.

1.1 Problem statement and Research questions

Safety-critical industries, such as the aviation industry, can be understood as exceptional in terms of risk and safety because of its sound safety culture, which is defined as “set of beliefs, norms, attitudes, roles, and social and technical practices within an organization which is concerned with minimizing exposure of employees, managers, customers, suppliers, and members of the general public to conditions considered to be dangerous or injurious” (Turner et al., 1989, p.4). Laws and regulations are followed, and many safety-critical organizations, especially the aviation industry, adhere to a regulatory rule-compliance regime, using, for instance, detailed checklists (Jore & Moen, 2015; Pélegrin, 2013). This is demonstrated in various studies and research (see also; Flannery, 2001; Maurino et al., 1995; Reason, 1997; 2008; Wiegmann et al., 2004).

A functional safety culture is crucial for an organization to maintain control over the countless risk it faces. Nonetheless, a strong safety culture can also have undesired effects, where for instance, complying with all rules, regulations, and checklists can create inefficiencies and a false sense of security (Hornbuckle, 2014; White, 2022). Moreover, being overly focused on

compliance may also cause employees to become overemphasized on rules, regulations, and tasks that must be fulfilled in order to comply with the law. Thus, this may result in forgetting the bigger picture of safety.

This thesis intends to explore the potential weaknesses of safety-critical organizations' safety culture to create awareness of current and future risks. To accomplish this, the following problem statement will be answered:

In what way can a sound risk culture improve an already existing safety culture in safety-critical organizations operating within compliance-based safety regime?

In an effort to provide insights into the problem statement, the safety-critical organization Avinor, which owns a majority of the airports in Norway, will be used as a case study. Additionally, three research questions will also be looked into in order to help answer the problem statement:

1. What is risk culture and how do different employees within the same safety-critical organization interpret and understand the term?

To be able to answer the problem statement, it is essential to explore the different definitions, but also interpretations of risk culture, as it is a central term in this thesis. Thus, it will be important to understand what risk culture is and how risk culture is related to safety culture. In order to answer this question, we will review previous literature to see what there is on the topic already. We will also interview individuals working in the Front-Line, local management, and corporate management. If the organization wants to have a functional and sound risk culture and safety culture, it is crucial that everyone works toward the same risk picture and that they perceive risk similarly.

2. How do elements of risk culture become apparent in the employees' attitude towards the application of procedures and policies in the organization?

Further, to be able to answer the problem statement, it is also important to look into how the different attitudes of the employees influence the utilization of procedures and policies in daily operations. This could also provide input to underlying trends as to whether the organization is vulnerable to maintaining a robust yet dysfunctional safety culture that would potentially have a negative impact on its main objectives of safety. The research question may also help to

explore if an emphasis on risk culture can help balance safety-critical organization's strategy of being risk-based.

3. How does an overemphasis on compliance influence the safety culture of an organization and how does this contribute to instances of non-compliance?

Lastly, as the problem statement addresses safety-critical organizations that operate within a compliance-based regime, it is also important to look at how an organization's emphasis on compliance may have undesired effects. This can help organizations gain a better understanding of their compliance with safety policies and culture. This may also direct focus towards how an emphasis on risk culture can help avoid some of the undesired effects caused by overemphasis on compliance.

1.2 Research approach and limitations

While many organizations may be aware that different cultures exist in the workplace, not everyone is necessarily aware that there is a component within a safety culture in an organization called risk culture. We believe that risk culture can have a positive influence on a safety culture. Thus, we chose to explore and examine risk culture.

When it comes to the aviation industry, security is a topic that is thoroughly explored and studied. However, there is little research on the operational work with flight safety on the airside. Moreover, the security component of Avinor also emphasizes malicious, intentional activities, which includes acts carried out by individual outsiders. By looking at security, the focus will no longer be on employees at Avinor and their everyday operational work and culture. Instead, it will explore the resilience of systems, the efforts made by employees to mitigate intentional malicious acts, and their adherence to rules and regulations regarding security and counterterrorism. We will concentrate on the employees of Avinor and their work towards flight safety on the airside, their perception of risk, their safety culture, and their risk culture.

Moreover, this thesis will not explore if risk culture is used as a strategic means to manage and develop the organization. We have been informed that Avinor has specific indicators, which are understood as their Key Performance Indicators (KPI), that they look at and are used in

order to measure efficiency, safety, and safety culture. The thesis will not explore any developments or adjustments to these KPIs used to measure the safety culture in Avinor.

Different-sized airports and safety-critical organizations have varying numbers of employees who have different work routines, personal perspectives, and organizational cultures. This can influence various approaches and perspectives toward risk perception and risk management. Our aim is to generalize the case study to several compliance-based safety-critical organizations by studying airports of different sizes and the corporate management. This will enable us to get a comprehensive understanding of such organizations.

1.3 Structure

This thesis is divided into seven chapters. Chapter 1 will give an overall description and introduction of the theme in our thesis: how a sound risk culture can improve an already existing safety culture within safety-critical organizations operating in compliance-based safety regime. In Chapter 2, there will be given a contextual description of Avinor, which is the chosen case study. In Chapter 3, the theoretical foundation for the thesis, such as different definitions and understanding of risk, culture, safety culture, and risk culture, will be presented. Moreover, the chapter will go through important theories for understanding the analysis, such as compliance and non-compliance, risk management, and risk perception. The fourth chapter will present the chosen research method for this thesis, which is an exploratory case study, consisting of semi-structured interviews and document analysis. This chapter will include a detailed description of methodological choices, how the process of gathering empirical data has been, as well as the strengths, weaknesses, and ethical problems of using such a methodology. The fifth chapter will provide the findings and analysis of the interviews and document analysis. Chapter 6 will discuss the thesis' findings and seek to answer the problem statement and research questions. Lastly, Chapter 7 contains a conclusion based on the discussion in the previous chapter. This chapter will also contain suggestions for further research.

2.0 Context - Avinor

Avinor is a Norwegian state-owned organization under the jurisdiction of the Ministry of Transport and Communications and is in charge of 43 public airports in Norway (Avinor, n.d.-a). These airports serve over 50 million passengers a year and the company has around 2,800 employees who are in charge of about 815,000 aircraft movements annually (Avinor, n.d.-b). The organization's role in society is ownership, management, and development of a nationwide network of airports for the commercial sector (Avinor, n.d.-b), which is crucial for the Norwegian infrastructure. The organization is also important for international aviation, thus, Avinor is required to comply with various safety regulations and standards, including those set by the International Civil Aviation Organization (ICAO) and the European Aviation Safety Agency (EASA).

Avinor works continuously with behavior to build a strong ethical culture in the organization, and they define safety culture as “the things we say and do that affect safety” (Avinor, n.d.-c). Flight safety is the highest priority at Avinor, and the main goal is to reduce unwanted accidents and aviation incidents to the lowest possible level (Avinor, n.d.-c). Therefore, Avinor has a strong focus on safety, and according to their Flight Safety Policy (Avinor, 2023), they are committed to maintaining a strong safety culture that prioritizes identifying, assessing, and managing risks. Furthermore, Avinor has had a compliance-based safety regime for many decades, consisting of strict rules and laws from authorities that the organization has to follow. However, in 2016, new laws were introduced, allowing Avinor to prioritize safety and stable operations with a more risk-based regulatory regime (EASA, 2016).

2.1 Regulatory Regimes at Avinor

There is generally a strong focus on safety culture and security in the aviation sector, especially in the aftermath of the terrorist acts that occurred on 9/11/2001 in the US, with strict rules, regulations, and policies that all airports must adhere to (Jore & Moen, 2015; Wang et al., 2018). As a result of this, risks were managed by following a compliance-based safety regime, also called a rule-compliance regulatory regime, which is based on prescriptive rules, such as regulations from authorities and detailed checklists, that are clear and require little use of judgments (Jore, 2015; Martin, 2019).

The main reason why compliance is important is that it ensures a sense of safety in work being performed by ensuring adherence to rules, thereby preventing man-made disasters and human errors (Turner & Pidgeon, 1997). In addition, compliance is legally mandated, meaning that it is a requirement by law, regardless of size or air traffic volume (Luftfartstilsynet, n.d.). An example of this is the requirement for strict security checks and controls, as well as the adherence to all rules and regulations set by the Norwegian Aviation Authority (NAA) and the ICAO at all Norwegian airports operated by Avinor, regardless of their location, size, or air traffic volume. Failure to comply can lead to legal consequences such as penalties and fines imposed by the NAA (Luftfartstilsynet, n.d.) In other words, by following this regime, strict rules, regulations, and procedures have to be followed when it comes to flight safety, and there is no room for discretion (FAA, 2021).

While Avinor aim to change how they regulate and manage risks by switching from a rule-compliance regulatory regime to a risk-based regulatory regime, several individuals, particularly Front-Line workers, still approach their work using a more task-based perspective. Numerous workers in Avinor still complete lengthy checklists and adhere to stringent regulations. This will be further examined in the thesis.

2.2 Safety vs Security at Avinor

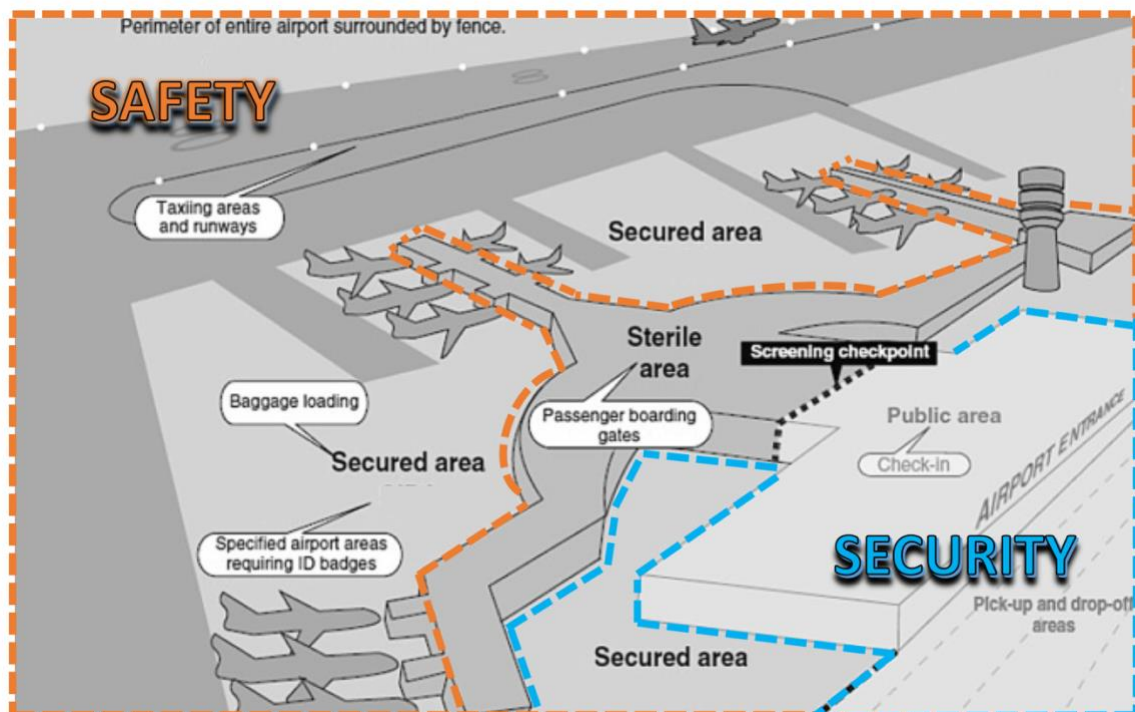
There are numerous assumptions regarding the relations between the terms “security” and “safety” in both academia and in practical life (Jore, 2017a). These two terms have similar meaning and is therefore often used as synonyms (Boholm et al., 2015). It was deemed significant for Avinor to establish clear distinctions between these terms, and within their airports, these terminologies are often used to describe specific areas.

The term “security” concerns actions to mitigate deliberate, malicious, and intentional acts, such as surveillance at the airport and the security checks where they, for instance, have metal detectors. In general, security is understood to be the protection of people or objects or the absence of danger or harm (Martin, 2019). According to Jore (2017a), intent alone is insufficient to define the term “security.” Security should instead be built on the fundamental distinction between malicious and non-malicious actions. This is because some actions might

be intentionally motivated but not malicious, such as avoiding safety barriers for the purpose of efficiency.

“Safety”, on the other hand, can be defined as “protection against human technical failure” (Holtrop & Kretz, 2008, in Jore, 2017b, p.161) or understood as harm to people caused by arbitrary or non-intentional events or acts (Hessami, 2004). The latter understanding of the term is in accordance with Avinor’s operational airside and its work with flight safety. According to Avinor (2015), the airside can be understood as the area that is physically inside the airport fence, the defined internal perimeter within access-controlled zones, and the maneuvering area including the taxiway and runway. Moreover, flight safety can be understood as the safety for operational workers and aircrafts to maneuver safely on the airside (Avinor, 2015). The operational work that is being done, such as runway maintenance, health, safety, and environment (HSE), making sure that fire engines are prepared in case of an accident are also part of the operational airside safety. The areas of safety and security at an airport are illustrated in Figure 1. This thesis will place emphasis on safety at the operational airside.

Figure 1. Self-made figure, inspired by Panter (2019), with examples of areas of safety and security at airports.



3.0 Theoretical Foundation

In order to adequately explore to which extent a sound risk culture can improve the already existing safety culture in safety-critical organizations, it is necessary to present a theoretical foundation to support further analysis and discussion. As a result, the chapter will explore relevant literature, which in its entirety will form a theoretical foundation for the analysis and to be applied in the discussion in Chapter 6.

The essence of this thesis is the term risk culture, which is a concept that is heavily used in industries such as banks or insurance companies (Levy et al., 2015). However, the term has yet to be thoroughly introduced and implemented in safety-critical organizations. In contrast, extensive research has been done on safety culture, which is highly acknowledged and emphasized in safety-critical organizations. Considering the nature of the activities of such organizations, a better understanding of risk throughout the organization, thus improving and defining its risk culture, could have a positive impact on safety.

First, the term risk is introduced in this chapter, and an attempt to appropriately describe the concept will be made. Then, the relationship between risk and culture is introduced, which will, in turn, provide an understanding of how culture influences risk and risk perception. Moreover, a great emphasis will be put on different types of culture, and culture's influence on organizations and their structures will be explored. Further, a distinction between safety culture and risk culture will be attempted. However, the research on this topic is somewhat limited. Therefore, the foundation presented is a composition of theories related to risk, risk perception, and culture, which is believed to help answer the problem statement. Moreover, as many safety-critical organizations operate within a compliance-based regime, this will also be introduced, as well as the advantages and disadvantages of having such an approach in a safety-critical organization.

3.1 Risk

Risk is an ambiguous term with several definitions, and there are disagreements within the research community regarding the definition of the term. The definition has evolved over time, with an increased focus on uncertainties in recent years. In Aven (2014), risk can be defined as “the combination of (P) and the extent of consequences (C)” (p. 27), often expressed as $P \times C$ (see also Ale, 2002). This definition and understanding of risk, can be viewed as a technical-economic perspective (Engen et al., 2021). Lupton (2013), however, defines risk as “a

phenomenon that has the potential to deliver substantial harm, whether or not the probability of this harm eventuating is estimable” (p.10). Moreover, the ISO 31000 defines risk as “the effect of uncertainties on objectives” (Standard Norge, 2018, p.1). This definition has been criticized by Aven (2017) as being difficult to understand and lacking scientific justification. Another definition of risk is where Aven and Thekdi (2022) define risk as “the consequences of the activity and associated uncertainties” (p.11). Additionally, they have emphasized that one needs to take both the positive and negative effects of the activity when addressing risk (Aven & Thekdi, 2022). Despite the criticism from Aven & Thekdi (2022), the definition of risk provided by ISO 31000 will be the prevailing understanding of risk in this thesis. This is because the definition from the standard is applicable to all organizations, regardless of types, size, activities, and locations, and it covers all types of risks, both negative and positive (Standard Norge, 2018). Moreover, the decision to use the definition of risk from the standard is based on the assumptions that most safety-critical organizations use it as guidelines for risk management practices, thus, such organizations are familiar with this definition of risk.

3.1.2 Risk Management

Risk management refers to all activities that address risk, such as avoiding, reducing, sharing, and accepting risk (Aven & Thekdi, 2022). According to the Institute of Risk Management (IRM, 2012), risk management can be defined as a “process that aims to help organizations understand, evaluate, and take action on all their risks to increase the probability of success and reduce the likelihood of failure” (Hopkins, 2012, p.38). In other words, risk management can be defined as managing risks by evaluating and using risk assessments, developing rules and procedures for making risk management decisions, and selecting the most appropriate action, investments, or decisions for risk (Aven & Thekdi, 2022; Hopkins, 2012).

3.2 Risk Perception

Understanding risk perception is crucial when investigating risk culture in safety-critical organizations operating within a compliance-based regulatory regime. Examining risk perception within the context of risk culture can give valuable insights into how individuals perceive and prioritize risks within safety-critical organizations. It has become widely accepted over the past decades that people evaluate various dangers and hazards using intuitive risk judgments. These judgments are referred to as risk perception and are typically influenced by

the culture one grows up with, as well as, for instance, the media (Slovic, 2000). It includes people's beliefs, attitudes, judgments, feelings, and the wider cultural and social dispositions they adopt towards threats to things that humans value (Aven & Thekdi, 2022; Lupton, 2013). However, risk perception could also be formed and influenced by different factors, such as the characteristics of the risks source, individual factors and cognitive heuristics, and social and cultural factors (Slovic et al., 2004). In risk research, there is a general understanding that individual factors, such as trust and social trust, affect how one perceives and responds to risk sources and risk events (see also; Earle & Cvetkovich, 1995; Earle & Cvetkovich, 1997; Earle & Cvetkovich, 1999; Freudenburg, 1993; Nakayachi & Cvetkovich, 2008; Siegrist et al., 2000; Siegrist et al., 2003; Siegrist, 2021). Risk perception is influenced by individuals' trust in the organizational decision-making processes or their perception of fairness regarding organizational objectives, thus, the organizational contexts of risk matter (Gould, 2021).

3.2.1 Risk perception and culture

Scholars such as Douglas and Wildavsky (1982) believe that people's risk perceptions are also influenced by subjective factors such as their values, beliefs, and worldviews. According to Douglas (1992), different cultural groups have different ways of categorizing and making sense of the world, and these cultural frameworks shape the way they perceive and respond to risks. In other words, the culture that individuals grew up in and the culture that individuals are a part of shape their risk perception (Mearns et al., 2001). According to Mearns et al. (2001) individuals of an organization do not necessarily have a common meaning system regarding hazards and risk but tend to have various perspectives on risk and safety that depend upon a variety of relevant factors, such as culture and perception.

Furthermore, cultural differences in risk perception can have implications for public policy and decision-making, as different cultural groups may have different risk tolerance levels and risk prioritization. Therefore, understanding these cultural differences is essential for developing effective risk management strategies sensitive to cultural values and beliefs. Culture can also influence how people respond to risk, including their willingness to take action to mitigate or avoid risks. Social norms, institutional trust, and the availability of resources to manage and address risks can all impact this (Douglas & Wildavsky, 1982). Overall, culture may significantly impact how people perceive and behave when it comes to risks. Thus, it is critical

to understand how these cultural elements may influence how individuals perceive and react to risks in order to create successful risk management efforts.

3.3 Risk and Culture

Links between risk and culture can be traced back to Douglas's work on society and cultural ties between group values and collective perceptions of specific risks (Douglas, 1985; 1992). Understanding these connections will contribute to a comprehensive examination of the complex interaction between risk, culture, and organizational dynamics. Douglas (1992) believed that risks were created as a means of symbolizing resistance to prevailing communities. Risk culture characterizes communities formed in the context of institutional ambiguity of risk, which may work to detect and identify environmental risk and other types of risk (Lash, 2000). Moreover, Douglas viewed risk as a modern Western strategy for coping with danger and otherness (Douglas, 1992; Lupton, 2013). According to Lupton (2013), many of Douglas' articles on risk aimed to clarify why some threats are classified as "risks" while others are not. Douglas's main arguments centered on the significance of maintaining the boundaries between oneself and others, dealing with social deviation, and achieving social order for social groupings, organizations, or societies (Douglas, 1985; 1992; Lupton, 2013).

Moreover, from Gould (2021), underlying assumptions and norms can develop into cultures, given that they become collective at the organizational level. Douglas (1985) also argued that each individual's perception of risk, understanding of risk, and personal heuristics are actually shared cultural norms, expectations, and assumptions based on distinct social roles and responsibilities in society. However, these cultural influences may create critical and often long-lasting differences between individuals' perception of risk and the reality of the situation (Gould, 2021). In other words, the comprehension of risk is dependent upon multiple factors, with cultural elements playing a significant role in shaping individuals' perception.

3.4 Risk and organizations

Since the early 1980s, there has been an increased interest and concern involving man-made disasters and the complexity of modern organizations (Gould, 2021). Hutter and Power (2005), states that "organizations, rather than individuals, are the critical agents of any so-called risk society because it is primarily in these contexts that hazards and their attendant risks are

conceptualized, measured and managed” (p.1). This is because organizations can be considered the center for processing and handling risks, but also potential creators and exporters of risk. Risks are incorporated into the routines and operational culture within an organization (Hutter & Power, 2005). However, when it comes to the event of near misses, organizations’ capabilities to comprehend and understand the nature, or the extent of the risks to which they are potentially exposed to, differ (Hutter & Power, 2005). Using the term organization in relation to risk could have several meanings (Gould, 2021). In this thesis, organizational risk is perceived as risk caused by an organization through management, operational, or maintenance insufficiencies.

3.5 Culture

There are many different definitions of the term culture. Bang (1998) states that there is no collective definition and understanding of the term culture as it is not something physical, concrete, nor visible. Culture is a term that has been created by humans in order to describe a phenomenon everyone experience from time to time – when individuals within a group spend enough time together, expectations and unwritten norms for how to act, what is true or false and what is right or wrong will start to develop (Bang, 1998).

From a sociological perspective, culture is “a community of ideas, values, and norms in a society” (Magnset & Hylland, 2017, p.18). Culture can also be seen as the thoughts, knowledge, and skills people have acquired as members of a society (Eriksen & Sajjad, 2015, p.40). According to Streicher et al. (2018), culture, in the most general form, comprises shared assumptions, attitudes, values, and beliefs that create sense and meanings and are expressed by behaviors, rules, rituals, and norms (Schein, 2010; Schneider et al.,2013). Culture teaches people standards of what is important and what is irrelevant, what feelings and thoughts are appropriate, and which are not, what should be done and how it should be done, and what should be avoided (Deal & Kennedy, 1982). People are exposed to the culture of their broader society and the more specific subcultures of their social groups. Moreover, there are different cultures in different settings, and in the context of businesses and organizations, there are different organizational cultures, and each organization should always seek to achieve a functional and sound organizational culture.

3.6 Organizational Culture

Organizational culture is a widely used but variously defined term that has grown over the last 40 years (Bang, 2020). In the same way as the term culture, organizational culture has no common definition. Nevertheless, a broad and general understanding and definition of organizational culture comes from Bang (1998), who defines it as a "set of common norms, values, and perceptions of reality that develop in an organization when members interact with each other and with the environment" (p.19). According to Jacobsen and Thorsvik (2019), and Bang (2020), the majority of definitions of organizational culture emphasize shared experiences, norms, ideas, and viewpoints among individuals working for the same organization.

Rather than focusing on good or bad cultures, it has been suggested to use *functional* or *dysfunctional* cultures to highlight that the culture can be appropriate or inappropriate in order for the organization to reach its goals (Bang, 2020). In other words, when deciding whether the culture within an organization works as an asset or liability, one should distinguish between the culture's strength and content. An organization's strength is dependent upon how well incorporated the culture is, and how long it has been around (Bang, 2020). A strong culture can ensure loyalty, and support amongst the members, and thus be a great asset. However, this is only given that the culture pulls in the same direction as the organization's objectives. Consequently, the content of the culture is what influences whether the organization will reach its goals or not (Bang, 2020).

Organizational culture may differ in strength, at the same time, a strong culture may not necessarily be a good culture. A strong culture may lead to managing problems, as the culture can potentially weaken the formal control mechanisms (Jacobsen & Thorsvik, 2019). Further, it could lead to group-thinking. Group-thinking can, for example, lead to uniform thinking, narrow-mindedness, or a lack of ability to accept criticism or alternative points of views (Bang, 2020; Jacobsen & Thorsvik, 2019). This illustrates how organizational culture can negatively affect an organization in situations where a solid regulatory regime and structure may not be helpful. Further, the relationship between cultural expression and cultural content is mutual, where the cultural content is reflected in the cultural expressions, such as structure and regulatory regime, while cultural expressions help to create, maintain, and change the culture and its content. (Bang, 2013). An organizational culture can reflect an organization's structure and regulatory regime, but it possible to believe that it can also be in conflict with the goals of

the governing structure and regulatory regime, thus, may lead to a dysfunctional culture (Bang, 2013).

Bang (2013) argues that organizational culture, encompassing values, norms, and perceptions of reality, is not directly observable but manifests through symbolic processes, objects, structures, actions, and achievements within the organization. As an organizational culture can reflect an organization's structure and regulatory regime, it is possible to believe that it can also be in conflict with the goals of the governing structure and regulatory regime, thus, may lead to a dysfunctional culture (Bang, 2013). Further elaboration on regulatory regimes and culture in organizations will be provided, where two different governance regimes commonly used in safety-critical organizations, rule-compliance regime and risk-based regime, will be explored.

3.6.1 Different governance regimes to compliance

According to Martin (2019), there has been a shift in how to approach and manage risks, where the shift has been away from prescriptive rules and a compliance-based regulatory regime to a more risk-based approach. Prescriptive regulations have generally been replaced with more risk-based policies in the sense that safety measures are intended to be selected by judgments about risk (Martin, 2019). A risk-based regulatory regime is an approach or strategy based on managing and reducing uncertain future dangers (Martin, 2019). The approach is founded on the presumption that organizations have the competence to know what type of future risks they may encounter and that they have enough knowledge to address these risks (Jore, 2015; Lid, 2022). This regulatory regime indicates that regulations and procedures from authorities must still be followed and adhered to, but safety-critical organizations that follow this risk-based approach will have greater leeway and can make their own choices to manage risk. This will result in being more flexible and adaptable as the risk picture evolves.

Although several organizations have switched regulatory regimes, it is possible to observe individuals in safety-critical organizations who still work in a compliance-based manner, which can, for instance, involve extensive checklists and strong adherence to rules and regulations from authorities (Jore & Moen, 2015). According to Jore and Moen (2015) this top-down type of management and regime has historically been the dominating approach for regulating hazardous activities and risks, including detailed, specific, and often technical requirements for

operations. In a rule-compliance regime, the authorities create comprehensive regulations to steer the direction of organizations in their safety work (Hopkins, 2011; Jore & Moen, 2015).

3.6.2 Why is compliance important?

There are several reasons why compliance is important in safety-critical organizations. Compliance can be defined as “the act of obeying a law or rule, especially one that controls a particular industry or type of work” (Cambridge Dictionary, n.d.-a). It can help recognize and reduce risks and hazards, such as equipment failure, bad weather, human error, and systems failure all of which safety-critical organizations can experience in daily operations (Budnike, 2022; Pümpel, 2016; Reason, 2008). Compliance shows a commitment to security, safety, and moral business conduct, which can create trust and confidence among stakeholders and customers, resulting in an improved reputation in the industry (Mills et al., 2016). Overall, compliance is essential to ensure organizations’ safety, security, and integrity. It helps to protect employees, customers, and other stakeholders and is required by law to ensure that the organization operates in a safe, sound, and secure manner.

3.6.3 Disadvantages of compliance

While compliance is generally seen as something positive because it helps ensure safety, there are situations where strict adherence to regulations can have unintended consequences. Even in the best organizations, there may be situations where following and adhering to the rules and regulations is seen as essential but inconvenient (Reason, 2008). For instance, some organizations may prioritize compliance with regulations over other considerations, such as customer service or efficiency. This can lead to rigid and inflexible policies that can frustrate employees and damage the organization’s culture. Additionally, overly strict regulations can create unnecessary bureaucracy and administrative burdens, which can be time-consuming and expensive for the organization and other stakeholders (Homann, 2022). Thus, it is important to recognize that compliance is not a solution or only has positive results, but it can sometimes cause negative consequences. Therefore, it is vital to have a balance between complying with regulations and considering other factors such as safety and efficiency.

Hudson et al. (1998) have written about why individuals bend the rules in safety-critical organizations. They draw attention to elements such as (1) *expectations* that rules must be bent

to accomplish tasks effectively; (2) *powerfulness*, where the feeling of one's own experiences and ability to complete tasks independently is strong, thus no need to follow protocols and procedures; (3) *opportunities* to take shortcuts or find better methods and solutions; and (4) *inadequate work planning and preparation*, which can result in working automatically, and resolving issues as they arise (Hudson et al., 1998). Furthermore, non-compliance can be defined as “the fact of not obeying a rule or law, especially one that controls a particular industry, or type of work or activity” (Cambridge Dictionary, n.d.-b). Hudson et al. (1998), also distinguish between three types of violations associated with non-compliance. *Routine Violations* occur when established procedures are not followed, leading to non-compliance. *Situational Violations*, on the other hand, occur in special circumstances that are inadequately covered in the existing procedures. Lastly, *Exceptional Violations* arise when no procedures are available to address a particular situation, resulting in a violation by not adhering to established protocols (Hudson et al., 1998).

Moreover, Chou et al. (1996) argue that when there is too much to do, the situation is stressful, and there is time pressure, employees can experience cognitive tunneling. According to Ververs and Wickens (2000), cognitive tunneling is a phenomenon resulting in an “involuntary fixation of mental resources on one aspect of the symbology at the expense of other sources of information” (p.345). Chou et al. (1996) explain that when stress levels rise, individuals may experience cognitive tunneling, where one activity or task is highly prioritized at the expense of other activities or tasks. In dangerous circumstances, this can lead to the tasks being focused on is less critical than those activities or tasks being neglected, thus leading to a very harmful situation. Furthermore, Chou et al. (1996) studied aircraft accidents focusing on different types of Cockpit Tasks Management Errors. They concluded that errors could occur when workers are not paying attention or are overworked in a stressful and time-pressured atmosphere (Chou et al., 1996). The latter, known as cognitive tunneling, will be examined in this thesis since it is plausible to believe that working compliance-based in a time-constrained workplace may lead to shortcuts or priorities that might have a negative impact on safety.

3.7 Safety Culture

Pidgeon (1991) argues that safety culture represents a new way of conceptualizing processes for handling risk and management in organizational contexts. Safety culture characterizes some

common behavioral preconditions for global catastrophes, disasters, and accidents in high-risk socio-technical systems (Pidgeon, 1991). Tuner et al. (1989) defines safety culture as:

“set of beliefs, norms, attitudes, roles, and social and technical practices within an organization which is concerned with minimizing exposure of employees, managers, costumers, suppliers and members of the general public to conditions considered to be dangerous or injurious” (p.4).

According to Arblaster (2018), a safety culture can represent employees’ attitudes about an organization’s approach to safety, perceptions of risk, beliefs on responding to and controlling risk, and engagement in activities that represent a safety culture. Safety and safety culture mainly focuses on human errors and human contribution (Reason, 2008; Turner & Pidgeon, 1997). Interest in the term safety culture can be traced back to the Chernobyl nuclear plant accident (Pidgeon, 1991). In several research and analyses of the implications of the Chernobyl disaster, serious human errors and violations of procedures were interpreted as evidence of a poor safety culture (Pidgeon & O’Leary, 2000). In other words, safety culture is concerned with establishing routines and an organizational culture that prevents human errors and violations of regulations, which will increase the safety of employees.

Reason (1997) studied how to establish a sound risk management and a functional safety culture. This type of culture includes being aware of warning signs, avoiding group-thinking, and avoiding a denial culture, but rather having an informed, learning, and just culture. Reason’s (1997) understanding and model for safety culture have served as ideals for organizations to strive towards, and he suggests that a functional safety culture consists of five elements: (1) *an informed culture*, where the organization actively distributes safety information while gathering and analyzing relevant information and data. (2) *A reporting culture*, which entails creating an environment where individuals feel comfortable reporting safety issues without being held accountable. The rationale behind a reporting culture is getting valid feedback when making mistakes or deviations, not blaming individuals for their mistakes (Reason, 1997). Employees must be sure that their information will be kept private and that it will be appreciated; otherwise, they may believe that there is no use in reporting. Another element is (3) *learning culture*, where an organization can improve by learning from its failures. According to Reason (1997) a learning culture is probably the easiest to follow, but it

is the most difficult to make work, because one has to act and create actual change in the organization. In a (4) *just culture*, errors and unsafe behavior will not be penalized if the errors were unintentional; however, people who behave carelessly or purposefully take unwarranted risks will still face punishment, thus an important prerequisite for having and achieving a just culture is “an agreed set of principles for drawing the line between acceptable and unacceptable action” (Reason, 1997, p.209). The last element of a sound safety culture is having a (5) *flexible culture*. A flexible culture is when the organization and the employees can adapt and be flexible in an effective way to changing demands and shifting needs in the market. According to Reason (1997) it often involves shifting the conventional hierarchical mode to a flatter professional structure, where it is the task experts on the spot, Front-Line workers, and individuals who know the situation best, should be the one making decisions. Then, once the emergency has passed or the hazardous situation is over, the organizational structure reverts back to the traditional bureaucratic mode of governing and controlling (Reason, 1997).

3.7.1 Safety Culture in Aviation

Like most safety-critical organizations, the aviation industry has gained a reputation of having a sound safety culture. However, the methods used to manage safety in aviation organizations can result in “functional” or “dysfunctional” safety cultures depending on organizational practices that impact the effectiveness and dependability of safety systems (Reason, 1997). Aspects of safety culture can be seen in the organization’s widespread attitudes toward care and concern (Pidgeon & O’Leary, 1994) Additionally, according to Gill and Shergill (2004), the aviation industry and its safety culture are heavily based on Reason’s (1997) model of safety culture presented above.

Moreover, the ICAO (2013) states that a safety culture includes the shared perceptions and beliefs that an organization’s members have about the safety of the public and that these ideas may influence how members behave. A functional safety culture, essential for preventing human errors and system accidents, depends on mutual respect and trust between employees and the management (ICAO, 2013). Taking this into account, top management plays therefore a critical role in fostering and promoting this culture within the organization.

3.8 Risk Culture

The concept of risk culture is “admittedly hard to describe” (Gorzen-Mitka, 2018, p. 427). Similar to safety culture, there are several definitions, understandings, and perceptions of the term, depending on the context or industry one is looking at. One of the many definitions of risk culture is from the IRM, where risk culture can be understood as “the values, beliefs, knowledge, attitudes, and understanding about risk shared by a group of people with a common purpose” (IRM, 2012, p.7). However, this definition views risk culture closer to safety culture, as the focus is on a group rather than the individual level. In this context, risk culture is considered on an individual level, within the safety culture. Deloitte (2021) states that to achieve a sound risk culture within an organization, “employees’ understanding of and attitudes towards risk must lead them to consistently make appropriate risk-based decisions” (Deloitte, 2021, p.3). In other words, the emphasis on risk culture is on the individual understanding of risk and the individual attitudes towards risk. Moreover, Levy et al. (2015) have another definition for risk culture, which originates from the financial industry, and this is the definition that will be used in this thesis:

“The mindsets and behaviors of individuals within an organization determine the collective ability to identify and understand, openly discuss, and act on the organization’s current and future risks” (p.1).

With this definition from Levy et al. (2015), it becomes clear that the emphasis is on the individual situated within a wider group setting. Thus, risk culture may be viewed as a micro-level culture, where one examines how the individual perceives, identifies, and comprehends risk.

Moreover, academic literature addressing risk culture in safety-critical industries, such as aviation, is limited. Therefore, to address this gap, it has been chosen to use the definition of risk culture established in the finance industry, which provides a more comprehensive framework that can be adapted to gain an understanding of risk culture within safety-critical contexts. Using this definition can enable a more complex examination of the cultural influences on risk management procedures and decision-making. By adopting an established definition from another industry, existing information and concepts can be used to increase understanding of risk culture in safety-critical organizations. Furthermore, using a definition from another industry enables the generalization and examination of risk culture across all

industries. An objective of this thesis is to generalize the concept of risk culture and explore its role in strengthening a functional safety culture. This broader perspective aids in recognizing shared elements, trends, and effective approaches that can improve safety culture across various safety-critical industries.

Both practical application and academic literature highlight different aspects of risk culture (Gorzen-Mitka, 2015; 2018). Nevertheless, there seems to be a mutual understanding that risk culture is common norms, values, traditions, beliefs, knowledge, or attitudes that influence an individual. (See also; Asher & Wilcox, 2022; Bozeman & Kingsley, 1998; Ching et al., 2021; Ghafoori et al., 2023; Gupta & Leech, 2015; Kunz & Heitz, 2021; Levy et al., 2015). Ching et al. (2021) also argue that inadequate risk management and risk culture can expose organizations to unexpected risk events, which potentially can have negative impact on performance. Other scholars, such as Streicher et al. (2018) introduce an alternative way to handle risks and manage risk culture in organizations by integrating existing research and approaches together with a holistic view. The scholars state that prior to evaluating and improving the risk culture, it is crucial to assess the organization and the employees' risk perception (Streicher et al., 2018). Several elements of a sound risk culture frequently occur in the vast literature from the financial industry, such as the importance of top management and the "tone at the top" (Ching et al., 2021; Gupta & Leech, 2015; KPMG, 2017; Mikes & Kaplan, 2013). The tone at the top refers to the top management's commitment to the organization's risk management efforts.

3.8.1 Risk Culture in the Aviation Sector

Turkoglu (2016) explores the risk culture in Turkish Commercial Air Transport Industry and argues that good safety and functional safety culture is well embedded in the aviation sector. Nevertheless, risk culture has yet to be focused on when it comes to aviation. Turkoglu (2016) introduces risk culture as a new component of the safety culture framework in the commercial aviation industry in Turkey that can further improve safety. This means that one must look at the individuals who work in this industry. A person's understanding of risk is a key component of risk culture.

Comprehensive knowledge of the individual's behavior in a group setting is also crucial. A robust risk culture for the aviation sector can, for instance, involve Front-Line workers having a systems-based understanding of their tasks, how their tasks affect and influence the entire system, and how they can influence the general operation and safety at the airport. A systems-based understanding and thinking is about viewing an organization or company as "a whole, with its bounds, both with internal and external environment" (Hurná & Bajusz, 2016, p.16). The advantage of system-based understanding is being aware of the fact that every task or system can be part of a greater one (Hurná & Bajusz, 2016). In addition, a sound and functional risk culture in the aviation sector will enable individuals to approach risk with an attitude and understanding that will facilitate them to make solid risk-based decisions. Nevertheless, as trends in literature reveal throughout the years, the primary focus has been on safety culture and safety management in the aviation industry, thus, there is little information and research on risk culture.

3.8.2 Safety Culture versus Risk Culture

It is important to stress that risk culture in this setting is viewed as a component of safety culture (Turkoglu, 2016). As mentioned, safety culture can, equivalently to risk culture, be defined as the set of beliefs, norms, attitudes, and social and technical practices within an organization. It has been discovered that some scholars use the terms "risk culture" and "safety culture" interchangeably, such as Abdulla et al. (2020). However, there is a substantial difference, as pointed out by Turkoglu (2016). Some characteristics and differences between safety culture and risk culture will be elaborated below and can be seen in Table 1.

Based on different scholars (Levy et al., 2015; Pidgeon, 1991), a key distinction between safety culture and risk culture is the point of views being examined. Safety culture takes a macro-level view of the organization, focusing on the group setting (Groves et al., 2011; Tuner et al. 1989). Therefore, safety culture revolves around the organization's behaviors, thoughts, understanding, and risk mitigation practices. In safety-critical organizations, having an informed, reporting, learning, flexible, and just culture is essential (Reason, 1997). Having a secure and sound safety culture can therefore be seen in the context of good communication, having the courage to report mistakes, and employees having a high level of trust in the organization. Moreover, in a functional safety culture, good safety barriers and mitigating

measures exist, and safe routines in the work exist, as well (Reason, 1997). Moreover, a sound safety culture is also based on routines and being compliant, for instance, adhering to rules in order to avoid human errors (Reason, 2008; Turner & Pidgeon, 1997).

Risk culture, on the other hand, does not focus on the whole organization nor the group. Rather, risk culture focuses on the individual within the organization, thus having a micro-level view (Levy et al., 2015). The main point of a sound and functional risk culture is to ensure that each member of the organization has a comprehensive systems-based understanding of the task they conduct and a comprehensive view of risk (Streicher et al., 2018). As mentioned, risk culture is about the mindsets and behaviors of individuals that determine the collective ability to identify and understand the organization's current and future risks (Levy et al., 2015). A functional risk culture will lead individuals to consistently make appropriate risk-based decisions. Risk culture does not focus on adherence to rules and regulations but on making good risk-based judgments, which are not task-based but systems-based. In other words, individuals within the organization should possess a broad awareness of the interconnectedness of various elements, including everyday tasks and operational work. Any incidents or issues in one area can impact the entire system, potentially resulting in risks and dangerous circumstances. A sound, functional risk culture occurs when individuals within the organization, both employees and the top management, understand, perceive, and have the same attitude towards risk, leading to consistently appropriate risk-based decisions making (Deloitte, 2021).

Table 1. Differences between characteristics of Risk Culture and Safety Culture.

SAFETY CULTURE	RISK CULTURE
Focus is on the organizational, macro level and meso-level.	Focus is on the individual, micro level.
Safety culture is an organizational culture that places a high emphasis on safety beliefs, values, and attitudes in <i>the organization</i> (Turner et al., 1989).	Mindset and behavior of <i>individuals</i> that determines the collective ability to identify and understand the organization's current and future risks (Levy et al., 2015).
Safety culture can be driven by processes, regulations, and formal governance.	Risk culture is value-based and ethically driven rather than based on processes or formal governance.
Focus is on the activity of the organization - "The way we <i>do</i> things around here".	Focus is on the mindsets of individuals - "The way we <i>think</i> around here".
Rule-compliance regulation.	Risk-based thinking.
Main emphasis on tasks and rule compliance to be as safe as possible.	Main emphasis on the comprehensive, systems-based way of thinking to achieve safety and security.
The focus is on the work that is set by different checklists, and regulations, rules and policies have to be followed.	The focus is on the overall understanding throughout the organization of why the work they do is important.
Has physical barriers and mitigating measures.	No focus on physical barriers or mitigating measures.

3.9 Summary of the theoretical foundation

People's understanding of risk differs, and the different interpretations are often linked to the individual's cultural background (Douglas, 1985; Lupton, 2013; Slovic, 2000; Slovic et al., 2004). Culture and cultural norms, both individual and in the organization, will affect risk perception, which consequently will affect how one sees, understands, and defines the risk picture. Moreover, social trust among individuals will also influence the risk perception and, thus, the risk picture (Earle & Cvetkovich, 1997; Siegrist, 2021). As for top management, their understanding of risk and the risk picture will, in turn, affect their risk management efforts (Ching et al., 2021; Gupta & Leech, 2015; KPMG, 2017). Subsequently, their understanding of risk and the risk picture will also influence other employees' interpretation and perception.

It is important to address that there are several cultures within the same organization, where both organizational culture and a safety culture exist. The risk culture may exist despite a lack of formal establishment or focus on such culture. However, in order to be able to look at safety culture and risk culture, one must understand both the organization and the underlying organizational culture. Often, organizational culture can reflect an organization's structure and regulatory regime (Bang, 2013) and organizational culture has an effect on how safety is perceived and dealt with in safety-critical organizations (Reiman & Oedewald, 2009). Safety-critical industries, such as aviation, are known to typically follow a compliance-based safety regime, where laws and regulations are strictly followed (Jore & Moen, 2015). An interpretation of having a compliance-based regulatory regime, where the employees and their jobs are heavily regulated, could lead employees to become ineffective, forget the overall goal of safety and rather be task oriented. It may also suggest a lack of comprehension among Front-Line workers regarding their work's underlying rationale and purpose. Instead, they just carry out the given tasks in order to be compliant. Moreover, it is possible to believe that employees with a lot of experience will take shortcuts due to being independent, and they get the opportunity to find other methods to do their tasks that are believed to be more efficient (Hudson et al., 1998). Furthermore, employees working in a safety-critical organization may also experience time-pressure and stressful situations where they have to prioritize specific tasks, which can result in cognitive tunneling (Chou et al., 1996). In other words, the employees may forget the bigger picture, such as the focus on safety, but rather only focus on the tasks and the KPIs.

A strong and functional risk culture, based on collective risk understanding and a systems-thinking approach among employees, can improve comprehension of tasks and balance the organization's strict compliance and safety culture. Having a sound risk culture can lead to less focus on compliance and increased focus and a broad understanding of the purpose of the work and why it is vital for safety. Individuals have various cultures and come from different environments, which results in several interpretations of risk. Therefore, a balanced culture and awareness of safety and risk may be created by having a healthy risk culture where everyone has a common understanding of the risks the organization may encounter.

4.0 Methodology

This chapter will explain the methodological decisions made for this thesis. The explanations will include the choice of research design, data foundation, data collection, ethical considerations, and strengths and weaknesses of this research methodology. The chapter is organized into the following sections. It begins with an introduction to the whole research process. Next, our research design, where Avinor is used as a case in our qualitative exploratory case study is introduced. Further, the research strategy will be presented. The data collection process is then discussed, along with the selection of informants and methods for data collection and data analysis. Finally, the chapter will address some methodological concerns, as well as considering the strengths and weaknesses of the chosen methodology.

4.1 Research Process

The whole process of how we have carried out the thesis, obtained literature, contacted informants, obtained data material, and analyzed data and findings can be seen below in Table 2. This table shows how the whole study has been planned and executed, and how we have prioritized the time we have been given to carry out the study. Having this diagram and following it when carrying out this thesis helped us track our progress and manage time effectively. This diagram has ensured that we stayed on track and completed our thesis within the given time frame.

Table 2. The process of the master thesis, shown in a Gantt diagram.

Tasks	January	February	March	April	May	June
Get overview over literature and get theoretical foundation	█					
Identifying problem statement and developing a research methodology	█					
Contacting Avinor and informants and obtain documents		█				
Conducting interviews and document analysis. Coding data material			█			
Analyze and compare data				█		
Discussion and conclusion					█	
Editing: reviewing and editing the thesis					█	
Proofreading and review final draft						█
Writing: introduction, theory, methodology, results, discussion & conclusion	█					

All decisions related to the research process are justified by the research design. The research design assures control by anticipating various parts of the study and incorporating them so that they may be presented at the right moment within the thesis (Blaikie, 2010). The research topic, the literature review, the data collection, the data analysis, and the evaluation of the research with particular emphasis on strengths and limitations are some of the essential components of the research design (Blaikie, 2010). We have decided to use a similar format for the method section of our thesis. This chapter will go through the methods we used to collect and obtain data, present the strengths and weaknesses of the methodologies used, as well as provide the reader with an understanding of how the research is performed.

4.2. Research Design

The problem statement and the research questions in this thesis provide guidelines for how the thesis should be designed. Research methodologies serve as a guideline for researchers in conducting their studies and ensuring that their work adheres to a high degree of academic integrity (Grønmo, 2004). In order to explore compliant safety-critical organizations, their safety culture, and their understanding of risk culture, as well as to assess the potential impact a robust risk culture may have on a safety culture, a qualitative methodology has been utilized. Using a qualitative method has helped us obtain the most in-depth information and data for the thesis.

Before starting the data collection, previous literature and research regarding the topic were collected and reviewed. It was uncovered that there are limited literatures and research that have explored the risk culture in safety-critical organizations and that the main focus has been on safety culture. Considering this, we believe that using an exploratory case study as a method is appropriate for this thesis. We chose this as the goal is to examine and elaborate more on the topic. This exploratory methodology seeks new insight into a phenomenon by asking questions and evaluating the phenomenon in a new light and perspective (Saunders et al., 2019; Yin, 2009). Exploratory case studies are best suited for situations where there is little existing information or knowledge about the topic and where the goal is to create insight and understanding of a problem (Saunders et al., 2019).

4.2.1. Qualitative Research and Triangulation

A qualitative approach can, according to Thagaard (2018), be considered research that involves close contact between the researcher and people in the field, such as in an interview. The benefit of the qualitative approach is that it allows one to capture thoughts and experiences that cannot be measured or quantified (Dalland, 2017). Moreover, a qualitative approach will help achieve an understanding of social phenomena, such as culture. Thagaard (2018) also states that qualitative methods, such as interviews, can contribute to understanding how people experience and reflect on their situations.

Using an explorative methodology determined that a qualitative approach would be the best and most effective method to gather the most accurate and trustworthy empirical data and explore and get in-depth information on the topic (Saunders et al., 2019). Moreover, qualitative investigations seek to comprehend a phenomenon or the social world by examining data acquired from an informant's perception of the phenomena (Jacobsen, 2005). Based on this, it was therefore chosen to use a qualitative research methodology, with the use of triangulation of semi-structured interviews and document analysis.

The purpose of using triangulation is to use two or more independent sources of data and methods of collection within one study. The advantage of triangulation is that it draws from the strengths of both methods so that the limitations of one method can be supplemented by the strength of another (Saunders et al., 2019). Triangulation is used for three primary purposes: to enhance validity, to create a more in-depth picture of a research problem, and to interrogate different ways of understanding a research problem (Thagaard, 2018). Triangulation ensures a more comprehensive and holistic perspective on the empirical data collected than what a document analysis or interview alone might provide. The triangulation in this thesis consisted of in-dept semi-structured interviews and document analysis. It is used in this research to gain a further and more in-depth understanding of the information and data collected from the interviews. To ensure the robustness of the findings, the data collected from interviews were complemented and evaluated by incorporating relevant documents on the topic. This methodological approach serves as a means of confirming and validating the findings.

4.2.2 Case Study

In this thesis, an exploratory case study methodology will be utilized as the research method. Case study methods involve “systematically gathering enough information concerning a

particular individual, social setting, event or group to permit researcher to effectively understand how the subject operates or functions” (Berg, 2004, p. 251). The use of case studies is preferred when there is: (1) “how” or “why” questions, (2) the researchers have little control over events, and (3) the focus is on contemporary phenomenon within a real-life context (Yin, 2009). In this thesis, several of the research questions begin with the word “how” as we aim to uncover the prominence of risk culture within a safety-critical organization, along with exploring the potential positive aspects associated with such culture. Further, risk and risk events in safety-critical organizations is something we have little control over, and, lastly, the focus is on a social phenomenon within a real-life context, where the phenomenon is risk culture in the context of safety-critical organizations. By focusing on a single phenomenon, the researchers aim to uncover the clear interactions of important components that characterize this phenomenon (Berg, 2004). Moreover, the researcher is able to capture different nuances and patterns of the phenomenon (Berg, 2004). According to Yin (2009), using case study as a method allows the researchers to “retain the holistic and meaningful characteristics of real-life events, such as group behavior, organizational and managerial processes and maturation of industries” (p.4).

4.2.2.1 Avinor as a case study

Using Avinor as a case, this method can then be understood as an exploratory organizational case study, where the unit of analysis is Avinor, which is a safety-critical organization (Yin, 2009). By using Avinor as a case, we will explore aspects of their safety culture and risk culture, including how their employees work and strengthen their safety. This case study has helped us gain access to the employees working at corporate management, as well as the employees at several airports around Norway. In addition, we have had frequent contact with our liaisons from Avinor and close communication with various employees. Without the collaboration, we would not have had access to the professional depth and expertise that this connection with Avinor has provided us, as well as an opportunity to see how the aviation sector functions.

4.3. Research strategy

Prior to the start of the data collection for addressing the problem statement and research questions, it was crucial to determine a specific research strategy and design that will be the foundation of the thesis. There are several social science research strategies that can be used to

answer different types of questions. This exploratory research design is a mix of both abductive and inductive approaches. An abductive approach involves using the analysis of data to help develop theoretical perspectives, and our theoretical framework, introduced in Chapter Two, gives us input on how we can develop an understanding of the data (Thagaard, 2018). An abductive approach means that we both develop theory based on systematic and in-depth analyses and that we interpret data in the light of existing theory (Thagaard, 2018). Both theory and empirical data are used to gather knowledge about the phenomenon of risk culture. In an abductive approach, there is a “dialectical relationship between theory and data” (Thagaard, 2018, p.184). By the use of abduction, it can help to expand knowledge about risk culture in safety-critical organizations, however, it will not provide a final explanation of how risk culture is expressed in such organizations. The challenge with this research strategy is that it is problematic for other researchers to replicate the same research and obtain similar findings, as it may yield results that are influenced by our own preconceptions and interpretation of theory and data material.

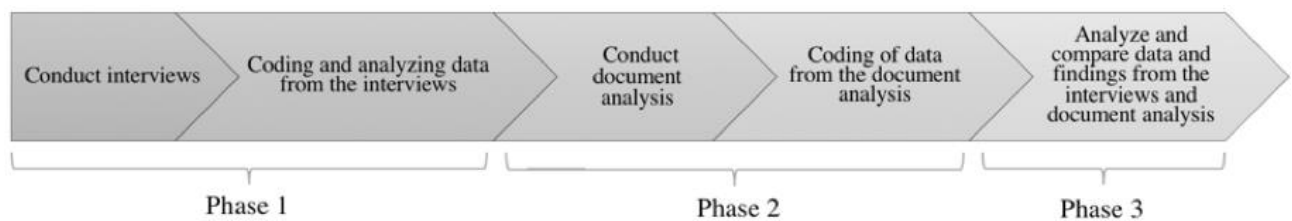
When using an inductive approach, we build concepts and analytical perspectives using the data as our starting point (Thagaard, 2018). We have decided to utilize terms that the informants themselves use in the thesis, such as terminologies used in the aviation industry. The concepts and terms emphasize significant information in the data material and improve the relationship between the theory and the empirical findings (Thagaard, 2018). Moreover, with an inductive approach, concepts, themes, or models are derived from data material using ours, the researchers’, interpretations of the raw data (Thomas, 2006). Huberman and Miles (1994) believe that an inductive approach is well suited when the field being researched is relatively unknown and unstudied. This is accurate for our research, as we examine risk culture in compliance-based safety-critical organizations.

Although our research design consists of aspects of both approaches, we consider it to be mainly inductive, with some elements of an abductive approach. We use previous research and theory to analyze and understand the data material, but we also look at concepts and terms that the informants use to emphasize significant information and improve the relationship between the existing theory and the data material. Consequently, our research design is inductive, but it contains some abductive elements where we discuss theory to explore risk culture as a concept in safety-critical organizations.

4.4 Data collection

This section will introduce our data analysis process and how we collected our data and informants. The data analysis process consists of three phases, as seen in Figure 2. In the first phase, semi-structured interviews were conducted, and after each interview, a statement form was sent out to the informants. The form contained eight statements that the participants were asked to rank and assess on a scale of 1 to 5, indicating their level of agreement or disagreement with each statement. The data collected from the interviews and the statement forms were then coded and analyzed. The second phase of the analysis consists of analyzing documents from Avinor, such as their own Flight Safety Policy, reports from their Safety Culture Survey, and guidelines and policies that Avinor adheres to. These documents were examined, evaluated, and processed before being coded and analyzed. Finally, the third phase was to compare the data and analyze the findings.

Figure 2. Timeline of the data analysis process.



The purpose of carrying out the interviews is to gain more detailed insight into the employees' attitudes and understanding of the organization's safety culture and risk culture. In addition, the purpose of the statements that had to be ranked and the document analysis is to study the adherence to rules and regulations and how compliant the employees are at the organization that is being used as a case.

Primary data is information gathered by us, the researchers, secondary data is collected by others but is used in its unedited form, while tertiary data is the results of secondary data that have also been analyzed by someone else (Blaikie & Priest, 2018). The data used in this thesis are classified as primary, secondary, and tertiary data. The personal interviews that have been conducted, including the statements that were rated, are used to gather the primary data (Blaikie & Priest, 2018). Based on this, we have a good overview of the data material and its quality. The secondary data used in this thesis are documents, such as policies and standards that Avinor must adhere to and follow. Moreover, the tertiary data used are the reports from the Safety Culture Survey provided by Avinor. The secondary and tertiary data were used in the second

phase of the analysis process to conduct the document analysis, while the primary data was collected and used in the first phase of the analysis process.

4.4.1 Selection of informants

Avinor is a large and complex organization with several actors and business areas. In order to explore Avinor's safety culture and their understanding of risk and risk culture, it has been chosen to interview various individuals who work in the organization. The informants have different positions from the Corporate Management, Local Management, and Front-Line, and they are based at different airports; Oslo, Stavanger, Bodø, Trondheim, and Tromsø.

By choosing informants from both large and medium-sized airports, as well as from the corporate management, we were able to explore and examine various work routines, situations, personal understandings, and organizational cultures. This can be seen in the context of compliance-based safety-critical organizations, where airports and other organizations exhibit variations in size, workforce, and organizational structure. Consequently, they employ diverse approaches to risk management and possess distinct perspectives on risk comprehension and understanding. Therefore, by having diverse informants from different positions, we will be able to generalize the case study to several different safety-critical organizations that are compliance-based and gain an extensive understanding and overview.

The informants were selected by looking into the organizational structure of Avinor. Through our contact with Avinor, we established a valuable connection with individuals who subsequently became our liaisons, and who could further assist us in our search for suitable informants. Our liaisons were informed that we required 2-3 informants from each department within the organization, including management and Front-Line employees, at the various locations, as well as a few informants from the corporate management. After receiving contact information for the different informants who could be of interest, we contacted them.

As the informants were chosen with the problem statement in mind, we can argue that our qualitative research method's selection process is on purpose and strategic (Dalland, 2017; Jacobsen, 2005). The primary goal of the thesis is to investigate the organization's safety culture, adherence to rules and regulations, and risk culture. Therefore, when we had to choose informants, this served as the foundation for our selection criterion. An overview of the informants can be seen in Table 3. The different locations are categorized as A, B, C, D, E, and F.

Table 3. Overview of the informants from Avinor.

Informant	Position in the organization	Airport	Abbreviation
1	Front-Line	A	A1
2	Local Management	A	A2
3	Local Management	A	A3
4	Front-Line	B	B1
5	Local Management	B	B2
6	Local Management	B	B3
7	Front-Line	C	C1
8	Local Management	C	C2
9	Local Management	C	C3
10	Front-Line	D	D1
11	Local Management	D	D2
12	Front-Line	E	E1
13	Front-Line	E	E2
14	Front-Line	E	E3
15	Local Management	E	E4
16	Corporate Management	F	F1
17	Corporate Management	F	F2
18	Corporate Management	F	F3

4.5 Interviews

The most common approach for gathering data in qualitative studies is the use of interviews, particularly unstructured and semi-structured interviews (Blaikie & Priest, 2018). The most crucial aspect of an interview is that it is a technique that enables us, the researchers, to conduct a divergent and complimentary discourse about the same topic or issue in order to get the most accurate, detailed, and reliable data. According to Thagaard (2018), interviews provide a particularly good basis for gaining insight into people’s experiences, thoughts, and feelings. Some of the purposes of the interview is to obtain complete and comprehensive information about how individuals understand and define the concept of risk culture and what opinions and perspectives the informants have on the topic. Moreover, Johannessen et al. (2010) state that

interviews are the most used way of collecting qualitative data due to it being a flexible method that can be used almost everywhere and make it possible to get full and detailed descriptions.

Furthermore, to ensure a comprehensive data from the informants, our interview process was strategically divided into two parts. The first part of the process involved conducting semi-structured interviews, which allowed for open-ended exploration of the informants' perspectives, experiences, and insights regarding the topics. The second part consisted of statements that were presented to the informants. The informants were asked to assess the statements on a scale of 1 to 5. This dual approach provided a more in-depth understanding from the informants.

4.5.1 Semi-structured interview

The first part of the interview process consisted of 18 semi-structured interviews with the informants by asking them questions. A semi-structured interview is generally organized around a set of predetermined open-ended questions, with other questions emerging from the dialogue between the researchers and the informants (DiCicco-Bloom & Crabtree, 2006). Furthermore, a semi-structured interview consists of an interview guide which is the starting point. However, the questions, topics, and order of the questions can vary depending on when it is appropriate to ask in the interview (Johannessen et al., 2010). We, as researchers, can move freely back and forth in the interview guide and ask follow-up questions. Conducting individual semi-structured interviews allows us to delve deeper into social and personal matters and to get to know the informants on a personal level, which other methods may not provide.

4.5.2 Statements

The second part of the interview process consisted of sending statements to the informants. This was done to explore causal relationships and facilitate the identification of patterns and generalizations (Jacobsen, 2005). The statement forms were a central part of our data retrieval as we wanted to gain an understanding of how the informants understand and view risk in the aviation industry, their attitude towards risk, and their views of what their safety culture and risk culture are like in the organization. To determine how the informants understand the term "risk culture", as well as how the safety culture is in the organization, a statement form asking the informants to rank statements on a scale of 1 to 5 was used. The statement form was also used to explore if Avinor has a strong safety culture involving high compliance and a sound and effective risk culture that is well-embedded in the organization. This type of statement

form is called a Likert Scale and is used to measure the attitude of participants (Joshi et al., 2015). A Likert Scale consists of a set of statements offered to the informants to rank their level of agreement (from strongly disagree to strongly agree) on a metric scale (Joshi et al., 2015). By integrating the rankings of the statements regarding the same phenomena, we can obtain an overall measure of the informant's attitude towards this phenomenon.

In order to achieve good quality on the structured statement form, we tested it in advance by having fellow students rate the statements. It had a clear design; the statements were well thought out, and the execution of the statement form was well justified. Ranking the statements took approximately 3-8 minutes to complete, and the informants themselves filled it out without our presence. We used a tool called "*Nettskjema*" to build the online statement form. When we finished conducting each interview, we used this service to distribute the statement form digitally via a link that was emailed to the informants. Since respondents only had to select a number between 1 and 5 on a metric scale, where 1 was *Strongly Disagree*, 2 was *Disagree*, 3 was *Neither*, 4 was *Agree*, and 5 was *Strongly Agree*, this type of statement form is an easy way to get the informants' thoughts and opinions without asking complex questions. Our statement form can be seen in Appendix D.

4.5.3 Interview Guide and Conducting Interviews

Prior to the interviews, an information sheet was distributed to the informants, informing them about the topic of the thesis, what type of questions they could expect, and the content (see Appendix A). The purpose of this information letter was to give the informants an understanding of the subject and make them think about and reflect on the culture in Avinor and the risks they encounter in their everyday working life and routines. The interview guide, as seen in Appendix B and C, was prepared in advance of the interviews. It encompassed 20 questions that served as a guide during the interviews. The purpose of the interview guide was to structure the conversation and ensure that the conversation contributed good empirical information and data for the thesis.

The interview period took place between 07.03.2023 and 02.05.2023. Except for one interview, which consisted of two informants together, all interviews were conducted individually. Most of the interviews were conducted through the video streaming service "Teams" since the informants were located in various places in Norway that we could not travel to. However, two of the interviews with employees from Sola Airport were conducted physically. We informed

the informants that we could conduct interviews in both English and Norwegian, but we ended up conducting all the interviews in Norwegian as this was their preferred language. Moreover, the interviews were an average of 35-55 minutes long.

4.5.4 Coding and categorization of interviews

Before analyzing the data from the interviews, it is important to transcribe all the information in written form. Transcribing the interviews allowed us to reproduce the material that was said during the interviews correctly. The interviews were transcribed continuously during the interview period, and systematizing and analyzing the interviews was carried out afterwards. Finally, the data was analyzed by manually coding the interviews.

Coding is a method for obtaining a system and overview of the data material to be analyzed (Skilbrei, 2019). By coding the data, it is possible to get a better overview and see if there are patterns in the data material. “Coding is about noting details and nuances in the material, and through that, one will ideally find patterns that help to see the bigger picture” (Skilbrei, 2019, p.186). The interviews were coded and categorized using a program called “NVIVO”. With the use of this program, we were able to gather all of the transcriptions into one location and get a digital overview. We manually coded the interviews within the application by reviewing the text and noting any repeated themes or terms across the different interviews. We used 20 different codes to organize the findings. Words that were used for the coding were, for instance; *experience, risk culture, safety culture, compliance, reporting culture, flexible culture, risk-based regulatory regime, leader role, and non-compliance*. All the different codes were also categorized in colors and categories. According to Thagaard (2018), by categorizing the data material and the codes, it is easier to “reflect both on how the codes can be classified, and what designations that can be given to the categories” (p.154). The codes were categorized in *general information, culture, characteristics of a safety culture, definitions and understandings, regulatory regimes, and other*, as shown in Table 4. By using the categories and codes we found when transcribing and analyzing the data material, we could look at the various meanings and understandings of the different concepts, such as risk culture and safety culture. The motive for the different categories and codes can also be seen in Table 4.

Table 4. Categories and Codes of data from interviews.

Categories	Codes	Why?
General information	Background Experience	These codes gives us a general knowledge of the informants background and experiences which can influence their understanding of risk, which is linked to the way they perceive and handle different hazardous and time-pressured situations.
Culture	Safety culture Risk culture	Codes regarding safety and risk culture deals with how the informants talk about their different cultures in the organization, and this can show how culture influences the understanding of risk.
Characteristics of a Safety Culture	Reporting Culture Informed Culture Just Culture Flexible Culture Learning Culture	These codes that are the five elements from Reason (1997) can provide insights into the nature of the organization's safety culture, and the category is used to get an overview of, understand, and examine the safety culture that already exists at the organization.
Definitions and understanding	Definition of Risk Definition of Safety Culture Definition of Risk Culture	These codes give us an overview of the data material that refers to how the various informants understand and define the different terms and concepts, and it answers directly to the first research question.
Regulatory Regimes	Risk based Regulatory Regime Rule-Compliance Regime	This category and codes can help us analyze and understand whether Avinor still has characteristics of a compliance-based regulatory regime or whether they have managed to develop further and change to a more risk-based regulatory regime.
Non-Compliance	Expectations Powerfulness and Independence Opportunities to take shortcuts Inadequate work planning and preparation Cognitive Tunneling	This category concerns non-compliance, and the codes are from Hudson et al.'s (1998) categories that explain why individuals choose not to follow the rules. These codes can give us an indication for why informants and other employees in the organization is non-compliant and take shortcuts.
Other	Leader role Communication Risk at work	This category consists of codes that does not fit with the other categories. It contains, for instance, information about how corporate managements influence local management and Front-Line workers' understanding and handling of risk, as well as other notable aspects from the interviews that do not fit under any of the other categories, such as how they communicate risk and what kind of risk they encounter at work.

4.6 Document analysis

Document analysis is an appropriate method to discover and explore something in detail and then discuss the topic (Johannessen et al., 2010). Document analysis is a theoretical task that builds on tertiary data, which can be previous data material from secondary literature. This type of analysis in itself is characterized by the use of documents, radio programs, TV broadcasts, and so on that have been written and made for a purpose other than that for which they are to be used in the thesis. The documents must therefore be interpreted in the light of the thesis' problem statement (Thagaard, 2018). In this assignment, it was quickly evident that we wanted to analyze documents consisting of regulations and rules that Avinor is required to adhere. We also quickly discovered that Avinor's employees are asked to biennially answer a Safety Culture Survey. The answers and reports from this survey were also of interest. Together, these data sources formed a basis for understanding the routines found at Avinor's airports and how the employees work with risk and safety. The purpose of the document analysis is thus to examine and analyze how the employees work to achieve the highest safety and their safety culture and risk culture.

Using this method can help us identify an individual, group, or institution's intentions, focus, or communication trends. Further, the purpose of document analysis is to organize and derive meaning from the gathered data material in order to draw valid conclusions (Johannessen et al., 2010). These documents contain relevant aspects such as safety, culture, or reporting, which are relevant to this thesis.

4.6.1 Overview of the documents

The six documents used in the document analysis were provided by Avinor. The documents address, for instance, their safety culture, reporting of the employees' understanding and attitude regarding safety, and guidance and regulations the organization must follow. One of the documents used in the analysis was the ISO 31000 standard for risk management that Avinor uses as guidelines for risk management practices. Two of the documents used in the analysis were related to Avinor's flight safety, where one is the policy itself, whilst the other is a document containing a description of the flight safety policy. Two other documents provided by Avinor were reports from their Safety Culture Surveys conducted in 2018 and 2022. The last document used in the document analysis was the Holistically Risk Governance Policy used in the Group. An overview of the documents used in the document analysis can be seen in Table 5.

Table 5. Documents of document analysis.

Documents	Author	Year	Document types and usage	Relevancy for the thesis	Common themes
Holistically Risk Governance Group Policy	Avinor	2017	Group policy to describe overall principles for holistically risk governance. Internal.	Provides the guidance and regulations the organization follows.	Risk, risk management, guidelines.
ISO 31000:2018	ISO	2018	Standard for risk management. Universal.	Foundation of the company's risk management strategies.	
Safety Culture Survey	Avinor	2018	Strategic insight report. Internal.	Provides understanding of the employees' opinion about the organization's safety culture and related topics in 2018.	
Safety Culture Survey	Avinor	2022a	Strategic insight report. Internal.	Provides understanding of the employees' opinion about the organization's safety culture and related topics in 2022.	Safety, safety culture, reporting, reporting culture, improvement, prioritization.
Safety Governance Description	Avinor	2022b	Description of Avinor's flight safety governance. Internal.	Provides an elaborate description of the flight safety policy.	Risk handling, risk understanding, risk-based approach.
Flight Safety Policy	Avinor	2023	Policy for flight safety. Internal.	Provides information on how the organization seeks to handle flight safety. It also identifies what Avinor considers to be a safety culture, and roles and responsibilities are elaborated.	

These documents are both used as support data, as well as main sources for data collection and analysis. The documents chosen covers central topics relevant to understanding how the organization comprehends and works toward mitigating risk, which may also significantly influence their risk culture and safety culture. The documents were coded by printing each document out, and important points were highlighted by hand in different colors, and each color represented one theme. Coding the data material from the documents helped us get a better overview and see if there were patterns in the data material.

Several of the documents listed above are looked at together. We have chosen to look at the Safety Governance Description and Flight Safety Policy together, as the description is an elaboration of the policy. Furthermore, the two safety culture survey reports are also looked into together. By having the results from two different years, 2018 and 2022, we can examine the development around several themes applicable to this thesis.

4.7 Ethical concerns

This section will include ethical concerns that are important to consider, and thoughts about how this can affect the results of the thesis. The project has been submitted to, and approved by, the Norwegian Agency for Shared Services in Education and Research (SIKT) (see appendix E). Ethical problems in research arise especially because of the complex conditions associated with exploring people's lives (Kvale & Brinkmann, 2009). Therefore, it is important to consider moral and ethical guidelines. One must always protect individuals' interests, integrity, and self-determination and ensure that informants are not unreasonably burdened.

It was important for the integrity of this research to ensure that all research ethics were followed. As such, in accordance with research ethical considerations and guidelines from SIKT (n.d), all informants and their personal information are anonymized except for their job level. The informants are only described based on their job levels and their work in order to differentiate between them. However, some of our informants from Avinor have a special and unique position that can make it possible to identify them due to their work and publicity in the media. Regardless of this, we have done the best of our ability to anonymize the informants, protect their interests and integrity, and ensure that they are not unreasonably burdened by any kind.

Throughout the process of completing this thesis, the importance of adhering to ethical guidelines and laws has been an important point. Kvale and Brinkman (2009) state three main points to accomplish an adequate ethical thesis; (1) informed consent, (2) confidentiality, and (3) consequences. These points were considered when conducting and using information from the interviews and the statement forms. The informants received information prior to the interviews, and they were informed that the information was confidential and would be processed in such a way that responses could not be identified. Before the interviews were conducted, the informants were also asked to consent to be recorded using the "*Nettskjema*

Dictaphone app". A consent form regarding this was filled out by the informants and sent back to us. Furthermore, the informants were not asked about information that is considered sensitive, confidential, or any particular personal information. Based on recommendations from selected literature and guidelines from SIKT, we claim that the study meets the expected standard and is within ethical research principles. Moreover, the program *NVIVO* and the tools «*Nettskjema*» and «*Nettskjema Dictaphone app*» complies to the requirements from SIKT. "*Nettskjema*" anonymize information from informants, and it ensure adherence to anonymity protocols. Furthermore, all collected data will be deleted automatically from the "*Nettskjema*" upon the end of the project, thus in line with the ethical principles from SIKT.

4.8 Methodological Concerns, strengths and weaknesses

It is important to be aware of methodological pitfalls and how to avoid them in order to have the best possible objective research that can be verifiable and of good quality. For a research project to provide credible knowledge, there are requirements for validity and reliability (Hellevik, 2002; Thagaard, 2018). Validity and reliability are used to evaluate the credibility of the research and to determine how good the quality of the information is. Reliability describes the trustworthiness and dependability of the data material, in other words, the quality of the data material, while validity describes the data's relevance to theory and research questions (Thagaard, 2018). Validity and reliability are both indicators of sound research methodologies. The results and arguments in research lose their significance if a researcher does not achieve validity and reliability since they can then be characterized by coincidence. In this section, we will go through the strengths and weaknesses of our methodology and show how this is related to reliability and validity.

Reliability can be understood as whether the research is reliable and trustworthy, which can be measured by how the research design is implemented through data collection, processing, and analysis of the data material. According to LeCompte & Goetz (1982), reliability is the extent to which studies can be replicated, and it is required that by using the same method, one can obtain the same result. However, obtaining the same result in qualitative research using interviews can be problematic and complicated because the answers from informants may be different, and the researcher plays a central role in the research process. Therefore, LeCompte and Goetz (1982) believe that it is impossible for any researcher to maintain absolute validity

and reliability. Furthermore, due to human behavior and the fact that preconceptions are never static, no studies can be reproduced exactly, regardless of which methods and designs are being used (Le Compte & Goetz, 1982). However, although achieving perfect intersubjectivity of validity and reliability is impossible, it is vital to reduce the threats as much as possible.

According to Ryen (2002), the researcher can ensure high reliability by using various measures, such as (1) the use of recording interviews, (2) having different researchers categorize and code the same data material in order to compare, and (3) have a good explanation of the procedures for data collection. In addition, Ryen (2002) recommended recording the interviews, which was done using “*Nettskjema Dictaphone app*”, as mentioned in section 4.7. All of the interviews were recorded, which ensured that we received the informants’ verbal versions of the interviews rather than our interpretations of what they said. Recording the interviews can help increase reliability. Moreover, Ryen (2002) also recommended that different researchers should categorize the same data material in order to compare the data categorization as a control. Since we are two researchers conducting the study, we categorized and coded the material and compared it. Finally, it was recommended by Ryen (2002) to explain all the procedures for the data collection, and we believe that in our methodology chapter, from section 4.0 to section 4.6, we have done that thoroughly.

4.8.1 Preconceived Notions and Bias

A possible weakness of this research that might affect the reliability of the thesis is our background knowledge and subjective interpretations. These factors can affect the study both before and after the data collection. We already had an assumption that a compliance-based safety-critical organization will have many different types of cultures in their organization and that the employees will have different views and understandings of risk and safety. The fact that we already had an idea and belief about the result of the analysis beforehand means that we possibly had a preconceived notion, thus being biased, which can negatively impact the analysis. Fangen (2010) states that researchers always have some form of understanding before they start fieldwork and research. Preconceived notions are a particular angle that cannot be given up as a researcher, and before a researcher starts the research process, one has already "decided in advance what one wants to know something about" (Johannessen et al., 2010, p.35). Even though we assumed that there would be different cultures and understandings of risk and safety among the various employees in an organization, this does not mean that we had decided on the outcome and result of the thesis. As researchers, we are open to getting opposite answers

to our assumptions about the topic, as well as getting different results than what we had expected. Having preconceptions about the topic can make it challenging for other researchers to do the same study and independently verify the findings. Throughout the whole research process, we were aware of this and thus tried to be as least biased and narrow-minded as possible in our point of view when we analyzed the data material.

4.8.2 Source Evaluation

Another methodological concern is the quality of the thesis and whether the thesis is verifiable. It is crucial to have good quality in the documentation and references (Skillbrei, 2019). We believe that we have good reference practice; thus, it will be easy to find the sources and documents that are used. This thesis adopts the APA 7th referencing style, leading to some direct quotations being presented as standalone paragraphs, while others are incorporated within the text. It is crucial to clarify that all direct quotations, especially those featured in our findings and discussions, hold equal importance, regardless of their placement as separate paragraphs or integrated into the text.

Moreover, it is also important to be critical of sources and use reliable information, as well as detailed descriptions of the method, since the thesis must be reliable, credible, and transferable. Based on that, we have used several independent studies, reports, and previous literature and theory, as well as our own assessments of the data material from the interviews and document analysis. Furthermore, we have also been critical of our own interpretations, thus, the credibility and reliability of the study will be strengthened (Thagaard, 2018).

The fact that we chose to conduct the interviews before the document analysis caused us to not be able to ask follow-up questions about their contents in the interviews, thus a methodological weakness. However, the interviews had provided background information and context that helped us, as researchers, to understand the documents better when we analyzed them. Additionally, the data obtained from the document analysis was used to triangulate the data material from the interviews. By comparing and contrasting the information obtained, we got a more complete and accurate picture of the case study. Our research design, which includes triangulation between interviews and document analysis, is an advantage in our thesis. Triangulation enhances validity by approaching the same topic with different methods in our research (Thagaard, 2018). It also creates credibility by giving us a more thorough and accurate understanding of the research topic. However, triangulation can be time-consuming, which can

be challenging with this approach. Nonetheless, as two researchers are conducting this research, the workload could be evenly distributed and arguably handled more efficiently.

It is also important to be aware of how the data material from the interviews and document analysis represents the phenomenon that is being studied. Therefore, it is central to evaluate the data's relevance and validity (Johannesen et al., 2010). Internal and external validity are the two categories of validity, and internal validity is the process of evaluating the thesis' credibility and reliability (Johannesen et al., 2010; Ryen, 2002). In other words, it is a test of causality and the causal relationship, a test of the phenomena being studied, and a test of the trustworthiness of the thesis' findings. Previous research questions and problem statements are not always similar to the problem statement we have chosen in our thesis (Skilbrei, 2019), and for that reason, it is crucial to be critical of the sources we have used in our document analysis. Due to the importance of being critical of the sources used, it was chosen to use reports regarding the safety culture at Avinor, as this is something that we wish to explore, analyze, and focus on. Furthermore, we have also chosen to look at Avinor's flight safety policy and the ISO 31000 standard that the organization follows, as this will help us analyze and interpret how compliant Avinor is and which regulations are followed by the employees. Therefore, we believe that the documents and reports we have chosen for our document analysis will help us answer the research questions and problem statement in a reasonable and adequate way, as these documents deal with themes and topics that are important for our thesis. Consequently, the internal validity will be strengthened.

External validity examines if causal relationships persist in other contexts and addresses the transferability (Ryen, 2002). In other words, how generalizable the results are. Our study may be difficult to generalize to other organizations and industries since we conducted interviews with employees from Avinor and used documents and reports that originate from, or are used by, Avinor in our document analysis. However, we discovered through the data collection, especially the interviews, that the informants provided us with important and relevant information that aligns with the documents. Hence, the informants used in the research was adequate, and using different informants probably would not have produced any different results. This makes the thesis's validity stronger. Moreover, Avinor is only presented as a case study, and it is vital to keep in mind that organizational culture, safety culture, and risk culture may all be present in other safety-critical organizations. Due to this, our thesis can be somewhat generalized to other safety-critical organizations. Additionally, we purposefully selected to

interview employees at various job levels and locations. As there will always be different levels within a safety-critical organization, we believe that the responses we received from the various informants and the findings from documents enable generalization to other safety-critical organizations, producing good external validity.

4.8.3 Statement Form

Having a statement form that used a Likert scale, we gained an understanding of how the informants understand and perceive risk and safety in the aviation industry, as well as their attitude towards a safety culture and risk culture. According to Joshi et al. (2015), one of the strengths of using a Likert scale is that it can easily measure human attitude. Moreover, the Likert scale is easy to use since everyone can understand how it should be carried out, because the informants must only rank the statements between 1 to 5 as to whether they agree or disagree (Joshi et al.,2015).

Furthermore, early on, we learned through our liaisons that the organization does not frequently use the term “risk culture” and that few employees, regardless of level, know what the word means. Due to this, it was decided to send out statement forms following the interviews. By doing so, we ensured that the informants understood what a risk culture is and how it varies from a safety culture, as well as having the possibility to reflect and consider the topics we covered during the interview before they started ranking the statements. We also believe that this has reduced the role of ambiguity in the response, thus a strength. However, sending the statement forms to the informant after the interview can also be a disadvantage because the informants were aware of what we are looking for and may have given it some thought. Furthermore, during the interviews, we discussed risk culture and our thesis with the informants, which may have created assumptions about what type of responses we hope to obtain from the informants, which might lead to bias. Therefore, these statement forms, has to be done with care due to the informants’ potential preconceptions and biases from the interviews. Nonetheless, the informants’ ratings from the statement forms can still help to support the primary data, especially if it matches with what the informants have said in interviews.

4.8.4 In-dept Interviews

Using qualitative in-depth interviews as a method gives the informants greater freedom, flexibility, and opportunity to express themselves. Thus, this is considered a strength of our

research design. As the interviews were conducted both physically and digitally, we reflected upon and considered whether the informants' responses and the findings could differentiate between physical and digital interviews. This is due to our observations that using digital services, such as "Teams", when conducting interviews made it more challenging to have a good flow in the dialogue. However, even though the flow of the digital interviews was sometimes troublesome and challenging, we learned more about the safety culture and risk culture at Avinor by conducting in-depth interviews.

One of the research questions in this thesis is, "How do elements of risk culture become apparent in the employees' attitude towards the application of procedures and policies in the organization?". As mentioned in Section 1.1., the purpose of this research question is to look into how the different attitudes of the employees influence how the procedures and policies are followed, used, and regulated in daily operations. Furthermore, this research question can help to explore the employees' attitudes about whether the way they think can be considered a risk culture. Using in-depth interviews makes it possible to ask questions regarding this, which is a strength. However, it is also essential to reflect upon the fact that it may be difficult to make judgments about employees' attitudes after a few months of research. Nonetheless, based on the empirical data we have collected from the in-depth interviews, we believe that we can make assessments of some trends in the employees' attitudes in the organization.

Moreover, having informants with different and diverse backgrounds with different roles within the organization has helped us better cover the diversity offered there. Therefore, we consider our findings valuable, and we are satisfied with the responses, as it can be challenging to get in touch with safety-critical organizations, as they have a lot to do, and often, much of the work is confidential.

4.8.5 Personal Interest

Last but not least, we believe that our personal interest in the aviation industry has been advantageous when writing this thesis. We selected this topic for our master's thesis because of the high level of interest. However, early on, there was a minor concern that interest in this topic would decrease over the semester. Nonetheless, our enthusiasm and interest in aviation have increased and become more remarkable. We have utilized this fascination and interest as inspiration and motivation when writing this thesis, thus a strength.

5.0 Findings

Throughout the interviews and the document analysis there are several topics and themes that have reoccurred that are of interest to this thesis. This chapter will present the findings and seek to establish relevancy towards the problem statement as well as the research questions. The themes discovered are related to safety culture, risk culture, flight safety, compliance, non-compliance, and risk management. The sections in this chapter are based on reoccurring themes and terminologies identified in the interviews, which were further supported by the documents. The chapter is structured as follows. First, the interpretation and understanding of risk is explored. Then, findings regarding the risk-based approach are presented. Thereafter, the findings related to safety culture are presented before the focus shifts to compliance and non-compliance. Lastly, the findings seen in relation to risk culture are presented.

5.1 The Informants' Interpretation and Understanding of Risk

This thesis aims to find out whether a sound risk culture can improve an existing safety culture within a safety-critical organization operating in a rule-compliance regime. Thus, it became essential to gain an understanding of different employees' interpretations of the risk concept. When asked to describe the term risk, there were various definitions. A recurring pattern seemed to be that risk is negatively related to an event. Probability was also used when describing the term risk from informants who hold the position of Local Management, C2, C3, and B3. Another informant, C1, a Front-Line employee, stated that *"risk is what one is willing to do, in relation to danger or a hazard"*, while another Front-Line informant, D1, viewed risk as anything that can go wrong. What follows from this is that most of the informants considered risk as something negative, which also appears in the ISO 31000 standard. However, the standard views risk as both something negative and positive (Standard Norge, 2018). The conclusion drawn from the analysis is that there seems to be somewhat disagreement about what risk is. This lack of collective understanding will, in turn, influence the way the employee perceives risk. From Front-Line informants, E3 and E1, they argued that their work did not facilitate nor include risk and that everything was well regulated, to which the term risk was *"beyond the scope"* of their work description.

Another finding from the interviews indicates that some informants had little to no knowledge of the concept of risk and failed to provide a satisfactory explanation of the term. On that note,

5.2 Risk-based Approach

Avinor's Flight Safety Policy (2023), as noted earlier, mentioned having a risk-based approach in the organization. When the informants were asked about the risk-based approach, there seemed to be a disagreement on what such an approach is and to what extent the organization held such an approach. It seemed to be a difficult concept to interpret and explain for many of the informants. Especially for those working in the Front-Line, there seemed to be some confusion about what a risk-based approach meant and what lies behind this.

According to the Holistically Risk Governance Group Policy (Avinor, 2017) and the Flight Safety Policy (Avinor, 2023), a risk-based approach should be executed on all levels within the organization, nevertheless, this is not evident from the informants' responses. One of the Front-Line informants argued that he did not work risk-based, that they take little risk at work, and that *"we have very good barriers"* (C1). Given the limited shared understanding of the term risk, there is a possibility that individuals may find it challenging to understand and define the concept of a risk-based approach. As a result, some struggled to provide a working explanation, while others provided different understandings. One Front-Line informant, B1, said that:

"(...) for those of us who work outside at the airport, it is actually someone else who interprets the regulations and translates them into that's how we do it here. So, we really live in a ready-made room (...)".

However, the informant followed up with, *"But in practical everyday life, there is a need to improvise, there may be a personnel shortage, (...) you must be able to redeploy people (...) And I would call that a risk-based approach"*. This indicates that while the informant may struggle to define a risk-based approach, an understanding of the concept is still apparent. Similarly, an informant from the Local Management stated that *"it is the foundation of almost everything"*. The same informant also said, *"We use a lot of risk and vulnerability analyzes. It is almost at the bottom of everything (...) there is a lot of risk analysis that lies at the bottom"* (C2). This shows that informants explain a risk-based approach differently. However, a weakness may be that there seems to be inconsistency in the informants' definitions. There are few elements that reoccur, which could suggest that there are different understandings of such an approach.

Although there were inconsistencies in the explanations of such an approach, other informants, such as one Local Management informant, E4, appeared to have a more academic understanding of what a risk-based approach means. E4 informed us that the regulations changed considerably in 2016/2017, from a procedure-based set of regulations to a more risk-based approach, where *“there is more responsibility, and it is up to us as the airport operator to make decisions more risk-based”* (E4). Other informants, such as informant D1, who works as a Front-Line employee, state that one has to think outside the box and improvise, and a Local Management informant A3 informs that they have had a more risk-based approach over a period by saying *“(...) we can now say that we only use 3 fire extinguishers even though the procedure says five, (...) there is room for discretion”*. According to another Local Management informant:

“People should be able to think and assess each situation and act appropriately. Not everything is regulated down to the smallest detail (...) you need people who can read and assess situations and consequently implement the necessary measures” (C2).

Lastly, informant F3, from Corporate Management, describes risk-based approach as:

“The importance of identifying hazards and the risks they pose is to aid prioritization. It is necessary to prioritize correctly and have management documentation that shows where efforts should be directed. Not everything needs to be addressed, as not all risks are equally critical or important, but they should rather be prioritized according to the situation. This involves identifying top risks and understanding, for example, the airport's risk profile, making informed decisions, and ensuring that risks are properly managed. This helps in developing effective procedures and rules that govern work processes” (F3).

Nonetheless, a common thread from the informants is that they, to a certain extent, do appear to have a risk-based approach to the tasks and events they are faced with. However, there seems to be a limited shared understanding of what the organization means when it states that one is to have a risk-based approach.

5.3 Safety Culture

To see whether risk culture could help improve the existing safety culture, it was deemed important to also get an understanding of what the employees consider to be related to safety culture. When talking about safety culture in the interviews, several informants told us that they have carried out a Safety Culture Survey in the organization. Moreover, there was a common agreement that Avinor had a safety culture, and all informants were familiar with the term. However, as with the term risk, there was a great variety of responses when the informants were asked to express and explain what a safety culture meant to them. For example, informant F1, who is from Corporate Management, said, “*we call it safety culture, but we might as well call it organizational culture*”. This shows that safety and safety prioritization are well embedded within the organization. Further, informants A1 and B1, both Front-Line employees, claimed that safety culture was more of a “*spinal reflex*”, indicating that safety culture is well incorporated within the organization. Moreover, one informant from Corporate Management defined safety culture as “*the things we say and do that affect safety*” (F3), which is in line with how Avinor defines safety culture (Avinor, n.d.-c).

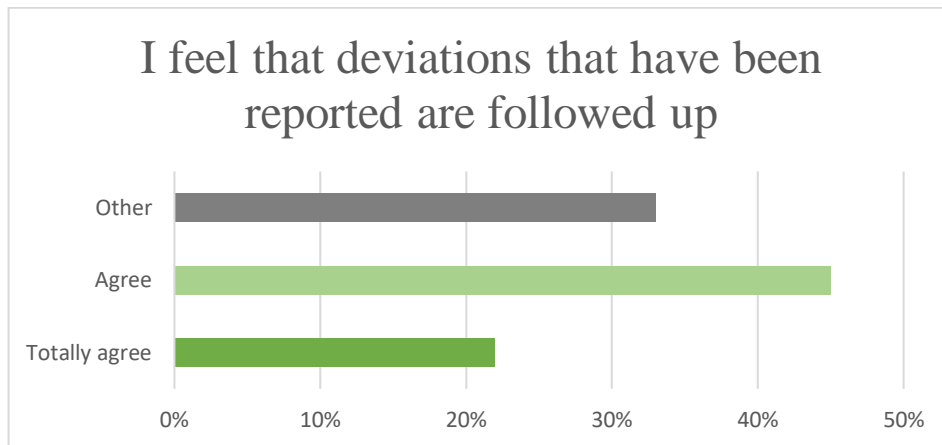
A common denominator is that the informants agree that the organization has a sound and functional safety culture. This also emerged from the Safety Culture Survey Reports (Avinor, 2018; 2022a). Thus, the data from the interviews are supported by the reports from the surveys. Moreover, when talking about safety culture, there were primarily two elements that reoccurred in several interviews, as well as the statement forms, which are (1) *just culture* and (2) *reporting culture*.

5.3.1 Just and Reporting Culture

When asking the informants about the organization’s reporting culture, most responded that they believed the organization had a good one. It should be noted that many also mentioned that there is always room for improvement but that, overall, the reporting level was satisfactory. Another vital aspect in relation to reporting is the accessibility to report deviations, incidents, or suggestions for improvement. It became apparent from the interviews that the organization has sought to make reporting more accessible by providing each employee with a phone where they can report directly from it. Furthermore, the Safety Culture Survey Reports also focus on reporting and the follow-up of the reported deviations. The reports of both 2018 and 2022 established that most employees understood the importance of reporting deviations and that learning from experience to avoid accidents is highly valued.

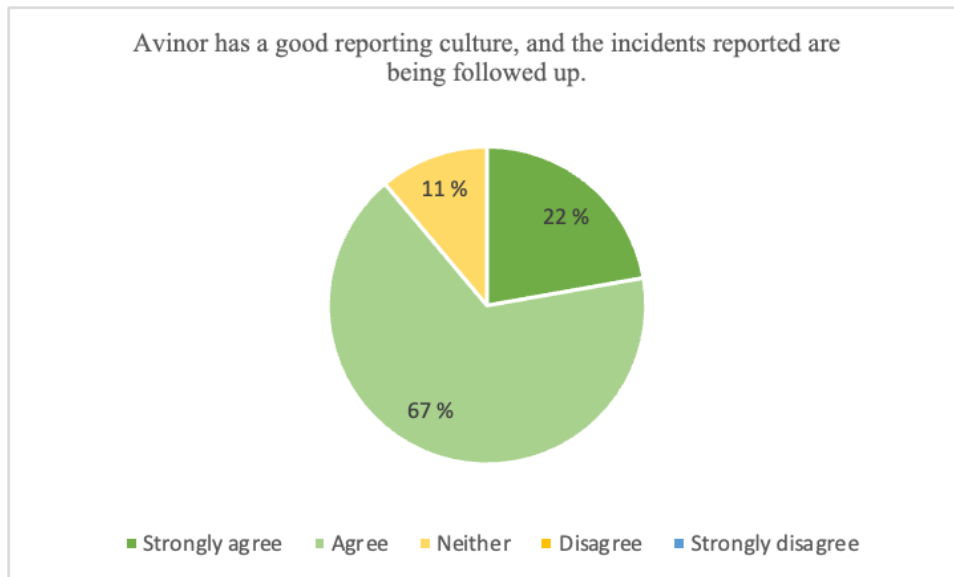
Moreover, when we asked the informants about which type of employee reports the most deviations, the responses varied significantly. Some of the informants also mentioned that there were factors that potentially influenced whether an employee reported deviations or not. Here, factors such as experience or long career reoccurred. Furthermore, other informants argued that personality types had the most significant influence.

Figure 4. Self-made figure based on the Safety Culture Survey Report (Avinor,2018).



From 2018, the Safety Culture Survey Report shows that reporting of incidents is valued high by the employees, as seen in Figure 4 above. This figure illustrates that 67 percent of the employees in the organization either *agrees* or *totally agrees* with the statement that the reported deviations are being followed up. Moreover, as seen in Figure 5 below, based on the Statement form, 89 percent of the informants believed that the deviations they reported are being followed up by the management. At the same time, 11 percent neither *agreed* nor *disagreed*. This indicates that the employees are overall satisfied with the reporting culture.

Figure 5. Illustration of the answers from informants related to reporting culture, from Statement Form.



The topic of reporting is also prominently featured in one of the documents from the document analysis, which is the Safety Governance Description (Avinor, 2022b). This document states that Avinor has an open and fair culture where incidents, deviations, and suggestions about improvements are to be reported and analyzed with no negative consequences for the individual who reported it. This is as mentioned in line with the Flight Safety Policy. Further, the Safety Governance Description says that when faced with deviations or incidents that could have implications for flight safety, all employees are obligated to report such matters (Avinor, 2022b). Moreover, it is required by the Safety Governance Description that all employees remain vigilant and report any identified risks or dangers, thereby allowing for information sharing among employees to facilitate organizational learning. Overall, it appears as if the employees adhere to this policy.

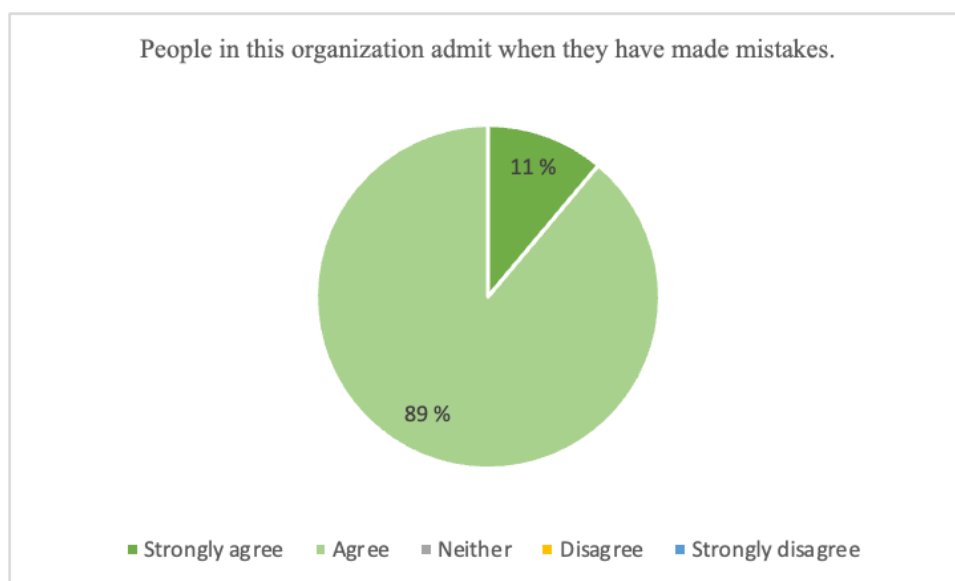
Most of the informants talked about reporting and just culture simultaneously. The informants put a great emphasis on the fact that one should not be punished for making unintentional mistakes, yet stressing the importance of reporting the incidents so that others in the organization could learn from them. One Front-Line informant, A1, stated that “*everyone writes [reports] everyone up. Nobody gets upset if he or she gets written[reported] up. You have to be able to put up with that*”. Informant C2, who works in Local Management, said that people feel confident enough to know that mistakes do not entail any negative consequences if reported. When addressing just culture, one Local Management informant, C3, expressed that

the organization is very interested in having a just and fair culture, where no one should be blamed for making a mistake, and that *“It’s not to catch someone and yell at them, but it’s because you want your colleagues well”* (C3). Informants B1, B3, C2, E4, and E2, who work in both the Front-Line and the Local Management, all stressed that reporting deviations is never about assigning blame, but rather finding the root cause of the problem. An informant from Corporate Management emphasized the importance of not sanctioning individuals who report deviations. The informant believed that reporting is crucial for gathering information and further developing the competence of employees, as well as creating an open and fair environment in the workplace. The informant further stated:

“A mindset of justice and call it an idea where we try to facilitate all employees to be able to report on themselves and others in a safe and good way, without anyone being exposed to sanctions or punishment from either the employer or others” (F1).

This statement from the informant is in accordance with the organization’s Flight Safety Policy (Avinor, 2023), which states that *“Avinor is to have an open and fair culture where incidents, deviations, and improvement suggestions are reported and analyzed in accordance with the just culture principle”* (p. 1). Moreover, this is also shown in the Statement form, in Figure 6 below, where the informants ranked the statement as either *strongly agree* or *agree*, and no one disagreed or were indifferent to this statement. This suggests that the informants are not afraid of punishment if mistakes are made, and they perceive their culture as just and fair.

Figure 6. Illustration of the answers from informants regarding admitting mistakes, from the Statement Form.

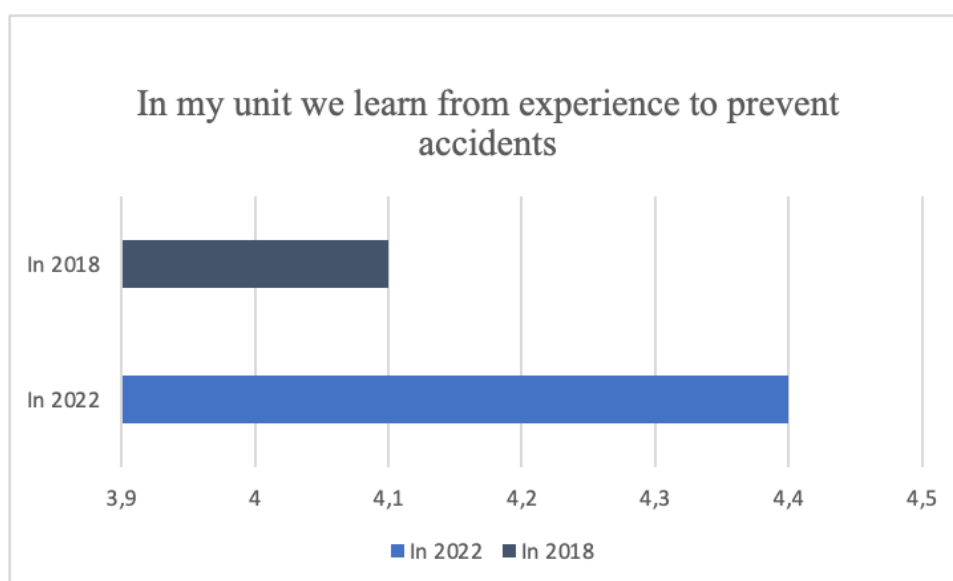


5.3.2 Informed and Learning Culture

The importance of sharing data and promoting an informed culture was emphasized by several informants in relation to reporting. Local Management informant, C3, highlighted the value of collaboration and open communication to address any issues that may arise. Front-Line informant, B1, mentioned the establishment of a weekly meeting forum where all actors at the airport can come together to discuss and resolve issues. Moreover, the Local Management informant, C2, mentions that “*we have many safety forums that go across departments and positions*” and the informant further emphasized the need for openness about mistakes and shortcomings so that others can learn from them. One informant from Corporate Management, F1, mentioned the existence of numerous meeting forums, both centrally and locally, to promote information exchange. Overall, this points to an organization that works continuously to facilitate information sharing and generate knowledge.

These efforts to foster an informed culture and encourage communication to align with the Safety Governance Description (Avinor, 2022b), which has established meeting forums at various levels to ensure that safety management and flight safety performance meet the required standards. The policy also includes the establishment of professional meeting arenas to further strengthen safety management and flight safety, which aligns with the information provided by the informants. Through these initiatives, it appears as if the organization is working towards creating a culture of safety that prioritizes collaboration, communication, and continuous improvement.

Figure 7. Self-made figure based on the Safety Culture Survey Reports (Avinor, 2018; 2022).



As seen in Figure 7, learning from experience is also highly focused on in the case organization and has had a positive development over the last four years. This aspect of learning from experience also relates to the importance of reporting, and informant F1, from Corporate Management, stressed that the data collected from reporting is significant for the organization. From ISO 31000, it is also emphasized that improvement should be a continual process through learning and experience, which undermines the results, as seen in Figure 7.

According to the Safety Culture Survey Reports, training and information are activities appear to be very valuable in the work that must be done to create a safe working environment (Avinor, 2018; 2022a). This is also revealed by the Front-Line informant A1, who states that *“those who, for example, drive on the airstrip must have regular courses and training, and those who drive plow trucks on the runway often have to train on plow formations”*. Moreover, from the reports, most employees seem content with both the guidance and information in 2018 and 2022. It appears as if most employees are aware of what they are supposed to do, given that an incident occurs. Adequate training and time to go through mandatory training have a score of 4,1 out of 5, while being informed about changes that influence safety is scored the lowest, with only 3,9 (Avinor, 2022a). In 2022, the Safety Culture Survey Report could identify that units experiencing an increase in safety culture also had an increase in both training and sufficient information. Thus, resulting in better flight safety. Avinor’s emphasis on training and the provision of various courses indicates its commitment to fostering a culture of continuous learning and knowledge-sharing within the organization. These initiatives can positively impact the overall safety culture in the organization. Moreover, the Flight Safety Policy (Avinor, 2023) also establishes what a safety culture should be recognized by, which is:

- Leaders should show that flight safety has the highest priority.
- Employees should make sound choices.
- Avinor should have an open and fair culture where incidents, deviations, and improvement suggestions are reported and analyzed in accordance with the just culture principle.
- Avinor should have the right competence and capacity to perform their tasks safely.

Furthermore, in terms of training and fostering an informed culture, several informants mention that they regularly undergo training and attend various courses to enhance their knowledge and expertise within their respective fields. Front-Line worker, B1, and Local Management

employee, C3, mentioned that Avinor is skilled in providing training and courses. Both the informants have attended different courses, and they both stated that the courses have provided them with good learning outcomes and competence. In addition, two informants, D2 and F2, who are newly employed in Local Management and Corporate Management positions, respectively, mention that they have to participate in an introductory course where they receive the necessary information. Another informant, E4, employed in Local Management, highlights that Avinor offers numerous courses and instructions on how work should be performed, which the informant appreciates. Additionally, it is also revealed by the informant, E4, that these courses are primarily conducted in Norwegian:

“All of the manuals and instructions were only in Norwegian, and many courses and such were only in Norwegian. Over the years, we have gotten many employees (...), so today, half of those who work at the airport have a Scandinavian-language background, while the other part consists largely of people from Eastern Europe. But our courses are still in Norwegian, some in English” (E4).

Overall, most of the informants agreed that safety culture was something they were very familiar with, and that safety culture is important and well embedded in the organization. Reporting deviations could be enhanced, not because individuals are indifferent to report but due to factors such as time constraints, lack of comprehension of what constitutes a deviation, or simply forgetting to report. Nonetheless, the aspect of learning culture and informed culture is well incorporated throughout the different levels of the organization.

5.3.3 Airside Flight Safety

Avinor’s Flight Safety Policy (2023) states that flight safety on the airside has the highest priority, which is arguably natural given the nature of the organization. Safety prioritization is also a topic that reoccurred in both years of the Safety Culture Survey. The report states that safety prioritization is about whether the employees believe that safety is an important aspect of everyday life, thus safety holds the highest priority (Avinor, 2022a; 2022b; 2018). Moreover, Avinor’s Flight Safety Policy (2023) has a crucial role in establishing flight safety. The policy seeks to be a tool to help ensure that Avinor sustains and improves flight safety. It indicates the Corporate Management’s attitude toward flight safety in order for the leaders and employees to make sound decisions regarding risk. In order to prioritize flight safety, it is stated in the

Flight Safety Policy that they are supposed to have a risk-based approach to continuously improve and strive for the best practice (Avinor, 2023). This aligns with the European laws to which Avinor has adapted (EASA, 2016).

All the informants expressed that ensuring flight safety is the top priority. One of the Front-Line informants, C1, stated “*after all, flight safety is what our job consists of*”. Additionally, an informant from Corporate Management, F1, expressed that “*there is a requirement that we must have a safety management system that constantly documents how we safeguard that safety and how we put safety first*”. In other words, it is required by law that flight safety must have the highest priority on the airside, and this is also mentioned in Avinor’s Flight Safety Policy (Avinor, 2023).

In the Safety Governance Description (2022b), it is stated that systematic measures have to be implemented in order to achieve, sustain, and further develop the safety level in conformity with the goals of flight safety (Avinor, 2022b). Moreover, the Safety Governance Description also mentions that flight safety in Avinor is continuously worked on and is an integrated part of daily operations (Avinor, 2022b). The document also expresses that reports on flight safety achievements and the performance of safety governance will ensure that appropriate decisions are made, thus making it possible to continuously improve the work with flight safety (Avinor, 2022b). The information will be used both reactively and from a risk-based perspective. Further, the Safety Governance Description expresses that all goals will either directly or indirectly support the Flight Safety Policy (Avinor, 2023). All employees should be able to, and have the opportunity to, suggest possible developments to contribute to continuous improvement of flight safety and suggest solutions to potential risks. In the document, it is argued that continuous improvement within flight safety shall ensure that Avinor continuously improves its work processes and flight safety performance (Avinor, 2022b).

To summarize, it is clear that flight safety has the highest priority at Avinor. This is demonstrated by the Flight Safety Policy and the insights derived from the interviews and other documents used in this thesis. The commitment to flight safety encompasses all organizational levels and reflects a strong safety culture.

5.4 Compliance

One of the documents from the document analysis was the Safety Governance Description, and this document includes the necessary processes needed to ensure that individuals adhere to laws, regulations, requirements, as well as internal and external frameworks that contribute to a suitable governance of flight safety (Avinor, 2022b). The Safety Governance Description indicates that any employee within the organization that has a role influencing flight safety is responsible for following relevant procedures and instructions for the job intended. In other words, they must adhere to all procedures and rules and to compliant. When asked questions about compliance and the impact of procedures, policies, and laws influencing the informants' daily work, the majority of informants indicated that there is an extensive regulatory framework in place. They further emphasized that nearly everything is thoroughly and heavily regulated and procedurally managed. Words like *“comprehensive”*, *“well regulated”*, *“regulation-heavy industry”* and *“procedure controlled”* were mentioned on several occasions. Front-Line informant D1, expressed that *“It's very procedurally driven, very fixed boxes that we operate within”*. Another informant, who works in the Local Management, said that *“It is very thoroughly regulated”* (B3). Moreover, a Front-Line informant stated that everything is based on procedures:

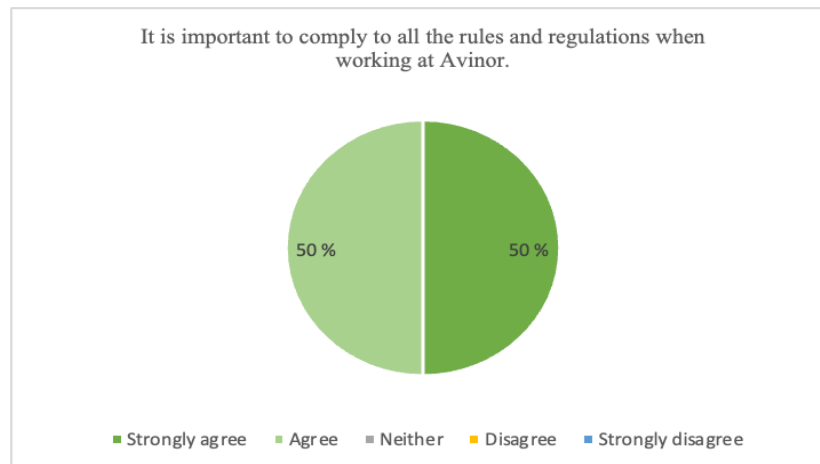
“What my employees do is, after all, procedures, procedures, and procedures. You must do this and that, this plan must be followed like this and that. When they have to do work, there is always a procedure there, so we are absolutely procedure-driven”
(A1).

It seemed to be a common understanding amongst almost all the informants that the work that is being done is well regulated and controlled, thus procedures and policies are typically followed. One Front-Line worker (A1) explained that when faced with a task, there is always a procedure that follows. There were also employees from the Corporate Management who believed that the organization is heavily procedure-driven, where one informant from the Corporate Management stated that:

“(…) this is a fairly regulatory-heavy industry. And more than I'm used to from the oil and gas industry, because there [in the oil and gas industry] are also a lot of rules, but here [in Avinor] it's much more detailed down to the smallest detail, so to speak. With a focus on barriers that are necessary for it to be safe” (F2).

Moreover, the fact that employees must follow procedures, rules, and regulations also becomes apparent in the Statement Forms. All the informants who filled out the forms either *strongly agreed* or *agreed* that it is important to comply with all the rules and regulations, as shown in Figure 8, below.

Figure 8. Illustration of the answers from informants regarding towards compliance, from Statement Form.



One of the main topics of the interviews was that following the rules and regulations is very important. It was emphasized by the informants that the organization is heavily regulated, and there seems to be a procedure for almost everything. On that note, it appears as if the employees follow these procedures down to the last detail and understand the importance of this, which is also stressed in the Group documents (Avinor 2017; 2022b; 2023).

5.5 About being non-compliant

It was also natural to ask questions about non-compliance when discussing compliance and adherence to rules in the interviews. Several informants started talking about non-compliance without being asked about this topic. On the topic of reporting, it was pointed out that there are individuals who take shortcuts, thus being non-compliant. However, non-compliance does not necessarily involve taking shortcuts. Nonetheless, such actions break regulations and are in violation of laws, policies, and other processes. Consequently, shortcuts will be regarded as non-compliance in our findings. One Front-Line informant stated that:

“We are focused on reporting deviations and mistakes, for instance, shortcuts and near misses. This is because we want to use it [the reports] as a preventive measure. We

have a very strong focus on situations that are considered near-misses, as well as situations that have happened [deviations, shortcuts, and mistakes]" (A1).

Informant C3, from the Local Management, informed us that *"there is always someone taking some shortcuts, and that is one of the biggest reasons behind [dangerous] events and near misses"*. When interviewing another Local Management informant, D2, the informant believed that employees take shortcuts *"due to convenience. (...). You do it the way that's easiest, which isn't always legal, but you do it anyway. It is done for the sake of simplicity"*. However, another informant from the Local Management, E4, said that employees take shortcuts because they want to *"make up for lost time and lost opportunities"*. Several of the informants who works from both Front-Line and Local Management, are also clear that non-compliance, in the form of shortcuts, occurs because employees want to be effective rather than committing shortcuts on purpose due to malicious intentions.

Similar to reporting, where some employees report deviations and mistakes more than others, it also emerges from the informants that some types of employees take more shortcuts and are more non-compliant than others. Front-Line informant A1 believes that those who have had a long career in the organization possibly take more shortcuts: *"I think that those who have worked longer can take more shortcuts, yes. Or, actually, it may depend on the personality as well."* Similarly, Local Management informant E4, believes that those with experience sees opportunities to take shortcuts and that individuals who have been with Avinor for an extended period of time tend to have a specific culture that they bring with to the organization:

"[The employees] can bring a certain culture with them and they are the ones we have to find in order to be able to see where "the hidden power" is. If we are going to be able to change our culture, we must find our "show-stoppers" who take shortcuts, and we need to convert them and get them to join the activities needed to change the culture in a safer direction" (E4).

Moreover, another Local Management informant, D2, believes that shortcuts and rule-breaking occur when employees experience stressful situations, where the informant says:

"The sharp end, Front-Line workers, possibly break the most rules, but that's because you stand there and perhaps have to make a decision and make an assessment quickly, then you are under pressure and stressed, and then things like this [taking shortcuts and breaking the rules] can happen". (D2).

Another Front-Line informant also mentions that doing shortcuts and forgetting some rules and procedures happen when the employees are in a stressful situation:

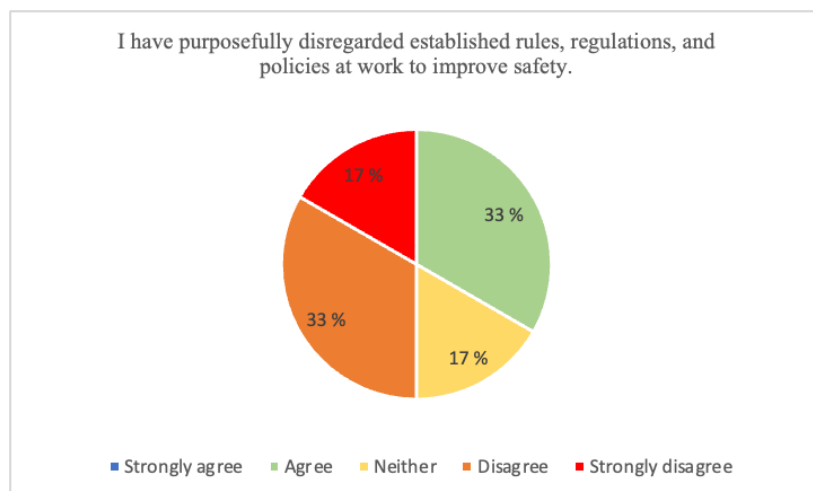
"We have, for example, been in situations where things have gone a bit quickly, you are not connected to the equipment correctly, you have also not done it quite right, or forgotten a step in the procedure or checklist" (A1).

The informant further states that *"people are busy and it is stressful and they start thinking about something else or prioritize other things"* (A1). Informant C1, who is also a Front-Line worker, also believes that hectic situations can cause non-compliance, where:

"It's challenging when you're in a hurry and it is a hectic situation. Taking shortcuts and feel free to drop the things you think you have control over, prioritize something else. But it is unconscious that they take shortcuts and break rules, but it does happen from time to time, yes" (C1).

Moreover, from the Safety Culture Survey Report (Avinor, 2018; 2022a), it is indicated that Avinor has a score of 4.0 out of 5.0 for the question *"In my unit, we do not break safety rules to complete work on time"*. This high score indicates that many employees believe that they do not violate rules and procedures due to time pressure. However, when asking the informants during the interviews if shortcuts are taken due to time pressure, almost all informants answered yes. One Local Management informant, E4, stated that shortcuts were taken due to making up for lost time. Additionally, there were different rankings from the informants who completed the Statement Form, as shown below in Figure 9.

Figure 9. Illustration of answers from informants regarding non-compliance in order to maintain safety, from the Statement Form.



Non-compliance and shortcuts are carried out in the organization, but there are disagreements as to whether it is done on purpose or not. Some of the informants believe that there are individuals who deliberately break the rules and do not follow the procedures. This can be because the rules are not improbable or are impossible to follow, and the procedures are not applicable to the situation. This can be seen in Figure 9, where 33 percent of the informants agreed that they have purposefully broken policies to maintain safety. One Front-Line informant, D1, argues that all the procedures and checklists that have to be followed and filled out are not always suitable and applicable for the work that is done. The informant further argues that laws from EU that regulate the procedures in which the organization has to follow are not always applicable. This was exemplified by informant D1, who said “(...) *the systems and all the procedures are not built for a country like Norway*”. Another informant, who works in the Local Management, E4, also states that procedures and rules are not always followed because there are processes that are not applicable but must be followed since they are mandated by law as the organization abides by ICAO and European legislation, where the informant states:

“There are some rules and procedures that must be in place, but these are typical procedures and processes that are affected by the weather and the surroundings. There are, for example, many variables that we have in Norway that is not found in Spain. Spain has different challenges when operating in the aviation industry, and so do we. Norway has different challenges than other countries” (E4).

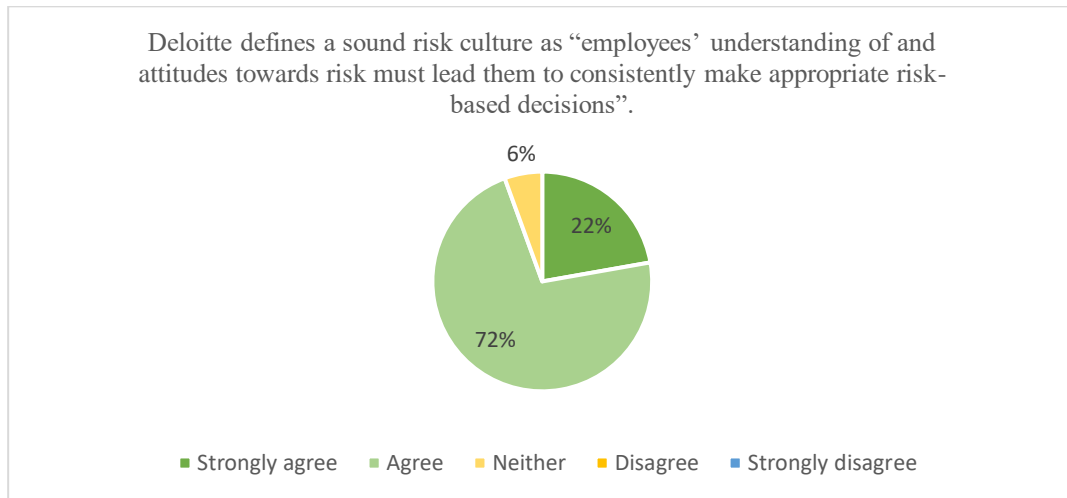
Overall, several informants agree that shortcuts are taken but that it is due to a desire to be efficient. Non-compliance does occur in the organization, but the informants argue that it is because not all the procedures and rules are adapted to Norway and the situations the employees find themselves in. Therefore, they must find alternative solutions to obtain safety, some of which may violate the law. It is possible to claim that rules are broken but that most deviations are reported. As mentioned in Section 5.3.1, there is a high focus on reporting deviations, mistakes, and shortcuts that occur in the organization.

5.6 What is Risk Culture?

As risk culture is a central theme in this thesis, it became crucial to find out the employees' understanding, definition, and knowledge of the term. It became apparent that the overall knowledge was weak, resulting in various definitions of risk culture. When asked if the informants were familiar with the term, several answered “no”, however, some said “yes”. The informants who said they were acquainted with risk culture provided different definitions when asked to describe their thoughts when hearing the term. Informant A3, who works in Local Management, stated that risk culture was not a term that they used in Avinor, but that it must be “*how one relates to risk, and to what extent someone is willing to use the potential room for action associated with it*” (A3). Another Local Management informant, D2, defined risk culture as “*the individual's relationship to risk handling*”. A different understanding came from one Front-Line informant, E2, who said risk culture is about the willingness to take risks within an organization. Several informants mentioned that it was either the willingness or the aversion to take risks. Informant B3, who is working in Local Management, said that it was about “*the sum of it, the nature of what we do (...) the individual understanding of safe job, risk and vulnerability analysis (...)*” (B3). The informant further claimed that the point of this is to have thought through the decision before making it. The latter definition is in line with Local Management informant E4's understanding of being conscious of one's own choices, behavior, and being aware of what one is doing. A possible observation here is that the organization may be unaware of an underlying risk culture that exists within the organization.

Those who said they were unfamiliar with the term, were asked what they thought risk culture was. One Front-Line informant said that he believed that it was “*either a culture in which one is extremely willing to take risks to achieve its goals, or that one does not take risks at all*” (C1). This is similar to the understanding of another Front-Line informant E2. Nonetheless, other informants who hold other positions in the organization, such as Local Management, also shared the same understanding of risk culture. The informants were provided with a definition of risk culture by Deloitte (2021) in the Statement Form, which defines the term as “*employees' understanding of and attitudes towards risk must lead them to consistently make appropriate risk-based decisions*”. Just like the other statements, the informants were asked to rank the statement from 1 – 5 on whether they agreed or disagreed with the statement, see the result in Figure 10. This illustrates that most of the informants either *strongly agreed* or *agreed* with this statement.

Figure 10. Illustration of the answers from informants regarding Deloitte's definition of a sound risk culture, from the Statement Form.



During the interviews, the informants were also asked whether they believed a sound risk culture could help improve the organization’s existing safety culture. Before asking this question, informants who could not provide a satisfactory definition of risk culture were provided with a definition, from both Levy et al. (2015) and Deloitte (2021). When all informants possessed an understanding of the term risk culture, most informants said that they believed that a risk culture could have a positive effect on safety culture. Informants B3 and A3, both Local Management employees, expressed that safety and risk culture are “*two sides of the same thing*”. Informant D2, who is also a Local Management employee, believed that putting risk culture on the “*agenda*” would grow awareness which would increase focus resulting in improved safety. This suggests that the employees understand the importance of holding a shared foundation of what risk is and how this relates to independent judgments and consequent decision-making, independently from the decision-maker.

6.0 Discussion

This discussion is divided in by the thesis' three research questions. The intent of this chapter is to discuss the problem statement up against the theoretical foundation and findings presented in Chapters 3 and 5:

In what way can a sound risk culture improve an already existing safety culture in safety-critical organizations operating within compliance-based safety regime?

The problem statement will help acquire a better understanding of the employees' adherence to the organization's safety regulations, safety culture, and unrecognized risk culture. Moreover, this may also provide insight into underlying patterns regarding whether the organization is susceptible to a strong and dysfunctional safety culture, which could negatively affect its primary goals. The problem statement may also serve in determining whether a focus on risk culture may support and balance the organization's safety culture.

6.1 What is risk culture, and how do different employees within the same organization interpret and understand the term?

As the purpose of this thesis is to examine whether a sound risk culture can help strengthen the already existing safety culture present in safety-critical organizations, it is essential to consider and look at what a risk culture is and how it is defined. In other risk-oriented industries, including the financial sector, risk culture has been heavily researched and is acknowledged as a crucial component of organizational culture (Kunz & Heitz, 2021; Levy et al., 2015). Additionally, the ISO 31000 standard clarifies the importance of "risk management culture" in the overall risk management process (Norsk Standard, 2018). There are several ways that risk culture is understood and defined. However, the lack of a universally accepted definition and understanding for this may be because various industries interpret risk and risk culture differently.

6.1.1 Interpretation and Understanding of Risk

Individuals' background will influence their risk perception, thus, their understanding of the concept of risk. Our informants, similar to those in other safety-critical organizations, are characterized by differences. How individuals perceive and describe risk will, in turn, have potential influence over how individuals choose to mitigate risk (Douglas, 1985; 1992; Lupton,

2013). Risk perception can also have implications for public policy-making and decision-making, which is again influenced by cultural groups with different risk prioritization. In light of this, a shared foundation of the concept of risk may create a shared language and understanding, thus facilitating the organization's given policies and procedures in a positive way.

However, the findings indicate that there is an absence of a similar explanation of the term risk within the organization. As a safety-critical organization, it is apparent that a majority of the organization's activity involves risk. Front-Line employees appear to have a significantly different definition of risk compared to the informants from Corporate Management. Front-Line workers often have a more substantial practical understanding compared to experts and academics. Further, informants from Corporate Management seem to possess a more theoretical understanding of the risk concept compared to Front-Line workers. Nonetheless, while Front-Line workers may not be able to provide an adequate definition of risk, it does not mean that they lack a profound practical understanding of what risk entails.

From Tuner and Pidgeon (1997), it follows that a lack of collective understanding of risk could possibly be the cause of disasters. How individuals prioritize and carry out tasks within an organization is shaped by underlying assumptions and norms (Bang, 2020; Jacobsen & Thorsvik, 2019). Thus, a shared understanding of risk is arguably important. In turn, the same understanding also affects the procedures and routines used for assessing and managing potential risks. As shown, the organization does not have a collective understanding of the term. However, the individuals within the organization appear to possess a fundamental comprehension and knowledge regarding the nature of risk, and this knowledge will, in turn, have considerable influence over risk culture.

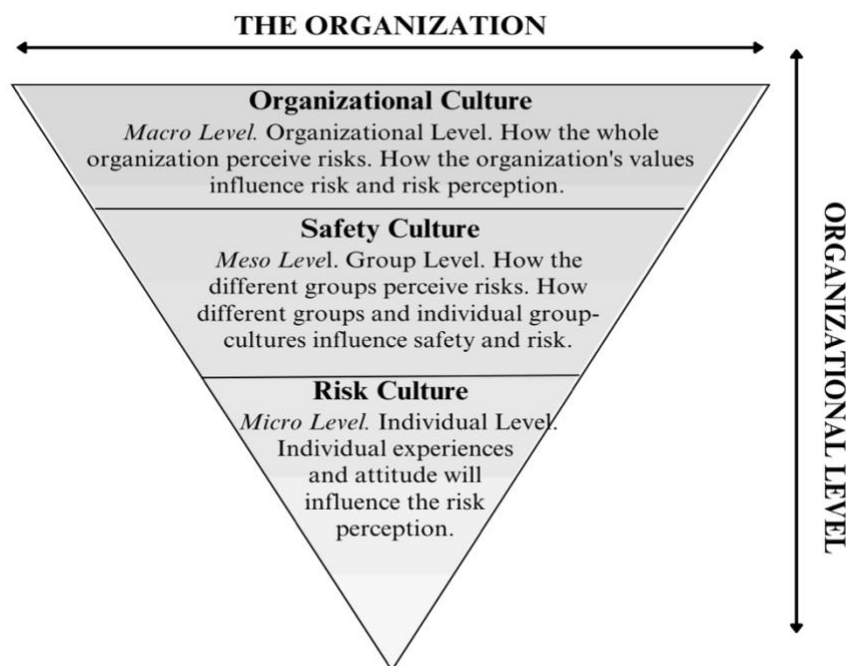
6.1.2 Interpretation and Understanding of Risk Culture

The way financial industries interpret risk and risk culture may differ from how safety-critical organizations do, indicating a potential difference between the two. This can be a result of the presence of diverse individuals from various cultural backgrounds working in different industries. As noted by Douglas (1985; 1992), shared cultural norms, expectations, and social roles play a part in shaping an individual's perspective, resulting in cultural factors influencing their perception of risk. Streicher et al. (2018) also state that it is important to assess the organization and the employees' risk perception before addressing the risk culture. Moreover,

the industry to which an individual belongs can influence their risk perception, thus, risk culture. To explore the interpretation of the term risk culture, a review of previous literature and research has been conducted. Here, it was established that the definition provided by Levy et al. (2015) will serve as the starting point. Levy et al. (2015) describe risk culture as the mindset and behavior of employees, where the employees must be able to recognize and comprehend risks that the organization may, face as well as discuss the risks and take appropriate action.

Furthermore, one of the informants from the Local Management explained how he interpreted the concept of risk culture, where he saw risk culture at the bottom of the pyramid. Informants F1 and F3 from Corporate Management shared a similar understanding of risk culture, which aligns with how the scholar Turkoglu (2016) defines risk culture. From this, risk culture is viewed as a new component of safety culture, where investigating and understanding what kind of risks are accepted and how risk decisions are made in organizations will introduce a new component to the existing safety culture. Moreover, the informant, E4, also explained risk culture as a micro level culture within safety culture. This explanation and interpretation of risk culture can be argued to be in line with the definition of risk culture from Levy et al. (2015), where the focus is on the individual. Thus, risk culture is viewed as a micro-level culture, where one examines how the individual perceives, identifies, and comprehends risk, see Figure 11.

Figure 11. Self-made visualization of Informant E4, F1 and F3 description of Risk Culture in the Organization.



It is believed that risk culture could have a positive impact on developing the employees' understanding of how everything is related, thus a systems-based way of thinking, and how this can help facilitate a risk-based approach. A functional and sound risk culture can, for instance, make employees throughout the organization gain a more comprehensive understanding of their tasks, including the interdependencies between their actions and the overall system, which can influence the level of safety. Additionally, a well-established risk culture empowers individuals to approach risk with a mindset and knowledge that enables them to consistently adopt a systems-based perspective and make informed risk-based decisions (Deloitte, 2021; Hurná & Bajusz, 2016). From the interviews, it became apparent that some employees may struggle to see the bigger picture and thus have a task-based approach toward their job instead of a systems-based approach. With an emphasis on risk culture, an increasing number of employees may be able to adapt to the risk-based approach and get a system-based perspective.

Moreover, another Front-Line worker talked about how some employees are not focused when working and thus do not have the overall understanding of how everything is connected in a broader system. Taking this into account, it becomes apparent that the informant discusses individual understanding and thoughts regarding how to work safely and avoid near misses and HSE accidents. Front-Line worker, A1, also mentioned that it does not help if most of the employees share the same understanding if some employees do not. Hence, it is possible to argue that although a majority of the employees possess an awareness of the risks they are exposed to and their role within the broader system, there are also other employees who do not comprehend nor have a shared understanding of risk. This indicates that while the informant mentions aspects that can be considered as risk culture, it is apparent that not everyone in the safety-critical organization understands or shares the same attitude towards risk. Hence, this may influence different interpretations and understanding of risk culture.

6.2 How do characteristics of risk culture become apparent in the employees' attitude towards the application of procedures and policies in the organization?

Although risk culture is not formally defined or discussed in the organization, there seem to be certain characteristics of risk culture emerging from the interviews, for instance, when informants talk about comprehending the tasks as a whole and having a systems-based

understanding. This is exemplified by some of the employees, such as informants working as Local Managers and Front-Line workers (A1, A2, and B1). They emphasize that these tasks and operations affect other tasks, and their operational work has a broader impact on the larger system. This may indicate that employees must have a systems-based understanding of why and how all the tasks they do are connected to a bigger system and that a broader risk perspective where individuals understand their role in the organization is important.

6.2.1 Flexible to Some Extent

The findings of this thesis indicate that most of the employees view the organization as a strongly regulated organization where all regulations, policies, and procedures must be adhered to, but they do not always maintain safety. When the informants were asked whether it was appropriate to follow all the procedures and complete all the checklists, one Front-Line informant responded both yes and no. He further explained that the procedures and checklists they have to follow are not always suitable and applicable. This might indicate that all the procedures that must be followed are important but that all procedures do not necessarily provide a positive input for safety. This also partially emerges from the statement forms, where six informants have chosen "agree" when asked about "*I have purposefully disregarded established rules, regulations, and policies at work to improve safety*", as shown in Figure 10. Even though rules and policies are crucial in safety-critical organizations, and employees are aware of the importance of adhering to them, rules have been ignored to enhance safety. The high focus on safety is demonstrated in employees' adherence to elements from the Flight Safety Policy (2023), indicating characteristics aligned with a risk culture and a systems-based approach.

Moreover, when asked whether there was room to go outside the given policies or procedures if they found it necessary to maintain or improve the safety of the organization, the answers varied. Some informants, such as one from Corporate Management, stated that it was possible, but "*depending on the situation*". It seemed as if there was an understanding that the procedures and policies were, to a certain extent, flexible. This could indicate that despite the high emphasis on compliance, where many laws and procedures must be followed, there is still some flexibility in certain situations where it may be necessary to depart from established procedures. As stated in Table 1, risk culture is seen as more value-based and ethically driven rather than process-based and formally governed. Subsequently, from this perspective, employees possess a systems-based mindset where they go outside the given laws, regulations, and policies when

they perceive the policies to obstruct safety and efficiency. This aligns with the definition of risk culture, where individuals are expected to have a mindset and the ability to identify and understand risks and be flexible to take appropriate action in response to those risks (Levy et al., 2015).

6.2.2 Mindset and Way of Thinking

Another characteristic of risk culture presented in Table 1 is that the focus lies on the mindset of the individuals. In other words, “*the way we think around here*”, as interpreted by informant F3. Taking this into account, it is arguably a trait of risk culture, as it shapes the attitudes, beliefs, and decision-making processes related to risk within the organization. Understanding and cultivating a risk-aware mindset is crucial for fostering a sound risk culture throughout the organization.

Moreover, there seemed to be an underlying assumption among some informants that the organization may be too heavily procedure-based, where there are procedures that are regulated down to the smallest detail. It is possible to argue that if it is highly regulated, then there is a possibility that employees will be unable to independently think through situations, judge them, and take appropriate actions and mitigating measures (Hudson et al., 1998). Highly regulated procedures and policies may also refrain organizations from having risk-based thinking, which is another characteristic of risk culture. From Levy et al. (2015) and theory of risk culture, the focus lies on the overall understanding throughout the organization as to why the work they do is important and how the work affects and influences the whole system. Overall, how individuals think plays a significant role in the organization’s risk culture and thus should be acknowledged when such culture is addressed. Risk culture emphasizes risk-based judgments in which independent judgments are needed. Hence, appropriate mindset is crucial.

6.2.3 Some Characteristics of Risk Culture are Apparent in the Employees’ Attitudes

It becomes apparent that risk culture is, in fact, not a term or concept most employees within the organization are acquainted with. However, characteristics of risk culture, such as flexibility and mindset, are to some extent evident in the organization. Moreover, the organization’s Flight Safety Policy (Avinor, 2023) states that one should have a risk-based approach to safety. Considering that a risk-based regulatory regime is an approach for managing and reducing uncertain future dangers (Martin, 2019), an understanding of risk culture could arguably be beneficial. This is due to the fact that risk culture could have a

positive effect on the shared foundation of risk, as risk culture seeks to make employees take consistent, risk-based decisions and be more able to handle the organization's current and future risks (Deloitte, 2021; Levy et al., 2015). Consequently, this could benefit the risk-based approach implementation throughout the organization.

6.2.4 Interpretation of Risk-Based Approach

Having a risk-based approach means that the safety measures are intended to be selected by judgments about risk (Martin, 2019). This undermines the importance of creating both a shared foundation of risk, as discussed above, and sound background knowledge in order to make informed judgments regarding risk. By having safety measures selected by sound judgments, there is an underlying assumption that the knowledge among the employees should be adequate and high (Jore, 2015; Lid, 2022). Similar to the definition of the term risk, there was also a varying response when the informants were asked about the topic of a risk-based approach. It appears as if a majority of employees working at both the Corporate and Local Management have a solid understanding of what is meant by having a risk-based approach. However, the understanding of this approach among Front-Line workers do not align with the rest of the organization. Hence, it appears as if there is a limited shared understanding of what constitutes having a risk-based approach.

Furthermore, it appeared as if the organization viewed having a risk-based approach as a means for both improvisation and risk prioritization. One informant from Corporate Management said that not all risks need to be addressed, rather, employees need to prioritize certain risks over other risks. Improvising can plausibly share a similar meaning to risk prioritization. When faced with incidents or stressful situations, employees have to move resources from one element to another to maintain a satisfactory level of safety. Analyzing the findings as a whole suggests that employees might adopt a risk-based approach to safety without realizing it. This demonstrates that the act of improvising and subsequently unconsciously prioritizing certain risks over others can be regarded as a form of a risk-based approach, wherein individuals make judgments and select which risks to prioritize. This unawareness, however, could pose a challenge as the employees would not be able to communicate and argue for their prioritization efficiently when there is no apparent shared fundamental understanding of a risk-based approach. Nevertheless, it is arguably important that there exists a fundamental understanding of what a risk-based approach is. Therefore, it is also essential that employees share a similar understanding of risk and the organization's risk picture, as this may influence risk

prioritization and the risk-based regulatory regime. Safety-critical organizations that have a shared understanding and can adhere to such an approach have the potential to gain greater flexibility and autonomy in managing risks. This enables them to be more adaptable and responsive to changes in the environment, evolving risk landscape, and advancements in technology. Risk-based thinking is considered a characteristic of risk culture, as seen in Table 1. Therefore, the employees' attitudes towards risk prioritization and improvising are arguably similar to the understanding of risk-based thinking. Based on this, it can be argued that risk culture is apparent in the employees' attitudes.

6.3 How does an Overemphasis on Compliance Influence the Safety Culture of an Organization and How Does This Contribute to Instances of Non-Compliance?

It is believed that too much emphasis on compliance may lead to dysfunctional cultures within an organization, which may have a negative impact on safety. From White (2022), it is possible to argue that compliance could also lead to a false sense of safety. To maintain safety levels, employees may feel the need to take shortcuts or be non-compliant. Considering this, risk culture could have a positive influence by creating a systems-based approach toward the tasks and operations while maintaining the safety level. As risk culture is a component within the safety culture that already exists in an organization, it is possible to identify some characteristics of risk culture in the safety culture.

6.3.1 Instances of Non-Compliance in an Organization

Whether a shortcut is understood as compliant or non-compliant depends on the specific context and the applicability of regulations and policies. If a shortcut violates applicable regulations, guidelines, or policies, it would be considered a deviation (Hudson et al., 1998). Hence, being non-compliant.

Moreover, according to several informants, shortcuts are taken when employees are in stressful situations. Some informants from the Local Management stated that time pressure and stress were one of the main reasons why Front-Line workers broke the rules. As a result of stressful and demanding situations, where shortcuts are committed or that there is non-compliance by prioritizing specific work tasks over other tasks that are just as important can be considered cognitive tunneling (Chou et al., 1996; Ververs & Wickens, 2000). It can be argued that employees have to make decisions in stressful situations, especially when there is time

pressure. This can result in prioritizing and choosing some tasks over others in order to achieve the highest level of safety possible, which can lead to unconscious non-compliance.

Moreover, the informants also seem to believe that certain employees are too concerned with completing their jobs efficiently. This is stated by one informant from Local Management who claimed shortcuts were a result of the desire to be effective, not with the intent to violate laws. This can be argued to be in line with Hudson et al. (1998) first category of why employees are non-compliant, which is due to employees having the expectations that rules must be bent to accomplish tasks effectively (Hudson et al., 1998).

Further, the informants also emphasize what can be understood as Hudson et al.'s (1998) second category of why employees are non-compliant, which is that employees feel that their personal experiences and abilities to execute tasks independently are strong, which results in the belief that they do not need to follow procedures and rules. For instance, some Front-Line workers mentioned that experience is an important factor that influences how employees handle and address risk and that experience may also be one of the reasons why they believe it is "okay" to take shortcuts. Another Front-Line informant stated "*to cut corners and feel free to drop the things you think you have control over and such. I can do that, but they [other employees] can't*" (C1). This illustrates that some employees feel that they have sufficient knowledge and experience. Thus, they make independent decisions which may result in them not following all procedures and protocols.

Hudson et al.'s (1998) third category of reasons for non-compliance is also evident in the interviews with the informants. Employees have the opportunity to take shortcuts or find better methods and solutions because it can be convenient and may be easier than following an extensive procedure. When there are strict rules and complex procedures that takes valuable time, it can become tempting to take shortcuts for the sake of simplicity (Hudson et al., 1998). This was exemplified by a Local Management informant (E4), who stated that convenience is also one of the reasons why employees take shortcuts, knowing it may not be legal and thus lead to non-compliance.

Furthermore, there was also established that international laws and regulations provide procedures and policies that have to be followed that do not always fit with the conditions in

Norway or the Norwegian weather. This could result in non-compliance due to the rules the employees have to follow are not applicable or suitable in the given context, as this may differ from one location to the next. If the situations are not mentioned in the procedures or that the situations are poorly covered in the procedures, they can be understood as situational violations or exceptional violations, which is what Hudson et al.'s (1998) call "inadequate work planning". This may be another reason why rules are bent or why non-compliance occurs. Another way in which non-compliance occurs is when checklists are not always followed correctly or done properly, thus resulting in near-misses or accidents, as mentioned by informants A3, A1, B1, and B3, from Front-Line and Local Management. Not following the checklists carefully before doing a task can be understood as inadequate work planning or preparation, which is also in line with Hudson et al.'s (1998) reasons for non-compliance.

6.3.2 Risk-Based Non-Compliance

It is possible to observe tendencies from the findings suggesting that individuals who possess experience and expertise are more inclined to take shortcuts. Informants from Front-Line, Local, and Corporate Management (A1, A3, E4, and F3) all mentioned that those who take shortcuts frequently have experience, knowledge, and a thorough comprehension of the tasks. New employees who lack specialized knowledge are unlikely to take shortcuts, according to informants A1 and F3. This indicates that individuals who possess sufficient knowledge can exercise independent judgment regarding risks and their own actions, thus leading them to take shortcuts. This aligns with a risk-based approach, where individuals are expected to have adequate knowledge and understanding of risks, enabling them to make informed decisions and identify effective measures for risk mitigation. Consequently, it can be argued that employees within the organization adopt a risk-based, non-compliant approach to risk. In other words, the employees' shortcuts, despite their non-compliant nature, can be interpreted as an application of a risk-based approach.

6.3.3 Risk Culture's Influence on Safety Culture

Organizations' emphasis on compliance may have undesired effects. By exploring how risk culture relates to safety culture, it can possibly help safety-critical organizations gain a better understanding of risks. It may also increase awareness of how compliance with policies can influence their safety culture. This may also direct focus toward how an emphasis on risk culture can help avoid some of the undesired effects caused by overemphasis on compliance.

Safety culture, unlike risk culture, is heavily researched and studied, also within safety-critical organizations. As stated in Chapter 2, safety culture can be defined as “the set of beliefs, norms, attitudes, roles and social and technical practices within an organization which are concerned with minimizing the exposure of individuals, both within and outside an organization, to conditions considered to be dangerous” (Turner et al., 1989, p. 4) Moreover, according to the organization, safety culture can be understood as “the things we say and do that affect safety” (Avinor, n.d-c). Comparing the two understandings, the essence of safety culture seems to be within the collective mindset of the organization concerning safety. It is important to stress that risk culture here is considered a component within safety culture. Hence, several characteristics of safety culture could potentially be considered characteristics of risk culture. This section will discuss risk culture and safety culture up against the model of Reason (1997) regarding a functional safety culture.

6.3.2.1 An Informed Culture

Despite not explicitly mentioning having an informed culture, there are indications from both the document analysis and the interviews that the organization emphasizes information sharing. From Gill and Shergill (2004), an informed culture within the aviation industry is situated in a setting and atmosphere where information exchange is valued. From Reason (1997), an informed culture is also when the organization actively distributes safety information while gathering and analyzing relevant information and data from incidents and near misses. The findings from the previous chapter indicate that the organization value information sharing by establishing communication forums across different airports. Further, this is also substantiated in the employees’ attitude towards information sharing. Most informants believed that it was important to learn from mistakes and to share this knowledge with others.

As seen in Figure 11, both safety culture and risk culture are seen as elements within an organizational culture in this thesis. From Levy et al. (2015), a key to successful risk culture is the creation of a consensus of the desired risk culture, which in turn, should be linked to the overall organizational culture. On that note, information sharing can also arguably be an aspect of risk culture. From Streicher et al. (2018), an alternative way to handle risk and manage risk culture in organizations was presented, which was by integrating existing research and approaches together with a holistic view. In order to get a comprehensive view and understanding of risk, one is arguably dependent upon information sharing, which suggests that

information sharing could also be an element of risk culture. As established in Chapter 2, risk culture is also dependent upon the individual's understanding of and attitude toward risk (Douglas, 1992; Lupton, 2013). This is, in turn, shaped by risk perception but also knowledge about different risks. In other words, the emphasis on risk culture is somewhat dependent upon a good, informed culture.

6.3.2.2 A Reporting Culture

When it comes to reporting culture, Reason (1997) emphasizes the importance of fostering an open and transparent reporting culture in order to have a sound and functional safety culture. This would allow organizations to learn from mistakes and improve safety performance. In an open and transparent reporting culture, employees feel comfortable reporting errors, near-misses, and hazards without fear of retribution or punishment (Reason, 1997).

However, it has to be stressed that “persuading” individuals to file and report incidents and critical near-misses is not easy, especially when it may concern divulging their own mistakes (Reason, 1997). That safety-critical organizations, as seen in the case organization, manage to create a good reporting culture shows that the employees understand the importance of reporting deviations and what it gives them, which is information and learning. Reason (1997) states that some individuals cannot always see the value in making reports, thus become challenging when trying to create and establish a good reporting culture. Moreover, demonstrating an appreciation for the value of reporting, and how it can result in information sharing and learning, reflects individuals' adoption of a system-based approach. This aligns with a risk culture that emphasizes the importance of individuals embracing a systems-based perspective and understanding of risks.

Both reporting culture and risk culture also value and emphasize open communication. This open communication and emphasis on reporting could, in turn, contribute to early risk identification, which arguably would enable organizations to make better judgments regarding current and future risks, which is the essence of risk culture (Grieser & Pendell, 2021; Levy et al., 2015). The focus on open communication could also increase risk awareness throughout the organization. Awareness of risk could potentially improve the challenges of achieving a

risk-based approach. This would be a result of a shared understanding, which could foster effective communication.

The majority of the data and information concerning risks that the employees receive is from the reports on deviations. This information is crucial for employees to obtain a comprehensive understanding and assessment of the risk landscape, enabling them to make sound judgments. However, the information and data from the reports may not provide an appropriate risk picture, as the different perceptions of risk among individuals can result in inconsistencies in what is being reported. This can, in turn, influence the organizational risk picture, which may influence the organization's risk culture. Consequently, emphasis on risk culture in an organization's safety culture could help employees gain a better understanding of risk, create a foundation of risk, and result in more consistent reporting, which would give a more accurate picture of the risk landscape.

6.3.2.3 A Learning Culture

From Reason (1997), learning culture refers to an organization that can improve by learning from its failures. Further, as seen in Figure 7, learning from mistakes is highly valued in the organization. There has been a significant focus on reporting deviations and near-misses, as this provides data which the organization can learn from. Knowledge is also an aspect that is covered in risk culture (IRM, 2012; Levy et al., 2015). Risk culture places great emphasis on holding a risk-based approach, and this approach implies that the underlying knowledge is sufficient. Another emphasis within risk culture is on the individual's understanding of and attitude toward risk. If knowledge and learning are seen as interrelated elements, learning culture is arguably also relevant to risk culture.

As mentioned, a risk culture can be understood as the mindsets and behaviors of individuals within an organization that determine the ability to identify and understand, openly discuss, and act upon the organization's current and future risks (Levy et al., 2015). A strong risk culture promotes open communication and discussion of risks. By having a learning culture, organizations can foster a sound risk culture that encourages employees to continuously learn from each other, from reports regarding accidents, incidents, and near misses, as well as adapt practices to improve safety and manage and mitigate risks.

Moreover, a learning culture could also be in line with a risk-based regulatory regime. In a risk-based regulatory regime, authorities prioritize resources and mitigating measures based on their own judgments and the level of risk posed by different activities in the organization (Jore, 2015; Martin, 2019). This approach emphasizes the importance of understanding and managing risk effectively by having independent, sound judgments regarding risk (Martin, 2019). By promoting a learning culture, employees in safety-critical organizations can enhance their knowledge and risk management practice, thus enabling them to make more appropriate judgments regarding risks that the organization is exposed to. Further, emphasis on learning could also help organizations to identify areas of weakness and implement appropriate measures with the intent to mitigate risk and enhance safety. Since a risk-based way of thinking is emphasized in risk culture, learning is, therefore, arguably a central trait in risk culture.

6.3.2.4 A Just Culture

Moreover, the informants put a great emphasis on the fact that one should not be punished for making unintentional mistakes, yet stressing the importance of reporting the incidents so that others in the organization could learn from them. Reason (1997) also put just culture as a significant element of a sound and functional safety culture, where errors and unsafe behavior will not be penalized if the errors are unintentional. Several informants stressed that it should be safe to report, thus open and fair. This corresponds with the findings, as illustrated in Figure 4, 5 and 6. A just culture can also be said to foster a sense of trust among the employees and leaders in the organizations, where employees know that they will be treated fairly (Gill & Shergill, 2004; Reason, 1997).

Social trust in a just culture plays a crucial role in shaping the overall safety culture. It refers to the level of trust and confidence employees have in their colleagues, leaders, and the organization as a whole. Trust and social trust are not only fundamental for establishing a just culture but also influence risk perception (Douglas & Wildavsky, 1982; Siegrist, 2012). A just culture, with its emphasis on fairness and learning, can positively impact risk perception by promoting a sense of psychological safety (Amundsen, 2021). When employees trust that they will be treated fairly by the leaders in the event of an error or incident, they are more likely to have higher trust. Moreover, trust between leaders and employees is a crucial factor influencing the employees' risk perception, thus leading them toward a shared understanding of the same

risk picture. From Streicher et al. (2018), it was established that prior to evaluating and improving risk culture, it would be critical to assess organizations' and their employees' risk perception, indicating that perception plays a significant role in risk culture. Risk perception is also influenced by individuals' understanding of risk, which is important for having a risk-based approach. As seen in Table 1, this approach can be a characteristic of risk culture.

According to Ching et al. (2021), risk culture emerges when top management throughout the organization is held accountable for the ownership of risk within their areas of responsibility. From Mikes and Kaplan (2013), it was found that the top management who supports creating a no-blame culture can encourage employees to speak up and discuss risk issues they are concerned about. Just culture in a risk culture setting helps shape the employees' attitudes and behaviors toward risk. If the employees perceive that the organization has a just culture, they may feel more comfortable reporting deviations, incidents, or suggestions for improvement. This could, in turn, have a crucial impact on the organization's capability to identify potential risks and vulnerabilities. Considering risk culture relates to organizations' ability to handle current and future risks (Levy et al., 2015), having a just culture is debatably important.

6.3.2.5 A Flexible culture

According to Reason (1997) a flexible culture emphasizes adaptation, resilience, and the capability to be flexible and act effectively in an environment of changing circumstances. Moreover, a flexible culture can take different forms, but it often involves "shifting from the conventional hierarchical mode to a flatter professional structure, where control passes to task experts on the spot, and then reverts back to the traditional bureaucratic mode once the emergency has passed" (Reason, 1997, p.196). In other words, it must be possible to adapt the management and structure of an organization, where those who are closest to the risk and know the most about the situation should make decisions and choices. This could be considered a form of improvisation, as mentioned by informant B1.

Moreover, understanding that not all procedures and checklists can be followed because it negatively affects efficiency and safety, can be considered as having to a certain degree, a systems-based understanding and approach to risk, which, in turn, is associated with being risk-based and having a risk culture. The findings also revealed that Front-Line workers acknowledged that they have made decisions in stressful situations that are not in line with

rules and policies, in order to prioritize safety. By adopting a system-based approach, where employees possess a comprehensive understanding of the interrelations between various actions and systems within the organization, flexibility in risk management can be achieved in a safety-critical organization. This entails viewing risk as an integrated and comprehensive part of the organization's operations, where elements and influences of risk are evaluated across systems, processes, and activities. This enables a more flexible response to, and mitigation of, risks by adapting mitigating measures and strategies based on a broad understanding of the risk picture. It involves revising and updating risk assessments and measures when new information or changes in the risk picture occur.

Further, incorporating a risk-based approach facilitates the ability to be flexible and make independent judgments regarding risk and safety. This means that decisions and actions are based on assessments of the probability, consequences, and uncertainties of risks, as well as prioritizing resources and efforts according to risk levels and risk pictures (Martin, 2019). Adopting a flexible approach enables safety-critical organizations to adapt to changes and prevent rigid processes from hindering effective risk governance (Martin, 2019). This may involve considering alternative measures and strategies based on ongoing risk assessments and adjusting them in line with evolving risk conditions. However, when there is no apparent foundation of risk and no shared understanding of a risk-based approach in the organization it can create challenges of incorporating a risk-based approach, thus challenges in achieving full flexibility. If the understanding is weak, this may also make it easier to go back to what one knows, which is the rule-compliance regime, rather than to make independent judgments.

A flexible culture involves having the capability to adapt effectively to changes in the risk picture (Reason, 1997). In order to do that, individuals should have a mindset of being vigilant, identifying potential dangers, and taking appropriate mitigating measures to prevent incidents and hazardous situations quickly. Similar to a flexible culture, a risk-based approach acknowledges the value of being proactive and responsive to risks through the use of risk assessments (Martin, 2019). Moreover, to be proactive and flexible when it comes to risk, it is important for all employees in an organization to have a similar risk picture and understanding of risk. It is, therefore, possible to argue that a sound risk culture, where all individuals have a comprehensive systems-based approach to risk, can help organizations achieve a broader risk perception and shared understanding amongst employees. This comprehensive understanding could potentially help achieve flexibility more efficiently.

7.0 Conclusion

This thesis sought to explore whether a safety culture in an organization operating within a compliance-based safety regime could be counterbalanced by fostering a systems-based approach to risk among all employees. It intends to generalize the findings to be applicable to any safety-critical organization. To explore this topic, the focus lies on the problem statement:

In what way can a sound risk culture improve an already existing safety culture in safety-critical organizations operating within compliance-based safety regime?

It was discovered quickly that risk culture was not a concept well embedded in safety-critical organizations. In the theoretical foundation, it was established that such culture is in relation to the mindset and behavior of individuals within an organization, which helps determine the collective ability to handle the organization's current and future risks. We also noticed a vast understanding among employees of what risk culture is. As risk culture is not something that appeared to be well embedded within the organization's safety culture, it proved difficult to make judgments about how elements of risk culture became apparent in employees' attitudes towards the application of procedures and policies. Yet, the emphasis on flexibility and the employees' mindsets indicates that there are traces of a risk culture present in the attitudes.

The findings of this thesis show that overemphasis on compliance could have a negative impact on the organization's safety culture. A good safety culture is conditional on its content. If the focus lies too heavily upon compliance, then it may work against its purpose, resulting in a dysfunctional safety culture. A dysfunctional culture may cause the organization fail to reach its main objectives and goals of safety. The findings further indicated that non-compliance occurs within the organization, and some of the reasons for this are that procedures can be inapplicable or time-consuming, and employees wanting to be effective. Our findings also indicated that some instances of non-compliance that occurs can be categorized as risk-based non-compliance, where individuals adopt a risk-based approach by being flexible and make their own sound judgements regarding risks to prioritize safety, however, these actions violate the procedures and policies, and are therefore seen as non-compliance. This could perhaps be avoided given that the organization's safety culture does not place too much emphasis on a rule-compliance regulatory regime, but rather on a risk-based approach. More freedom and leeway would allow employees to make more independent judgments, in given frames, which could reduce elements of non-compliance.

If an organization emphasizes risk culture organization-wide, it may help enhance its flexibility, adaptability, and responsiveness to the changing environment, the evolving risk landscape, and technological advancements. Based on our findings, we see indications that this emphasis on risk culture could result in an increased number of employees who may be able to adapt to a risk-based approach and get a systems-based way of thinking. This can, in turn, enable them to make sound independent judgments related to safety and risk.

It is important to remember that safety-critical industries are characterized by complex, non-linear dynamics involving many interrelated actors and processes, and that it is humans who work in these industries, and thus, it is easy for individuals to make mistakes. However, an improved understanding of risk culture among individuals can contribute to an increased overall understanding of how all tasks are interrelated, and thus, enhance awareness of the risks the employees may encounter in their workday. The increased understanding could, in turn, facilitate better independent judgments, and seek to prevent mistakes. Consequently, a risk culture can improve employees' risk perception and help them get a broader and more systems-based approach toward risk.

Hybrid threats dominate our contemporary and technological society, and new risks can be challenging to predict because of today's digitalization. While no organization can completely eliminate all risks and threats, an emphasis on risk culture involves having a proactive and systematic approach to identifying, assessing, and managing risks. This could, in turn, ensure that decisions made are more likely to be the same, independently of the decision-maker. Most safety-critical organizations operating within a compliance-based regime have implemented policies, procedures, and practices to promote a functional safety culture. Consequently, emphasizing risk culture in light of their safety culture could have a positive influence on the existing safety culture, thus improving the level of safety.

7.1 Recommendations

Although risk culture is becoming significant in safety-critical industries, there is a notable gap in the existing research that addresses this issue. This gap underlines the need for additional research and analytical insights on this topic, and it prevents our knowledge of the complexity and depth of risk culture in safety-critical organizations. In order to have a deeper understanding

of risk culture in the aviation industry and other safety-critical industries, additional research is needed on this topic related to risk management and culture in these industries.

This thesis is limited to one case within the aviation industry. However, it is believed that the findings and results could be generalized to other safety-critical organizations. As there is little research done on this topic, it would therefore be beneficial to have similar research conducted on similar organizations within the aviation industry, as well as other safety-critical industries, such as the oil and gas industry. This would, in turn, help to generalize from a theoretical standpoint. It could also be interesting to do the same study with several cases within the safety-critical industries to compare and generalize at a greater level.

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Appendix

Appendix A – Information letter and consent form

Exploring Risk Culture in safety-critical organizations

*This is an inquiry about participation in a research project where the main purpose is to **evaluate and explore the concept of compliance, safety culture and risk culture in Avinor, and to analyze and see how the different perception, definitions, and understanding of risk culture are in different levels in the organization.** In this letter we will give you information about the purpose of the project and what your participation will involve.*

Purpose of the project

The intent of this thesis is to explore whether emphasis on risk culture can improve an already existing safety culture for a safety-critical organization operating within a compliance-based regulatory regime. The thesis will examine if a sound risk culture can help balance the strong safety culture and the compliance in the organization. It will explore the organization's interpretation of the term "risk culture", and if this understanding fosters a risk-aware culture, as well as the challenges they may face in doing so. The research will also explore the organization's understanding of risk culture, safety culture and compliance.

Who is responsible for the research?

The University of Stavanger is responsible for this research project.

Why are you being asked to participate?

For the purpose of this project, we have chosen to interview different employees within the organization (Avinor), due to wanting a good overview of the whole organization and get a better and more holistic view of the company. You are being asked to participate in this project due to your position and expertise within your organization.

What does participation involve for you?

The method applied for this project is qualitative interviews with experts on their fields. For the duration of the interview, we wish to record and make notes. If you choose to participate in this project, we would like to perform a face-to-face or online video-interview. The interview will take approximately 30 to 45 minutes and will include questions about what your background is, how you define the concepts "risk" and "risk culture", how your organization defines "risk culture" and how your organization work towards creating a sound risk culture and how the culture influences on the organizations efforts towards risk management. You will also be asked about how you work and if you comply with the rules and regulations and your opinions around all the strict regulations in the aviation sector. You will also be asked to rate different statements from 1 – 5 (strongly disagree to strongly agree). Your answers will be recorded electronically. The interview can

either be in English or Norwegian, however, as this project will be in English, any transcribes made in Norwegian will be translated.

Participation is voluntary

Participation in the project is voluntary. If you choose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you choose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). The information shared with us will only be available to the students in charge of this project and relevant professors contributing to this project. All participants will be anonymized in the publication. This means that names and ages will be redacted, but your position in the organization will be disclosed.

What will happen to your personal data at the end of the research project?

The project is scheduled to end 15th June 2023 and recordings and notes from the interviews will be deleted.

Your rights

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data, and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection

Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent. Based on an agreement with the University of Stavanger, Data Protection Services has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have any questions about the project, or want to exercise your rights, please contact;

- The University of Stavanger via Vilde Aasland, 264765@uis.no
- The University of Stavanger via Mai-Linh Michelle Nguyen, 267665@uis.no

- The University of Stavanger via Kenneth Arne Pettersen Gould, Kenneth.a.pettersen@uis.no
- Our Data Protection Officer: Elena Sikveland, 51834516, elena.sikveland@uis.no
- Data Protection Services: personverntjenester@sikt.no, +4753211500.

Yours Sincerely,

Kenneth Arne Pettersen Gould
(Supervisor)

Vilde Aasland & Mai-Linh Michelle Nguyen
(Students)

Consent Form

I have received and understood the information about the project “Risk Culture in the Aviation Sector (Avinor)”, and I have had the opportunity to ask questions. I consent to;

participate and be interviewed

I consent that my personal data is being processed until the end date of the project.

(signed by project participant, date)

Appendix B – Interview guide in English

Interview guide

Introduction

The purpose of this thesis is to explore the role of top management in creating and sustaining a sound risk culture throughout the whole organization. It will examine the top management's interpretation of the term "risk-culture", and if this fosters a risk-aware culture, as well as the challenges they may face in doing so. The research will also consider the impact of top management's role on the overall risk culture of the organization and compare the top management's understanding of risk culture with the rest of the organization. Through semi-structures interviews with individuals working at Avinor to explore their understanding of the term "risk culture" and how their culture influences on the organizations efforts towards enterprise risk management.

Considering this, the problem statement of this thesis is:

In what way can a sound risk culture improve an already existing safety culture in safety-critical organizations operating within compliance-based safety regime?

And we have developed three research questions:

1. What is risk culture and how do different employees within the same safety-critical organization interpret and understand the term?
2. How do elements of risk culture become apparent in the employees' attitude towards the application of procedures and policies in the organization?
3. How does an overemphasis on compliance influence the safety culture of an organization and how does this contribute to instances of non-compliance?

Background

1. What is your educational level and how long have you been working in Avinor?
2. What is your position in the organization? Which department do you work for?
3. Are you faced with risks in your daily tasks at work?
 - a. What kind?

Safety Culture

1. Flight safety is said to have the highest priority in Avinor, how is this reflected through your work?
2. Are you familiar with the term safety culture?
 - a. How would you define it?
3. Is there established a set of rules, policies or procedures for a lot of your work?
 - a. *If they mention Luftfartstilsynet, where Luftfartstilsynet have regularly checks on certain indicators – Do you focus more on tasks and indicators that Luftfartstilsynet will check compared to other tasks?*
4. Is there room to deviate from the policies and procedures if necessary to accomplish Avinor's overall objective and goals of safety and security?
5. Do you think the organization has a good reporting culture?
 - a. Yes/No? Why?
 - i. How are those followed up after?

Compliance

1. Have you experienced a situation where you had to communicate the importance of following rules, regulations, and checklists to a colleague who was not following them correctly?
 - a. If yes - How did you handle this situation?
2. Have you ever been in a situation where you had to go beyond the policies and procedures in order to prioritize flight safety?
 - a. How did you go about it?
3. Have you ever been in a situation where the policies and procedures stood in the way of you working to prioritize flight safety?
 - a. How did you go about it?

Risk

1. How do you describe risk?
 - a. Do you think of this when making decisions on an everyday basis?

2. Avinor's flight safety policy says that one works risk-based, how would you say this reflects your work towards flight safety?
3. Your organization use ISO31000 as guidance for risk management, where risk is defined as "effect of uncertainty on objects", do you agree with this definition?
 - a. Why/Why not?
4. What do you consider to be Avinor's biggest risks?
5. What is your understanding of Avinor's risk picture given your place in the organization?

Risk culture

1. Have you ever heard of risk culture?
 - a. If no – what do you think it is?
 - b. If yes – How would you describe it? Do you think Avinor has a strong risk culture? Why?
2. Do you believe that a sound and good risk culture can help improve Avinor's already existing safety culture?

Other

1. Is there a strong set of published values that are regularly referenced to, and are taught to new joiners/employees and reinforced by management?
 - a. Are these values being regularly followed?
 - b. What do those values say about the culture of the organization?
2. Do you feel like you have sufficient knowledge about the risks you face within your level in the organization?
 - a. Do you know your mandate?
 - b. What measures are taken to sufficiently provide you with insights and knowledge about risks relevant to you?

Appendix C – Interview guide in Norwegian

Intervju guide

Introduksjon

Formålet med denne masteroppgaven er å utforske og se på om en sterk risikokultur kan balansere den sterke sikkerhetskulturen og compliance som finnes i organisasjonen. Oppgaven vil se på toppledelsen (konsernet) sin forståelse av begrepet “risikokultur”, og om denne forståelse skaper en risikobevisst kultur, samt bevisstgjørelse rundt utfordringer de kan møte på. Forskningen vil også sammenligne toppledelsens forståelse av risikokultur med resten av organisasjonen (frontline-workers). Gjennom semi-strukturintervjuer med personer som jobber i Avinor vil vi utforske deres forståelse av begrepet "risikokultur", om det er muligheter for å avvike fra strenge lover, regler og sjekklistor samt om en god risikokultur kan balansere og hjelpe de ansatte fra å ikke glemme det overordnede målet om sikkerhet.

På bakgrunn av dette så lyder problemstillingen slik;

På hvilken måte kan en god risikokultur forbedre en allerede eksisterende sikkerhetskultur i sikkerhetskritiske organisasjoner som opererer innenfor «compliance-basert» reguleringsregime?

Og vi har utformet tre forskningsspørsmål;

1. What is risk culture and how do different employees within the same safety-critical organization interpret and understand the term?
2. How do elements of risk culture become apparent in the employees' attitude towards the application of procedures and policies in the organization?
3. How does an overemphasis on compliance influence the safety culture of an organization and how does this contribute to instances of non-compliance?

Bakgrunn

1. Hva er din utdanningsbakgrunn og hvor lenge har du jobbet i Avinor?
2. Hva er din stilling i organisasjonen? Hvilken avdeling jobber du i?
3. Møter du risiko i ditt daglige arbeid på jobb?
 - a. Hvis ja – hvordan type risiko?

Safety Culture - Sikkerhetskultur

1. Flysikkerhet sies å ha høyeste prioritet i Avinor, hvordan gjenspeiles dette gjennom ditt arbeid?
2. Er du kjent med begrepet sikkerhetskultur?
 - a. Hvordan vil du beskrive en god sikkerhetskultur?
3. Er det etablert et sett med regler, retningslinjer eller prosedyrer for mye av arbeidet ditt?
 - a. Hvis ja – hva da? Fortelle mer?
 - b. *Hvis Luftfartstilsynet blir nevnt, der det blir snakket om at Luftfartstilsynet har jevnlig sjekker og inspeksjon på Avinor sitt arbeid ved å se på spesifikke indikatorer – Fokuserer du mer på oppgaver og indikatorer som Luftfartstilsynet ser på, sammenlignet med andre oppgaver?*
4. Er det rom for å gå forbi de prosedyrene og regelverket i situasjoner der det er nødvendig for å kunne opprettholde god sikkerhet? -> med andre ord, har du en beslutningsmyndighet der du kan vike unna disse prosedyrene og reglene for å oppnå god flysikkerhet?
5. Mener du at Avinor har en god reporting-kultur?
 - a. Ja/Nei – Hvorfor?
 - i. Hvordan blir dette fulgt opp?

Compliance

1. Har du opplevd en situasjon der du måtte kommunisere viktigheten av å følge regler, forskrifter, prosedyrer og sjekklister til en kollega som ikke har fulgt dem riktig?
 - a. Hvis ja – Hvordan håndterte du situasjonen?
2. Har du noen gang vært i en situasjon der retningslinjene og prosedyrene har stått i veien for dine arbeidsoppgaver og effektivitet å prioritere flysikkerhet?
 - a. Hvordan gikk du frem? Hva gjorde du da?
3. Har du noen gang vært i en situasjon der du måtte gå utover retningslinjene, regelverket, sjekklister og prosedyrene for å prioritere flysikkerhet?
 - a. Hva gjorde du da? Hvordan gikk du frem?

Risiko

1. Hvordan vil du beskrive risiko?
 - a. Tenker du på dette når du tar beslutninger i hverdagen?
2. Avinors flysikkerhetspolicy sier at man jobber risikobasert, hvordan vil du si at dette reflekterer arbeidet ditt mot flysikkerhet?
3. Avinor bruker ISO31000 som veiledning for risikostyring, der risiko defineres som "effekt av usikkerhet på objekter", er du enig i denne definisjonen?
 - a. Hvorfor/Hvorfor ikke?
4. Hva anser du som de største risikoene for bedriften?
5. Hvordan er din forståelse av Avinor sitt risikobilde gitt din plass og stilling i organisasjonen?

Risikokultur

1. Har du hørt om begrepet risikokultur før?
 - a. Hvis nei – hva tror du det er?
 - b. Hvis ja– Hvordan hadde du beskrevet en risikokultur? Tror du Avinor har en sterk risikokultur? Hvorfor?
2. Tror du at en sikker og god risikokultur kan bidra til å forbedre Avinors allerede eksisterende sikkerhetskultur?

Annet

1. Finnes det et sterkt sett med publiserte verdier som det jevnlig refereres til, og som læres opp til nye ansatte og som blir forsterket av ledelsen?
 - a. Blir disse verdiene jevnlig fulgt opp?
 - b. Hva sier disse verdiene om kulturen som finnes i organisasjonen?
2. Føler du at du selv har god nok kunnskap om risiko som du møter på i arbeidshverdagen din?
 - a. Er du kjent med hvor stor beslutningsmyndighet/fullmakt (mandate) du har?
 - b. Hvilke tiltak iverksettes for å gi deg tilstrekkelig innsikt og kunnskap om risikoer som er relevante for deg?



Statements/utsagn med Avinor

Name

What is your level at Avinor?

Hva er ditt stillingsnivå hos Avinor?

Deloitte defines a sound risk culture as “employees’ understanding of and attitudes towards risk must lead them to consistently make appropriate risk-based decisions”.

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“In our organization, our values promote good risk-based decision making.”

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“People in this organization admit when they have made mistakes”.

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“Avinor has a good reporting culture, and the incidents reported are being followed up”.

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“I know the level of risk I can take in my role”.

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“My direct manager “walks the talk” on risk management”.*

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

*Walks the talk = Putting words into action - showing that what is being said is being actively done. (Det som blir sagt samsvarer med handlinger som blir gjort).

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

“It is important to comply to all the rules and regulations when working at Avinor”.

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

"I have purposefully disregarded established rules, regulations, and policies at work to improve safety".

Rate the statement from 1 – 5, where;

1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

1 (Strongly disagree).

2 (Disagree).

3 (Neither).

4 (Agree).

5 (Strongly agree).

Appendix E – Approval from SIKT

Kommentar

OM VURDERINGEN

Sikt har en avtale med institusjonen du forsker eller studerer ved. Denne avtalen innebærer at vi skal gi deg råd slik at behandlingen av personopplysninger i prosjektet ditt er lovlig etter personvernregelverket.

FØLG DIN INSTITUSJONS RETNINGSLINJER

Vi har vurdert at du har lovlig grunnlag til å behandle personopplysningene, men husk at det er institusjonen du er ansatt/student ved som avgjør hvilke databehandlere du kan bruke og hvordan du må lagre og sikre data i ditt prosjekt. Husk å bruke leverandører som din institusjon har avtale med (f.eks. ved skylagring, nettspørreskjema, videosamtale el.) Personverntjenester legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til oss ved å oppdatere meldeskjemaet. Se våre nettsider om hvilke endringer du må melde: <https://sikt.no/melde-endringer-i-meldeskjema>

OPPFØLGING AV PROSJEKTET Vi vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!