Thesis for MS-Degree in
Strategic Management

Implementation of Safety Management Systems
in the Aviation Industry
From the viewpoint of the Management of Change

Guðjón Atlason

Thesis Advisor: Gylfi Dalmann Áðalsteinsson Associate Professor
Faculty of Business Administration
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School of Social Sciences - University of Iceland
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Preface

This paper is a MS Thesis in Strategic Management at the University of Iceland. It is a 30 ECTS study in the field of Change Management where the implementation of a significant change to safety management in aviation is examined and a survey research was conducted.

The Thesis was made with relevant and important support, guidance and encouragement from the Thesis Advisor, Mr. Gylfi Dalmann Aðalsteinsson, Associate Professor at the University of Iceland. I want to thank him especially for his valuable advice and sharing of his knowledge in Change Management.

I like to thank my colleague in the world of aviation for many years, Mr. Einar Örn Héðinsson, Director at the Icelandic Transport Authority and former ICAO Air Navigation Commissioner for his support and advice, and for reading over the thesis and commenting on it.

For reading over the thesis, my wife Ana and the girls for bearing with me.

Finally, I like to mention the late Pétur K. Maack who was my superior and mentor for many years, a former Professor at the University of Iceland and Director General of the Icelandic Civil Aviation Administration. He introduced me to quality and safety management in relation to aviation.

Reykjavík, 8 January 2018

Guðjón Atlason
Abstract

The objective of this study is to examine changes in safety management practices in the aviation system from the viewpoint of the management of change in order to determine if the application of a change management process would be beneficial for the implementation of the changes in aviation organizations. A quantitative research with a survey was conducted in connection to this paper. The survey contained 24 questions regarding the changes to safety management practices in aviation. The survey was sent to targeted relevant participants in 600 aviation organizations and 190 responses were received.

Foundation of the survey was the hypothesis that the application of a change management process would be beneficial to a successful implementation of a Safety Management System in aviation organizations, and the research questions of how successful the implementation of Safety Management Systems in aviation organizations has been and what influence it will have on the implementation of the systems if a change management process is put in place before the system is implemented.

The main conclusions from the research data supports the hypothesis but it became apparent during the research work that deeper studies would be interesting and without doubt beneficial for an implementation process of changes and for aviation management in the organizational setting.
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1.1 General

Perhaps there is nothing at all which goes without changes and the perception of a status quo may just be an illusion, possibly founded deep in our collective motivation through history in our constant need for feeling safe and secure in an ever changing environment.

Nevertheless, changes are an inevitable part of our lives and not only our human lives but our natural, scientific and sociological surroundings. Therefore, items such as infrastructure, material, equipment, organizations and methods do constantly change. People which are now in their middle adulthood and have stayed in the workforce for some years have experienced many changes during their career. The time seems to have passed where careers were fixed and reliable and a person could expect to sit in the same office and the same chair for her lifelong career (Rawson, D. 2012).

The same seems to be true for organizations, the expectations of the market, the vast technical evolution and highly competitive environment has been demanding for organizations in most areas to frequently innovate and adapt to changes.

“If it ain’t broke, don’t fix it!” (Lance, T. B. 1977)

Now, why would somebody want to implement a change? Sometimes there is a clear and cut reason which everyone can understand, be it a clear operational need, a regulatory requirement, or expectation and demand of the market or a financial need often fueled by starvation threatening the organizational success and life.

The question however becomes particularly interesting for the people of various organizations and systems which are believed to be functioning well at the point in time when the management or some other body makes a decision to change.

This thesis examines the various aspects of a change and how change management literature approaches the subject of managing a change within organizations and systems. The paper in particular focuses on recent development concerning safety management, where new requirements for Safety Management Systems (SMS) have been introduced by international bodies, including the International Civil Aviation
Organization (ICAO) and the European Aviation Safety Agency (EASA), to be implemented by the global aviation system.

The aviation system for the purpose of this paper is considered to include variety of civilian organizations of the air transportation industry, such as but not limited to aircraft operators (i.e. airlines), flight training organizations and general aviation operators, air navigation service providers, manufacturing and maintenance organizations, aerodrome operators, ground handling service providers (e.g. fuel handling, de-icing, catering, aircraft cleaning, load control, baggage handling, passenger handling), civil aviation authorities, international associations (e.g. ACI, CANSO, IATA, IFALPA) and selected international organizations (i.e. ICAO, EASA).

There are without doubt many factors which may influence the success of an implementation of a system, such as a Safety Management System (SMS), to the aviation system. The change associated with such an implementation and literature for the management of change will be studied in this context.

This paper is therefore a study of change in relation to the implementation of SMS to the aviation industry, considering implementation of a new management system as a significant change to any organization.

Changes happen for various reasons, they may e.g. be unforeseen and sudden in relation to an event, or they may be originating from a decision made on individual level, by management of an organization, by regulators or it can be a political decision.

However, they come to be, changes do need reaction from individuals, groups and organizations involved, and if possible appropriate preparation should be established before a planned change is originated. Changes affect the culture of individuals, groups and organizations. There are various definitions available for culture, based on different aspects and points of view in the literature and they will be closer examined in the chapters about culture below.

There are several theories and models available that have been introduced for the facilitation of organizational changes.

Changes constantly apply to, and affect the daily routine of individuals, groups and organizations and can be internally driven, for example from wanting to improve efficiency or the performance of processes, or it can be externally driven from the social
or natural environment, stemming from such items as requirements from regulations, customer demands or land use plans and climate changes. Researches have however indicated that implementing changes which in any way affect human life and activity, be it on individual level or the level of groups and organizations, is not too easy to perform. Changes affect people in different ways and tend to provoke emotional responses which commonly cause resistance to a change and higher failure rate of changes (Kotter, 1995; Jashapara, 2004).

The literature contains various approaches to the management of changes, and models which are designed to assist management to facilitate desired changes and increase the possibilities of successfully implementing a change. In the next sections four of the better known scholars with models to the management of change will be discussed including their main principles.

A common understanding of the change management process is that it follows a phased process in stages, often a three phase process such as William Bridges’ model for changes (2009) and the classic Lewin’s 3-Step model for a change (Jashapara, 2004). Both Lewin and Bridges look at the change process as a pre-existing stage, a movement or transition phase and a post stage in which the change has manifested and new sets of processes have been implemented.

J. P. Kotter’s approach to organizational changes includes however eight steps and he maintains that going through all the eight steps in the right order is important to increase the possibility for a successful change (Kotter, 1995).

Likewise, Jeffrey M. Hiatt in his ADKAR model for change sets forth a framework which includes five main elements or objectives which he introduces as building blocks. His approach is based on the assumption that a successful change should be understood at the individual level and therefore the facilitation of a change should be rooted with each person associated with the change. He claims that all these elements must be in place for a change to be realized. (Hiatt, 2006)

1.2 Kurt Lewin’s model for change
A German-American psychologist, Kurt Lewin (1890-1947), a pioneer in management of changes, is well known for his work, theories and influence on social changes including organizational changes. He maintained that facilitating a process of learning might solve
problems associated with the implementation of changes, provide the individual with understanding and re-establish her perception of her social environment. Lewin’s contribution to change management included his work on the Field Theory, Group Dynamics and Action Research on group behavior, and the 3-Step model of change which is often cited as Lewin’s main contribution to changes at the group, societal and organizational levels. These together formed Lewin’s approach to planned changes (Burnes, 2004).

Lewin suggests by his 3-Step model of change that a successful change requires a three step approach involving the steps of unfreezing, moving and refreezing, in order to unlearn former behavior and adopt a new one (Lewin, 1951; Hayes, 2002). The model is furthermore based on dynamics of change, the assumption of the presence of driving and restraining forces which act on the equilibrium for either maintaining the quasi-stationary equilibrium which exists at any given moment or causing it to move as the forces either decrease or increase. These forces, originating in the organizational inner and outer environment, may form among individuals or groups, for example because of mindset of individuals, attitudes, habits or customs which can either act on the driving forces and thereby support the change or the restraining forces which work against the change. “The intention of any manager is to strengthen the driving forces while reducing the influence of restraining forces.” (Jashapara, A. 2004, p. 220)

![Figure 1. Lewin’s Force Field Model](image)

In accordance with Lewin’s theory the management for organizational change should take notice of the three phases for a change and the principle of the forces acting upon the quasi-stationary equilibrium. It should take measures to make use of the forces by
increasing the driving forces but reducing the constraining forces in order to manage the change in the desired direction.

The three phases which Lewin sets forth in his theory (1947) are:

- **Unfreezing**, where present behavior which is stabilized based on a quasi-stationary equilibrium at any given time and supported by a complex field of driving and restraining forces, is loosened, destabilized and unlearnt.

- **Moving**, is characterized by instability and disorder where the adoption to the changes is beginning to take place. New structures, new strategies and different types of behaviors and attitudes are forming and being adopted.

- **Refreezing** occur when the new behaviors are reinforced and become stabilized at a new quasi-stationary equilibrium supported by the driving and restraining forces and become relatively safe from regression. (Burnes 2004; Hayes, 2002; Jashapara, 2004)

![Figure 2. Three phases for changes (Lewin, 1947)](image)

Burnes maintains that although Lewin did for a long time dominate the theory and practice of change management, his approach to change has attracted a major criticism and in particular the 3-Step model (2004).

Schein (1999) considered the 3-Step model, Lewin’s basic change model of unfreezing, moving, and refreezing to be a theoretical foundation upon which change theory could be based. “The key, of course, was to see that human change, whether at the individual or group level, was a profound psychological dynamic process that involved painful unlearning without loss of ego identity and difficult relearning as one cognitively attempted to restructure one’s thoughts, perceptions, feelings, and attitudes.” (Schein, E. H. 1999, p. 59)

Although having received criticism and being in the discussion for decades, Lewin’s theory and in particular the 3-Step model has undeniably influenced the literature and
practice for organizational changes. It may be considered likely that it continues to do so in the foreseeable future within the discipline of change management.

1.3 William Bridges, Transition

William Bridges (1933-2013) presented a model for change management in his 1991 original version of his book: *Managing Transitions. Making the Most of Change.* He emphasizes in relation to his model that the success of a change depends upon the people who is affected by the change: "Changes of any sort – even though they may be justified in economic or technological terms – finally succeed or fail on the basis of whether the people affected do things differently." (Bridges, 2009, p. 5-6)

Bridges uses the word “transition” for a change in line with his model which examines the change process as a three phase transition which follows a timeline from the start of the transition until the end which he actually calls a “New Beginning.” The new beginning appears and the change begins to work when people develop new identity in association with the change, new experience and new energy as they discover the new sense of purpose (Bridges, 2009).

In line with this view of the concept, Bridges looks at the initial phase of the transition process as an end which is characterized by letting go of what was before. He maintains that this is a very personal experience, touching on the very self of the person. People have to let go of what was before, they have to leave before they can arrive at a new way of doing things. In fact, they have to let go of the they way they used to be (Bridges and Mitchell, 2000). He calls this phase, *Ending, Losing, Letting Go.* This is a very important step in the process and must not be overlooked; the people must be helped to overcome their losses:

“Because transition is a process by which people unplug from an old world and plug into a new world, we can say that transition starts with an ending and finishes with a beginning.” (Bridges, 2009, p. 5)

The transition phase in-between the first and the last phase Bridges calls “The Neutral Zone”, it is not a comfortable zone and people like to get out of it. During this time the old is gone but the new isn’t fully in place yet. The neutral zone is a tricky time and can be characterized by a certain state of chaos, although it can at the same time be creative (Bridges, 2009). He gives the Neutral Zone great importance where new
things take place and old habits are avoided and he urges the management to pay
attention to the activities which characterizes the zone: “Successful transition, [...],
requires that an organization and its people spend some time in the neutral zone. This
time in the neutral zone is not wasted, for that is where the creativity and energy of
transition are found and the real transformation takes place.” (Bridges and Mitchell,
2000, p. 2)

People don’t like endings and Bridges gives great importance to the attention which
should be given to the people, the success all depends on the buy-in and how the
people is reassured that they will not be harmed by the change. He advises
management and leaders of a change not to forget the endings and neutral zones.
According to Bridges (2009) changes will not be successful if those important phases are
neglected and an attempt is made to start on the final stage.

People can fail getting through the transition in all three phases. Some will not be
able to make it because they don’t let go of the old ways and fail to make a successful
ending. Others will get lost in the Neutral Zone, and are not able to adapt and take on
new habits. There are even people who after making it through these two initial phases
fail to work by the new methods, cannot find themselves in the new processes (Bridges
and Mitchell, 2000).

Bridges (2009) claims it is of most importance for managers and leaders of changes
to understand where the people is in the transition process. One has to know where
people is going if one is going to lead them. Many failures occur in transition because
the purpose is not clearly enough communicated and the new beginnings are not
managed well enough with encouragement, support and reinforcement.

1.4 J.P. Kotter, eight steps for a change
A former Harvard Business School professor, John P. Kotter, was born 1947 in the USA.
Kotter is known world wide for his publications including researches, studies and
theories on changes and change management within organizations.

Kotter, in his article Leading Change, Why Transformation Efforts Fail (1995) and his
book on the same subject (1996), outlines eight critical success factors for an
organizational change, and he maintains that management and leaders should follow
closely eight steps to changes and that they should be careful not to skip a step, and
they should follow them in the right order. “When managers produce a successful
change of any significance in organizations, the effort is usually a time-consuming and
highly complex eight step process, never a one-two-tree, hit-and-run affair. Managers
who opportunistically skip steps or proceed in the wrong order rarely achieve their
aspirations.” (Kotter, 1999, p. 6)

He discusses the success factors, approaches them by outlining the errors
management and leaders frequently make from the point of view from each success
factor and finally provides a model consisting of the eight steps to transforming an
organization. Kotter (1995) discusses the difference between a manager and a leader
and maintains that organizations frequently have too many managers and too few
leaders to be able to successfully transitioning through a change.

Kotter gives importance to several key factors, mainly the sense of true urgency.
“True urgency focuses on critical issues, not agendas overstuffed with the important
and the trivial.” (Kotter, 2008, p. 6)

Furthermore, however, he focuses on items such as a clear vision, the role of the
change management leadership, the participation of the personnel and the
institutionalization of new approaches. All the eight steps in the model Kotter presents,
are however according to Kotter (1996) important to address fully.
The eight steps in the model are:
1. Establishing a Sense of Urgency

Kotter (1995, 1996 and 2008) gives this item such an importance as to say that although it is not an easy step, successfully establishing a true sense of urgency distinguishes between the winners and those who fail leading a change. It is therefore vital to find urgency for motivation, based for example on crises, potential crises or major opportunities and communicating it to the individuals affected or participating in the change. It is harder to get people on board with a change if there are no crises, and all is good in the operation. “Without motivation, people won’t help, and the effort goes nowhere.” (Kotter, 1995, p. 97)

There are high failure rates in establishing this first step, managers and leaders frequently underestimate how difficult it really is to drive people out of their comfort zone and get them to participate in a change (Kotter, 1995 and 1996). He stresses the importance of leadership over managing and states that: “Phase one in a renewal process typically goes nowhere until enough real leaders are promoted or hired into senior-level jobs.” (Kotter, 1995, p. 97)

2. Forming a powerful Guiding Coalition

A powerful coalition has to be formed. One or two followers convinced that a change is urgent and needs to be driven through are not enough, the coalition must grow and it must include a good portion of key personnel including senior managers, other reputable managers, experts and communicators. This strong and powerful coalition is needed to strengthen the urgency and get the real will to change to sink in, and to overcome the resistance to the change (Kotter, 1995). The leader of the change needs to locate and convince the key personnel to buy-in to the change (Kotter and Rathgeber, 2006). Often the change coalition group forms untraditionally, and functions outside of the normal hierarchy in the organization. This is good and an indication of active leadership on various levels in the organization instead of the conventional hierarchy power structure typically used for managing tasks (Kotter, 1999).

3. Creating a Vision

Kotter (1995) states that in every successful transformation effort a clear vision has been drawn up and communicated to the personnel and all stakeholders. The vision is for longer term and is of importance to help clarifying the direction the organization is
moving into with the change and to create a mindset for the future destination. It has to be appealing to convince people to jump on for the ride. A fragmented vision of the future objectives should be avoided as this will be confusing, rather the vision should include a holistic simplified picture of the future state of affairs. If it is unclear, blurry or fragmented, where the change will take people it is more likely to generate stronger resistance.

4. Communicating the Vision

The vision has to be clear and appealing but that is not enough as if it isn’t communicated to the concerning people all these efforts may be in vain. According to Kotter (1995), after creating a clear vision it has to be communicated in an effective way. By this he explains that it will not be enough to communicate the vision in a single speech or only at some events and venues. This will likely be unsuccessful. Instead the vision should be communicated via multiple channels and in various ways so that the people hear, see, read, talk and in fact experience the communication for the vision, over an extended period of time as well. The behavioural communication is also of importance, bearing in mind that what you do speaks louder than what you say. This is especially true for the actions of the management and leaders. The communication about the change has to include new growth possibilities and some brightness even if the change is a downsizing one. People need to see beyond the short-term sacrifices with a long term goal for improvement.

5. Empowering Others to Act on the Vision

To enable the change process to take place, the people need to be empowered for action. New ideas and risk-taking should be encouraged and non-traditional processes and activities should be experimented. There are always obstacles to changes and more often than not such obstacle is to be found in the resistance of people. This resistance can be very serious and in fact it can easily damage the change process and prevent transformations to take place (Kotter, 1996). Kotter (1995) points out that especially damaging can be managers, often from middle management but also from senior management, who simply do not want the change and work against it either openly or behind the leader’s back. Good ideas frequently get attacked and shot down by all kinds of people, not always for obvious reasons and often the resistance comes from an
unexpected direction (Kotter and Whitehead, 2010). There may be self-interests behind such behaviour or that the person is insecure and fixed in her comfort zone.

It is necessary to remove these obstacles although it may at times be very difficult to do so. Sometimes a person has to go or the obstacle can be removed by making some rearrangements in the organizational structure, be it within departments, divisions or to the larger extent. It is necessary to act and remove the obstacle, whatever it is (Kotter, 1995).

6. Planning for and Creating Short-Term Wins

It is important to set up goals along the transition route. The objectives should be chosen carefully bearing in mind that they are reachable within the time frame selected and that they are likely to create a clear and obvious wins. Short-term wins are indication to the people that the work, the difficulties and the objectives that they are striving for is showing some improvement and gains. They are successful on the path, have reached a target or managed to create something new consistent with the new vision. Short-term wins generate positive atmosphere and enable the change leaders to reinforce the vision and possible make slight adjustments. Good and improving performance reduces disbelief and doubts, reduces resistance (Kotter, 1996). The short-term wins have to be based on real improvement and targets that have actually been reached; the people have to agree that the objective has been reached.

7. Consolidating Improvements and Producing Still More Change

Although celebrating short-term wins is good and necessary for empowering the people and reinforcing the change process, leaders must not fall into the temptation of celebrating full victory too soon (Kotter, 1996). This may backfire badly, the transition may halt or reverse and the useful changes that so far have been implemented may slowly start to disappear. When victory is declared too early, the power in the change efforts is likely to reduce and this allows the dormant resistance to grab its weapons again and work against the change. Often both the initiators for the change and the main resistance forces are causes for a premature declaration of victory: “Ironically, it is often a combination of change initiators and change resistors that create the premature victory celebration.” (Kotter, 1995, p. 102)
8. Institutionalizing New Approaches

The necessity of properly anchoring the change may not be underestimated; this takes time and continuous efforts by the leadership. The gained success after all the work may diminish or vanish if the new approaches are not institutionalized fully within the organization. Here the struggle is to win over the cultural elements which are deep rooted in the organization. The corporate culture is not easily changed and this will take long time even after the main change process is done. People’s behavior may be altered but to become fixed as a norm it must be reinforced in the new culture. The culture may be thought of as the atmosphere within the organization, manifested in the perception of the normal way things are done there. “In the final analysis, change sticks when it becomes “the way we do things around here,” when it seeps into the bloodstream of the corporate body.” (Kotter, 1995, p. 103)

J.P. Kotter is still continuing the work on his theories about the management of change, and he is an active consultant in the field, a teacher and public speaker. He is present and active on the internet, for example on mass media forums, which enables students in the discipline to readily reach his up-to-date writing, theories, suggestions and activities.

1.5 Jeffrey M. Hiatt

A former Engineer and project and program manager working with changes regarding organizational structures and systems, Jeffrey M. Hiatt noticed great difference in how successful changes were within organizations. He became interested in the question of why some changes succeeded while others failed, although it appeared that similar processes, technical solutions and project management methods were put in place. He started to look further into the subject and after a decade of studies and observations he developed his theory and model for changes, the ADKAR model which is based up on one thing primarily: The people. (Prosci, 2017).

Hiatt (2006) maintains that the major element affecting the success of a change is the people involved. His experience and researches indicated that in order to manage a change successfully, the leader had to address the people’s side. Changes affect people; it’s not only a matter of altering and managing processes, infrastructure, equipment or other environment. Somewhat to his surprise, the people affected by the change are
the major influencers on the success of the change and the common theme that Hiatt experienced around project failures was the resistance to a change: “I was surprised to find the most challenging problems dealt with people and not with things.” (Hiatt, 2006, p. 2)

Furthermore, Hiatt discovered that the key to a successful change is not only difficult to pinpoint and address within the project tasks and technical methods managers frequently use to implement a change, it rather lies beyond the visible and busy activities that surround the change: “Successful change, at its core, is rooted in something much simpler: How to facilitate change with one person.” (Hiatt, 2006, p. 2)

This assumption lead Hiatt to develop the ADKAR model, it provides his ideas about how to successfully manage a change down to the level of the individual: “By its nature, ADKAR is an individual change management model. In other words, ADKAR represents the essential elements of change for a single person.” (Hiatt, 2006, p. 43)

The elements of the model Hiatt (2006) describes in detail in the book, in short “ADKAR”, are in accordance to his explanations, arranged so that they fall into the natural order of how one person experiences a change. ADKAR is an abbreviation for these elements: Awareness of the need to change, Desire to support and participate in the change, Knowledge of how to change, Ability to implement required skills and behaviors, and Reinforcement to sustain the change (Hiatt, 2006). Examination of each element further provides the following:

A - Awareness: This element serves to explain to the people why a change has to be made, enhance the understanding of the nature of the change and it provides a risk if a change is not initiated. This element can be considered to establish a sense of urgency for the change if it is compared to the first of Kotter’s eight steps for change (1995). This element also provides information about the external and/or internal drives that created the need for a change, as well as it establishes some knowledge or an answer with the affected persons of the “what is in it for me” question.

D – Desire: The willingness to support the change and to take part in it is regarded in this element. There are many factors which influence the individual’s choice and position towards a change, factors such as an individual’s personal situation and intrinsic motivators that are unique to each person. This element establishes the
coalition for the change if it is compared to Kotter’s eight steps for change (1995) although it is addressed in a different way with more attention on the individual than the group. Individuals are of course part of groups and the organization.

K – *Knowledge*: This element represents the essential knowledge for the people who are participating in the change, the training and education needed and assistance to establish the detailed information about tools, systems, processes, procedures, techniques and the behavioral aspects which follow the implantation of the change. Although this element seems quite related to the element of Desire it is positioned below Desire in the model as people will not be motivated to learn and adapt if it does not have the desire to go along with the change.

A – *Ability*: The realization and the implementation of the change; knowledge is turned into action and this element is indicative of when a person or the group of persons is able to demonstrate the capability to implement the change and to actually work in accordance with the new approaches as foreseen by the planned change project.

R – *Reinforcement*: This element is representing the factors that sustain a change, internal to the person itself and external factors affecting the organization which serve to maintain the established new approaches and anchor them into the very culture of the organization.

Although the ADKAR model has received a lot of attention among students of changes and is recognized as one of the major models in modern change management discussion, there are some critiques of the model. Hiatt’s model is in some ways simpler then Kotter’s eight steps to transition, but at the same time it addresses the more concealed elements of the change process, the personal element. To do this however the model has been criticized for still focusing on processes over people (Hornstein, 2015). Hiatt maintains in his model that the ADKAR elements are the building blocks that should be considered for individual change. His research shows that problems with the “people dimension” of change are the most commonly cited reasons for project failures, but according to Hornstein (2015), the model focuses on processes more than on people and he argues that it fails to consider change to be a complex, systemic phenomenon that involves the interdependence of a multiplicity of variables and that it
fails to highlight the important distinction between individual and organizational changes.
2 The change management process

2.1 General

Changes, as much as we seem to dislike them, are on-going in our lives constantly, they take place in our natural and social environment and they take place in social systems as well, such as in any organization: “Change is, to coin a phrase, the only constant.” (Fisher, J.M. 2008, p. 257)

In fact, changes have become the norm as contradictory as that may seem: “Change, paradoxically, has become an organizational norm.” (Child, J. 2009, p. 277)

Although changes have become so common that they are considered the norm, that doesn’t mean that changes are easy or simple to manage.

Changes are a difficult process and failure rate is high (Kotter, 1996).

“It is not easy to change an organizational norm. There are many barriers to change and many attempts fail.” (Child, J. 2009, p. 278).

There are many reasons for changes in the today’s organization, sometimes many, on-going at the same time. Some common changes include but are not limited to: environment such as regulatory changes, mergers of organizations, renovation, reengineering, refocusing, restructuring, human and organizational development, implementation of management systems such as quality management systems or safety management systems, cost-cutting, downsizing, outsourcing, networking of supply chains and innovation (Child, J. 2009).

Changes occurring within organizations have influences on the present status, they put pressure on the culture within the organization and thereby affect the organizational behaviour and operation, its products and services. The changes may be planned or emergent, large or small, negative or positive, from external sources or internal. However, they come about it is important for the organization to be prepared and if possible to plan for the changes as timely as possible, plan for their management. The first step in preparing for external changes is realizing that changes keep coming and by putting effort into monitoring the external regulatory and market environment.
Intentional changes must be thoroughly thought out and planned for, including the possibility of the best plan failing in which case a contingency plan could be desirable. Change management is a process organizations go through when either changes happen unplanned or a change is planned, it affects the people, the organizational culture, structure and present operational processes and procedures. There are several descriptions and definitions available in the literature for the change management process. A change can be described as a process with input, internal activity and an output. A process described in this simple way has a certain time element within it, from input to output. Fisher (2008) maintains that change is a process with a time dimension but not an isolated event in the “here and now”, therefore he claims it is important in any change management model to take it into consideration, to place the past, the present and the future on the change process timeline. When looking at the change on a timeline like this, it starts to look quite similar to other processes, such as a learning process. A learning process in organizations evolves mostly about locating and correcting errors. Without this consideration it may be more difficult to manage a change effectively (Fisher, 2008; Daft, 2001; Argyris and Schon, 1978). Bridges (2009) has a similar view and recognizes the importance of including the past and the future into the change management process model. Daft (2001) distinguishes between incremental changes and radical changes, where although both are a process along a time scale there is a difference in the time, where the incremental change takes a longer time but the radical change happens quicker, and there is a difference in the type of change as well. The incremental change happens slowly over time and equilibrium is maintained within the organization during the process, while during a radical change the equilibrium of the organization is disturbed and a transformation happens which take the organization onwards to a new level where the past is left behind and new methods adapted.

Furthermore, looking at this timeline of the process described here above and whether the changes are confined to an individual or take place within groups or teams, the change management process within organizations may be considered to be a learning process, where not only individuals learn but an organizational learning takes place. Kim (1993) maintains that theories of individual learning are crucial when trying to understand organizational learning. When organizations learn, and although it can be
argued that in its basics, the learning takes place through the individuals who form the organization in particular while the organization is small, there is a difference in individual and group or organizational learning which emerges when the organization grows and a so called group learning or team learning appears (Jashapara, 2004). Considering the writing from these authors brings up interesting questions about the relationship between changes and learning, and if learning can be connected to changes to some extent. For example, it may be interesting to examine if there is a difference in individual and organizational learning and if so, then to consider if similar effects can be found in relation to changes? Argyris and Schon (1978) examined the paradox they found in comparing individual and organizational learning, and wrote that although organizations contain collection of individuals and no organization are without individuals, organizations are more than merely a collection of individuals. “The importance of individual learning for organizational learning is at once obvious and subtle-obvious because all organizations can learn independent of any specific individual but not independent of all individuals”. (Kim, D. H. 1993, p. 38)

Organizational learning, although taking place through the experience and actions of individuals, can therefore be considered to be different from individual learning. Organizational learning, group or team learning, Senge (1990) sees as the capacity of a group to engage appropriately in dialogue and discussion and to have three main characteristics for effective learning; a) without a dominant individual the ability to collectively think insightfully as a team about complex issues, b) the ability with full consideration of the others in the group to be innovative and coordinated acting as a group with alignment of the team members c) the ability to share practices and skills with other teams within the organization.

Another aspect related to organizational learning are the effects of success and failure on organizational learning. Most people don’t like to fail as failing may hurt, and often people choose a way which they believe to be the most secure path to a success. This is a conservative choice and it is common in organizations, managers avoid failures by choosing not to take a risk but to pursue the traditional ways which have worked in the past. Contrary to these traditional views for failure avoidance, there are scholars who set forth the idea that failures should be viewed as not only a normal part of a
learning process, but as essential prerequisite for effective learning. They maintain that the better results come from learning from failure, from trial and error, from experiments with various outcomes (Sitkin, 1992). These scholars relate creation, innovation and ultimate success to the fact that risk taking and failing in attempts in the pursuit for something new cannot and should not be avoided for it is a necessary part of the road to success. Put in other words, we learn through trial and error. This refers both to individual learning and team learning: “Failure allows organizations to learn through experimentation and making adjustments from their mistakes.” (Jashapara, 2004, p. 65)

It is however not surprising that although the ideas of failures being positive in the learning process there are instances where failure should be avoided and the magnitude and effects of the failure matter. This is how modest failures can be considered the most beneficial, by for example increasing innovation or improving organization’s resilience to adapt to different environments, but major failures should be avoided in order to save the individual or organization from major damages or extermination (Jashapara, 2004). All failures are however useful for learning from them and should be examined for that purpose, even the catastrophic ones where the larger bodies such as domains or industries and other organizations or other individuals benefit in the longer run.

Looking at the change management process in the same light it could be said that some small failures may not be all that catastrophic in the overall process and management should not fear such learning elements within the process in particular where the failure is small and the change is large. When planning for changes there should be some space for correcting the course when small failures occur within the change process. While in the same manner, large failures within the change process should be avoided and dealt with accordingly possibly with a contingency plan. There are several ways a correction can be applied to a learning process and may possibly be affective as well on the change process.

One way of viewing an organizational learning is looking at it as a mental process, a cognitive development in accordance with the cognitive school, the learning being behavioural and cognitive in nature. In order to explain the organizational learning as a
mental process, the concepts of zero, single-loop learning, double-loop learning and triple loop learning can be found in the literature (Argyris and Schon, 1978; Georges, Romme and Van Witteloostuijn, 1999; Hayes and Allinson, 1978; Jashapara 2004; Snell and Chak, 1998). There has been various dichotomy presented in relation to those theories which arrange the levels of learning into some kind of hierarchy from simpler to more matured stage although not all authors agree on the differences between those levels or if they exist at all (Tosey, Visser, and Saunders, 2012). Apart from the zero learning which occurs in an organizational setting where members fail to take corrective action to problems or urgent challenges, the most basic form of learning which takes place in a system is the single-loop learning. A single-loop learning is a behavioural development in the organizational learning setting and is characterized by new responses based on existing interpretations, in fact it can be looked at as “doing things better”, fixing a problem with existing organizational structure, existing processes and procedures (Hayes and Allinson, 1978; Georges, Romme and Van Witteloostuijn, 1999).

In contrast, double-loop learning puts in question the established organizational structure and processes, seeking basis or root causes and new means to solve problems, it is a cognitive development which can be regarded as organizational changes that affect the interpretation of events and development of shared understanding among organizational members (Jashapara, 2004). It can be considered and understood as “doing things differently or doing different things” (Hayes and Allinson, 1978; Georges, Romme and Van Witteloostuijn, 1999).

The triple-loop learning sometimes referred to as the third level of learning in the organizational setting has been suggested, inspired by and originally based on deutero-learning in accordance to Bateson in 1973 and his framework for transformative levels of learning (Tosey, Visser, and Saunders, 2012). In addition to questioning work processes and the basis for tasks, the triple-loop learning theory is based further on the members of the organization, their views and attitudes and collective mindfulness where the members produce new structures and strategies by discovering how members before them have facilitated or inhibited learning (Georges, Romme and Van Witteloostuijn, 1999). The theory of triple-loop learning has however been criticized for lacking theoretical development and support from empirical research, that it is not clear in what way it differs from the other levels of learning and furthermore critics claim that
data is not necessarily supporting that the triple-loop learning is a higher level of learning or has more significance than single or double-loop learning, thereby questioning the hierarchy of the levels. (Tosey, Visser, and Saunders, 2012)

Studying these concepts and theories on learning further in relation to changes within organizations would be interesting and possibly beneficial for managing changes.

2.2 The people

“An organization is a product of “organizing,” namely the process of arranging collective effort so that it achieves an outcome potentially superior to that of individuals acting or working alone.” (Child, 2009, p. 6)

An organization could then furthermore be considered to be made up from the people who belong to it and affect its environment, material, facilities, equipment, processes and procedures.

One of the main elements of a change management process must be to ensure that the desired changes stick and get implemented for the intended future (Kotter, 1996). It will be beneficial to look at the change from the perspective of the people, to consider how the people perceive the change. The change could be viewed as a process and the importance of carefully taking notice of the past, present and future as well as the critical steps that can be followed to increase the likelihood of a successful change appears in most of the change management models. Why does it seem to be such a challenge to get changes to permanently manifest in the organization? The main element that sticks out as a root cause for failed changes, is related to the people and the strongly related elements, how the people perceive the change in a positive or negative way, the culture and the attitude of the affected person(s) (Bridges, 2009; Hiatt, 2006). Negative responses can be a resistance to the change, doubts and concerns, or the expression of other negative feelings about the change. It is important to consider and take notice of both the positive and the negative attitudes of the people, and to expect both and work with both and attempt to reverse the negative feelings for the better (Binney, Wilke and Williams, 2009). The people, their view, culture, attitude, feelings and behaviour is therefore a major element affecting the success of the change process and they furthermore cater for the largest uncertainty of how successful a change will become (Galpin, 1996; Hiatt, 2006; Kotter, 1995; Kotter &
Resistance to change is a major element to be considered and managed during a change, but in fact the reasons why people resist to organizational changes are reasonably clear and although not easy to deal with, the resistance is predictable (Child, J. 2009; Kotter, 1996). The management of change is centered around adapting the attitude of the personnel and the behaviour as well as the organizational culture in order to support the changes which are being implemented on the role, policy, organization, procedures and systems within the organization, and in order to reach enduring changes and measurable results (Þorkell Sigurlaugsson, 1996). In this light the change process could be considered to act similar to a learning process where the individuals, all affected individuals but particularly those who are within the organization are the main actors affecting the success of the change.

2.2.1 Personnel

Any management desiring to implement a change must take care of its personnel throughout the change process (Bridges, 2009; Hiatt, 2006). The personnel are of utter importance to the success of the change, and the main challenge of the management is to convince the personnel and get them to buy-in on the change. When looking into the literature there appears many reasons why the people are so important element during a change process, this simply cannot be overlooked if there is to be the slightest chance of success:

The existing organizational environment and arrangements are not only about allocating responsibility and accountability for the work. An organization involves structures that determine the distribution of power and reward among its members. The people who have vested interests in maintaining their organizational privileges as managers or professional specialists would be irrational not to defend them. An established organization is also a familiar working environment, to which people have adjusted and which they often wish to maintain. Change constitutes a disturbance that can have serious psychological ramifications. Considerations such as these can provoke a negative reaction to change and explain why fundamental change initiatives so often fail. (Child, J. 2009, p. 278)

The personnel tend to resist changes due to many reasons, but the strongest resistance is probably based on insecurity about how the individual will fare after the change has been implemented, will she still have her position, will her working
circumstances and environment be the same or can she expect some changes which will not be positive. Will she lose her job, her office, her chair or her workmates? Any threat to the status-quo, to the present comfort and security the person is used to is likely to result in a resistance to the change. Therefore, it is very important to put a lot of work into assisting the personnel to accept and support the change. One way that has proven useful in some circumstances is to involve the personnel fully or as fully as possible into the change process right from the planning stage and all through the change and if possible to give the personnel active role in the planning and in the execution of the change with the aim to make them own the change as much as possible. With ownership of the change, there comes better possibility for acceptance of the change. Even if it is successful to get the personnel to buy-in to the change, it must not be forgotten that each individual needs care and assistance along the way (Bridges 2009; Hiatt 2006). A frequent reassurance of the person’s position throughout and after the change is necessary. The change is a process which starts with a closure of the old way of doing things, the individual should be assisted in the process of mourning and letting go before new habits can be re-enforced successfully (Bridges, 2009).

2.2.2 Management

It is very important that the management which wants to implement a change has appropriate knowledge about change management. It should not be attempted to do changes without considering the fundamentals of change management theories, that is if a successful change is desired. Change management theories may not all be in line with each other, but when read and studied a certain pattern will appear which is likely to become of assistance to managers leading changes. Another approach in case it may be fitting the task, could be to adapt one or few theories and follow them as closely as possible. There are step-by-step methods available that can be followed and well written considerations listed out to take care off.

Too many changes have failed and the statistics show that the failure rate of changes which are unprepared, not sufficiently prepared or wrongly prepared is very high (Kotter, 1996). It is therefore important to consider the management carefully beforehand, which is supposed to manage the changes, to determine if the manager or management team is able and if the knowledge and ability is not present in the
management team, it could be considered to add persons to the management team with more appropriate knowledge and experience and with the particular task of managing the changes. It may be better to withhold the change for some time while everything is prepared properly rather than rushing into changing without the proper ability.

2.2.2.1 Managers

Not only is it important when changes are prepared, to look closely at the management team participating in the change or affected by the change, it should be considered to work thoroughly with the managers as individuals as well, to prepare them for their role in the change or during the change and to get them to buy-in to the changes. This is important for all levels of management, the senior management, the middle management and all managers. It is also important to seek out leaders and opinion makers in the organization that may not be holding a management position and get them to buy-in on the change. These are key individuals in the organization.

Not all managers should be expected to be in on the change, even if they may appear to be. Middle managers may sometimes be fearful of changes, that on a later stage the change might affect their position, delayering or reorganization might affect them (Child, J. 2009). The reason is simply that managers are also personnel and they may not be convinced that the change is good. They may have fear of their status as well as other staff. Their jobs, their comforts or possibly privileges may be perceived threatened or simply they may be uncomfortable with the change because of new things to learn, new ways of doing things and new expectations from the organization (Kotter, 1996). If the managers who are part of the management team have not bought into the change, the chances of their staff successfully going through the change process are diminished considerably. The buy-in of managers is considered a necessary foundation to any change within an organization. First of course is the commitment of senior management, but the whole management team has to be on board and they have to be there whole hearted, not only on the outside. It is well known that managers pretend to support a change but in fact they do not and work against the change behind the back of other managers (Kotter, 1996).
If a resistance is not possible to overcome, sometimes management has to take the decision to remove the obstacle (Kotter, 1996).

Another important factor which determines a success for a change is how the managers manage the personnel. Do they manage with an authoritative method, giving orders and expecting the staff to follow without questions? Is the manager “the boss” who decides and gives orders single handed? Does she manage from the outside, applying her management actions to the process and the people? Such management styles are not likely to benefit the intention to implement a change (Kotter, 1996).

2.2.2.2 Leaders

“How do you encourage others to behave differently – particularly when it seems they have good reasons not to change?” (Binney, Wilke and Williams, 2009, p. 221). Considering the high rate of failure, this question is likely to be asked a lot by frustrated managers attempting to lead a change in the modern organization.

There seem to be several things to consider when speculating about how this question is best answered and, what is more important, what can be done to maximise the outcome to be beneficial for the change.

Does the manager control or does she lead? Rather than the authoritative management styles mentioned above in paragraph 2.2.2.1 another style may be considered desirable to increase the possibility of successful implementation of a change. It could be beneficial to adopt management styles which promote leadership over control (Kotter, 1995).

First and foremost, changes can be considered to evolve around and effect people (Bridges, 2009; Hiatt, 2006) and therefore managers intending to implement a change should put the people at the core of their planning. Managers (leaders) who want to be successful in leading changes could furthermore consider closely the differences in the terms “management” and “leadership”. Leaders should be considered as part of the organization and to succeed they must connect to the people and they must focus on the people around them, and although personality traits matter somewhat, they rather have to be playing a role that suits them and they need to be a part of the process, to come alive in the moment, to be fully present with others to be more likely to lead that change successfully. Instead of managing mostly detached from the outside, the leader
positions herself amongst her people, becomes part of the process and she changes herself. This has been shown to be one of key actions of successful change leaders according to a 4-year research by Binney, Wilke and Williams (2009). For “…”. Leadership is not then about knowing the answer and inspiring others to follow. It is about participating and leading from within. It is the capacity to release the collective intelligence and insight of groups and organisations”. (Binney, Wilke and Williams, 2009). It is not a coincidence that major thinkers in the change management and leadership disciplines frequently use the leadership term in relation to change management, management styles seem to have considerable affect on the success of change implementation (Kotter, 1995; Binney, Wilke and Williams, 2009).

Another important factor which came out of the research of Binney, Wilke and Williams (2009) was the attention to the continuity, that is leaders sometimes seem to fall into the trap of concentrating on changes and forgetting the day-to-day business that needs attention on daily basis. While driving the change is important and a goal to be reached, the daily continuity also needs leadership and management. Knowledge and experience also has to be looked after, and valued during changes. Sometimes vital knowledge and experience is retired during a change or simply walks out the door, and markets, products or processes may be lost before anyone notices it. So, staying on guard and managing the day-to-day processes are of equal importance as leading the change. Putting too much effort into the change furthermore can risk that people experience that the leader is rejecting all that has been done before, they may feel she is disrespecting the past and that is not likely to be well received. A change leader should therefore show respect and appreciation to the past and the present in order to gain trust and be able to communicate convincingly the need to change in the future.

A third important element that appeared during the research has to do with how the change leader worked with the negative. The way the leader handles the resistance to change and other negative feelings about the change. The leader must overcome the temptation to tolerate only positive views. On the other hand, she should do her best to tolerate and find value in all expressions of doubts and concerns and work with them in attempt to reverse that energy into positive energy to drive the change. Binney, Wilke and Williams (2009) therefore suggest (p. 225-226) that leaders work with the negative
and use positive thinking. They suggest some ways to ease that process and they remind that it is worth the effort to get a sincere support rather than false support, but often managers and personnel comply but become secretly resentful. They emphasise that a change starts with “you”, and that compliance is not a change.

2.2.3 Groups and teams

It cannot be expected that anyone can implement an organizational change single handed and all by her lonesome in the sense that the leader cannot make the change happen by herself, she needs to convince and persuade others to buy into the idea and accept the change. Unless the organization is composed of very few persons, this is the real challenge. One of the first important tasks when planning for a change is to define the management team that will need to participate in the change or which is in any way affected by the change. The management often consist of senior management which of course is vital for anything to happen, if the senior management is not on board the chances of the change being successful is considerably diminished. Then there are the middle managers, often people with considerable power and virtue within the organization, these individuals are very critical to get on board as if they don’t they are likely to resist the change at least secretly and may easily undermine efforts for the change to succeed. Important people in the organization are leaders and opinion makers who may not be members of the management at all. It is strategically important to locate those individuals and worth the time and effort to invest in their buy-in by all means.

The management team may be considered the most important team to believe in and buy into the change right from the start, best when the change is on the pre-design stage. When the management team is ready it is desirable to attempt to enlarging the team, at least to enlarging the group of people who buy into the change. More teams can be established and they can be in the form of groups, such as project groups, task forces or groups who study or work with certain aspects related to the change. This way the people in the groups may get a better sense or feeling of belonging and they may get some feeling of ownership of the change. It is important to consider that the groups and teams are made up of individuals and when it comes down to it, all changes have to
be accepted and executed by the individuals who belong to the organization affected by the change (Bridges, 2009; Hiatt, 2006).

2.2.4 Special roles

Someone will carry the burden of managing the change when it is considered beneficial to change. This may often be the executive director of an organization or somebody else from the senior management level, depending on the nature and extent of the change. Sometimes it may be considered better or even necessary to get assistance from outside of the organization, possibly a consultant or another organization which specializes in management of changes.

2.2.4.1 Change managers

Change managers can be internal from the organization or external. Their main task is to plan for and organize a change process, to manage or lead the change as it is implemented into the existing organizational structure, its processes and procedures. The main challenge of change managers remains the same, that is to work with the people of the organization, design the change, plan for it and implement it. The person chosen to lead a change should be familiar with the basic theories of change management and be considered suitable for communicating the change to the change agents, decision makers and not the least, the opinion makers within the organization. It is important of course that the change management leader herself believes in the change, believes that it is beneficial and that she positions herself in the midst of the change and leads from within and not from without (Binney, Wilke and Williams, 2009).

2.2.4.2 Project managers

Change management and project management connect in some ways and sometimes the management of change is allocated to project managers which are selected either from within or hired from outside the organization. Project managers then become the individuals who lead change, sometimes called agents of change. In fact, they become the change managers, and take on the role of leading the change (Kendra, K.A. and Taplin, L.J., 2004). The discipline of project management is in many cases different however from a change management task in essence particularly in regard to organizational changes, and a project manager’s view a bit unlike the view of best fit leader for changes as she is described in much of the literature (Binney, et.al.,
Project management is centered around a particular project, with design, planning and work stages which are logically calculated and positioned on a timeline. “A Project is a complex, nonroutine, one-time effort limited by time, budget, resources, and performance specifications designed to meet customer needs.” (Gray, C. F. and Larson, E. W., 2008)

In many instances this description of the project will suit well for describing or defining a change management task, however this is not at all universal. Kendra and Taplin (2004) identify knowledge, skills, and competencies that they find common to practitioners and project managers in regards to organizational development and changes. They introduce 6 principles or competencies in this context and introduce their importance in developing professional project managers as effective agents of change. These are: communication, teamwork, process management, leadership, training, and continuous learning.

There are many variations of changes and a change may of course in certain circumstances be set up as a project and it may be appropriate, and in some cases a project manager will be well suitable for managing a change. Regarding the typical organizational changes, this may however not the best solution. Lets not forget that according to the literature, organizational changes are about people, they evolve around people and affect people (Bridges, 2009; Hiatt, 2006). Their success is based on the people element and deal as much or even more with the software of the human mind, feelings, psychological processes and other such elements as the material ones. While it is important to plot out as precisely as possible the timeline and materials of changes and the stages for implementation of each segment, the human factor has proven to be of vital importance for a success of a change in the organizational setting. Therefore, it may be considered that there may not always be a full correlation between a good project manager and a successful leader of a change.

2.2.4.3 Consultants

The use of consultancies external to the organization has in recent years become more popular and quite common even in regards to organizational changes. While some authors view the consultant as a skilled practitioner and her processes as professional expertise and best practices, critical view has certainly been introduced. Benefits have
among other things been attributed to the external view and expertise compiled from experience and knowledge gained by the consultant as she is able to concentrate on certain issues and tasks. This can be considered as a great source of expertise for managers in need of assistance with their processes and in need of help. The relationship between the consultant and the needing manager is considered most important and has been described as a practitioner’s-patient relationship in clinical theories of intervention and group theories. The exercise of the consulting is then considered to take place in a sort of psychiatric setting, where managers are expected to submit to diagnoses (Schein, 1988 and Argyris, 1970). Such views are positive for consultancies and concentrate on the effectiveness of the consultancy intervention and assist consultancies in selling their ideas and solutions to the managers who are the clients (Fincham, R. 1999).

Critical views on the other hand bring up the image of the consultancy as a knowledge industry that is trying to sell itself to their clients which in this case are the management of the organizations:

Critical research has seen in the rationalist aura of consultancy a system of strategies designed to build images of its own expertise in order to legitimize this to clients. An alternative radical structural perspective brings into focus the limitations of consultants’ socio-political skills, and views with suspicion any notion that knowledge sites like consultancies could be the creators of new dependencies. (Fincham, R. 1999, p. 349)

Taking notice of the literature, it might be considered that consultancy may therefore be one of the tools or possibilities that management can turn to when they need to consider best solutions for implementing a change which affects an organization. Possibly consultancies should be considered merely as an aid to frustrated managers who have to deal with ever changing organizational processes due to changes in the environment, or internal processes driven by the market or other forces, be it reengineering, reorganizing, delayering or something else. At the end of the day, the senior management of an organization is responsible and accountable for the results. Management should however bear in mind the limitations of the consultancy as it is an external process applied to the internal processes of the organization and may lack in various ways the appropriate knowledge and experience to deal with forces or
situations within a particular organization. Another thing to take notice of is that when processes are outsourced, they might become alien to the internal management and personnel and the organization may become dependent upon the consultancy if the management runs into difficulties to take-over after the consultancy leaves and to make the consultancies work their own, in a way that is necessary to continue the process.

2.3 Culture

The subject of culture is vast and the varieties of culture and cultural effects are many. This paper centers around changes in the aviation system, the changes that follow the introduction and implementation of Safety Management Systems (SMS) in aviation and therefore the text in the following chapters relate in many cases directly to aviation. Culture plays a central role in all changes, the text in this chapter will be more related to aviation and those changes.

There is not a one universally accepted definition available for culture. The meaning and complexity of the term is wide ranging from national cultures, to organizational and professional cultures, to group cultures, cultures of generations and family culture to name just a few, and in fact a single simple definition which fits all this variety may not be necessary and might limit the ideas of cultures. But what is a culture? When the history of the conceptualization and measurement of culture is examined, it becomes apparent that there are different views and contradictory scholar opinions about which values, beliefs and norms are considered representative of the concept of culture (Straub, D., Loch, K., Evaristo, R., Karahanna, E., and Srite, M., 2002).

Still, there are some common factors that should usually be present in cultures, such as beliefs and values. Culture can therefore be, and has been, viewed from various angles and it should be so, and it has been defined in many ways and some of them will be examined a bit further here below.

ICAO definition from Doc. 9859 on organizational safety culture states that: “Culture is characterized by the beliefs, values, biases and their resultant behavior that are shared by members of a society, group or organization.” (2013, p. 2-10)

Culture is a very strong phenomenon and it is persistent within individuals, groups and organizations alike. Everyone in human societies is affected by culture.
Culture is not easy to change (Kotter, 1995), and this is also the case regarding changes in the organizational setting which is strongly affected by cultural aspects associated with various mental, emotional and behavioral traits of the people, the individuals which are affected by the change. People is affected by cultures in various ways. Straub, et.al. (2002) explored culture in light of the social identity theory (SIT), which suggests that each individual is influenced by several cultures and sub-cultures, some ethnic, majority, minority or other groups, some national and some professional and organizational. The list goes on.

Culture not only takes effort and long time to alter, it has also been found to be an element of a strong force, affecting changes and complicating intentions to implement changes and may in fact cause enormous resistance to a change, if not properly planned for and managed. Changes therefore in most cases act upon the deep rooted cultures and they have to sink in deeply if they are to succeed to affect the culture and change it. Such a process can be time consuming and can easily take five to ten years (Kotter, 1995). Management should take notice of these elements before attempting to originate a change within their organization.

Sub-cultures affect the overall culture of an individual, of organizations and of whole domains and industries. ICAO maintains in Document 9859 (2013) that the three most influential cultural components on safety management are organizational, professional and national cultures. Undoubtedly there are more and they collectively make the change of implementing new thought, systems and methods into managing safety a challenge to achieve, including the time which often turns out to be much longer than expected.

In case of the implementation of safety management systems (SMS) in the aviation industry including the aviation authorities, it can be fair to assume that 10 years is not even long enough, the struggle has been on-going for at least 15 years and this “new” approach to safety management is not even close to be fully implemented, up and functioning appropriately within the industry.

2.3.1 National Culture

“National culture differentiates the characteristics of particular nations, including the role of the individual within society, the manner in which authority is distributed, and
national priorities with respect to resources, accountabilities, morality, objectives and different legal systems.” (ICAO Doc. 9859, 2013, p. 2-12)

National culture has strong influence on other cultures, for example Reason (1997) maintains that every organizational culture is shaped by the national context in which it exists. The same way national culture would influence professional cultures somewhat and it would affect safety culture.

As part of mental programs which consist of values and culture in people in general, Geert Hofstede (1984, p. 13) simply defines culture as “…collective programming of the mind.” He uses the term for describing whole societies but uses the term “sub-culture” for cultures of smaller groups within societies. “Mental programs can be found at the universal, the collective, and the individual level.” (Hofstede, 1984, p. 13)

Most people belong to many cultures, as members of a family, of generations, of an area, clubs, professions, industries, organizations to name a few “groups” which have their own cultures, and not the least a particular nation. Of course nations have changed throughout time and are constantly changing or evolving. Sometimes more than one nation lives within an area with common borders although borders do not define a nation in itself. Borders have often been moved, but most of us have the certainty in mind that we belong to a particular nation. This feeling which is a cultural feeling is sometimes enforced by governments and politicians which desire to unite the people for a purpose or their own agenda. By acting upon this feeling leaders can have the people of a nation get the strong sense of belonging. The effects of extreme nationalism are well known throughout history and the potential consequences when this flammable cultural effect is used by populists, dictators and demagogues and evolves into the madness of prosecution of minorities and wars.

National culture is deep rooted like other cultures or other aspects of a culture and this has to be considered when changes come about, when something different or something new is introduced, be it new technology or different methods for conducting activities. A desire for a change is usually a desire to alter a cultural aspect and in line with that it might be assumed that when management is introducing a change in safety procedures within an organization, it is in fact asking for a change in culture.
From a safety management perspective, national culture plays a large part in
determining the nature and scope of regulatory enforcement policies, including the
relationship between regulatory authority personnel and industry personnel, and
the extent to which safety-related information is protected. National culture forms
an intrinsic component of personal beliefs that inherently shapes the safety
perspectives of individuals prior to their membership within an organization.
Organizational culture may therefore be significantly affected by the national
cultures present among the members of its workforce. (ICAO, Doc. 9859, 2013, p. 2-12)

2.3.2 Professional culture

A professional culture or an industry culture is made up of the cultural components
belonging to a profession or to an industry:

Professional culture differentiates the characteristics of particular professional groups
(i.e. the characteristic behaviour of pilots vis-à-vis that of air traffic controllers, civil
aviation authority personnel or maintenance engineers). Through personnel
selection, education, training, on-the-job experience and peer pressure, etc.,
professionals tend to adopt the value system and develop behaviour patterns
consistent with their peers or predecessors. An effective professional culture
reflects the ability of professional groups to differentiate between safety
performance issues and contractual or industrial issues. A healthy professional
culture may be characterized as the ability for all professional groups within the
organization to collaboratively address safety performance issues. (ICAO, Document
9859, 2013, p. 2-10)

2.3.3 Organizational culture

“Whereas national cultures arise largely out of shared values, organizational cultures
are shaped mainly by shared practices.” (Reason, J. 1997, p. 192)

The patterns and common notion of “how we do things around here” can be
understood as referring to the organizational or corporate culture of an organization
(Binney, et.al., 2009).

Organizational culture can be considered to consist of the beliefs, values,
assumptions and attitudes which are deep rooted among the personnel and the
structure, processes and procedures within an organization (Kotter, 1995; Jashapara,
2004). Individuals make up the organization, the group of people who manage and work
for the organization and therefore the culture is in some way based on the sum of the
individuals which belong to the organization.

According to ICAO Document 9859 (2013) organizational culture refers to the
characteristics and safety perceptions among members interacting within a particular
entity. Organizational value systems include prioritization or balancing policies covering areas such as productivity versus quality, safety versus efficiency, financial versus technical, professional versus academic, and enforcement versus corrective action.

Organizational culture has the potential to affect interactions between senior and junior members of a group, interactions between industry and regulatory authority personnel, the degree to which information is shared internally and with the regulatory authorities, the prevalence of teamwork in the regulatory authority or industry organization, reactions of personnel under demanding operational conditions, the acceptance and utilization of particular technologies and the tendency to take punitive measures in reaction to operational errors within a product or service provider or by the regulatory authorities.

Organizational culture is also affected by factors such as business policies and procedures, supervisory behaviour and practices, safety improvement goals as well as minimum tolerance levels, management’s attitude toward quality or safety issues, employee training and motivation, the relationship between the regulatory authorities and product and service providers, policies on work/life balance.

The way in which management deals with day-to-day safety issues is also fundamental to improving organizational culture. Collaborative interaction between front-line personnel and their safety and quality counterparts, as well as the representatives of the regulatory authority, is indicative of a positive organizational culture. This relationship should be characterized by professional courtesy, while maintaining respective roles as necessary to ensure objectivity or accountability (ICAO Doc. 9859, 2013).

2.3.4 Safety culture

A safety culture encompasses the commonly held perceptions and beliefs of an organization’s members pertaining to the public’s safety and can be a determinant of the behaviour of the members. A healthy safety culture is an informed culture, it relies on a high degree of mutual trust and respect between personnel and management and must therefore be created and supported at the senior management level (Reason, 1997). A healthy safety culture is furthermore a learning culture; it actively seeks improvements including safety improvements of systems. Such organizations’ safety
culture remains aware of hazards and utilizes systems and tools for continuous monitoring, analysis and investigation. It is important that safety culture is present in the whole aviation system within a State, in State aviation organizations and other public aviation organizations as well as in product manufacturing and service provider organizations. Other characteristics of a healthy safety culture include a shared commitment by personnel and management to personal safety responsibilities, confidence in the safety system, and a documented set of rules and policies. The ultimate responsibility and accountability for the establishment and adherence to sound safety practices rests with the management of the organization, and in particular the senior management. A safety culture has to be deep rooted in the organization and it cannot be effective unless it is embedded within an organization’s own culture (ICAO Doc. 9859, 2013).

2.3.4.1 Just culture

Following challenges in the implementation of changes that have been considered desirable for safer operation in the aviation industry over the last decade increased attention has been given to the way blame is attributed to individual personnel following incidents and accidents within organizations. Aviation and health care are two major industries which have been dealing with blame and even criminalization of human error. Attribution of blame in those industries where critical and precise safety procedures have to be followed in the operation and risk is sometimes considerable does not make it easier to implement desired changes to the safety management methods within the industries organizations. One of the necessary factors of a functioning safety management system is the safety reporting and it is also a good measurement of the status of the functioning of an SMS and the safety culture within an organization. The purpose of safety reporting is to bring out in the open faults in a system, faults that often are latent and underlying causes for incidents or accidents, to bring it to the attention of people who can do something about the problem and install improvements and defences. Implementation of safety management systems where safety reporting is an essential element has turned out to be difficult as while wanting everything in the open, but not tolerating everything is not a very convincing way to get

Initially when the blame culture was to be addressed and corrected the so called blame-free or no-blame culture was introduced. It meant that there would be no consequences what-so-ever for faults and for reporting occurrences or safety concerns. It quickly became apparent that this would not serve as an acceptable model to the industry, regulators and other authorities. “An effective reporting culture depends, in turn, on how the organization handles blame and punishment. A “no-blame” culture is neither feasible nor desirable.” (Reason, 1997, p. 195)

Under the no-blame policy, even willful acts, substance abuse or gross negligence would not be punishable. According to Reason (1997) this could be seen to oppose natural justice, might lack credibility in the eyes of the workforce and was furthermore not possible to implement in many States because of the pre-established national legal systems.

To correct this a certain line was introduced, a line that would be drawn somewhere between an honest mistake and a willful act or negligence, a legitimate reason and an illegitimate behaviour. This changed the no-blame policy into what is now called a just culture policy.

Just culture is generally assumed to be an essential element of a modern SMS where continuous improvements in safety are desired (Dekker, 2012; European Commission, 2014; ICAO Doc. 9859, 2013; and Stolzer, et.al., 2008). Where just culture is properly implemented the personnel can differentiate between acceptable and unacceptable acts (Dekker, 2012). According to Reason (1997, p. 195) just culture fosters: “... an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information – but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.”

The just culture and its principles have recently appeared in ICAO material (Doc. 9859, 2013) and in various national regulations which are written to comply with the Standards And Recommended Practices (SARPs) of ICAO. As an example of the just culture and the line drawn between the acceptable and unacceptable behaviour, the following guidance material paragraph is extracted from a suggestion for a text in a
template for a safety policy from the European Commission Regulation of Aerodromes, (EU) No. 139/2014 (GM1 ADR.OR.D.005(b)(2) - p. 110):

The safety policy should actively encourage effective safety reporting and, by defining the line between acceptable performance (often unintended errors) and unacceptable performance (such as negligence, recklessness, violations, or sabotage), provide fair protection to reporters.

This regulation is presently applicable in 32 Member States of the EU and EFTA.

Just culture policy supports the objectives of an SMS which is implemented in order to improve safety in the operation: “If the just culture component of the SMS is presented correctly, the harried front-line managers should find that the SMS supports their need for appropriate behavior ...” (Stolzer, et.al. 2008, p. 257)

2.4 Back to changes

2.4.1 General

It was important to look briefly at processes and systems within organization and some of the various types of cultures which affect the management of changes. Those aspects affect changes such as the implementation of management systems in organizations and operation.

This paper is written with the intention to examine the change associated with the implementation of a SMS mainly, which is now required for most domains of the ever growing and evolving industry of air transportation. The following few paragraphs concentrate on the aviation environment and the changes associated with introducing a regulatory requirement for the implementation of management systems to a whole industry.

In the context of aviation, ICAO has defined in the following way the change management process which appears in the ICAO SMS Framework for SMS (ICAO Annex 19, 2013):

“Change management. A formal process to manage changes within an organization in a systematic manner, so that changes which may impact identified hazards and risk mitigation strategies are accounted for, before the implementation of such changes.” (ICAO, Doc. 9859, 2013. p. (xii))
2.4.2 Successful change

Now, what is a successful change? What time should it take before the change is fully implemented and finalized? Is it a successful change that first was initiated by standards and regulations in 2001 and is still only at best partly implemented into organizations and operations, more than 15 years later?

There is not single correct answer to these questions, but they certainly do become interesting and relevant when such a long time passes and the path to finish still looks mountainous ahead. It has to be noted though that the ICAO provisions have been evolving constantly from 2001 as new SARPs have been made and they have been applied to more domains than initially. However, when examining closely at the domains of air traffic services and aerodromes it is a common finding that the SMS is not fully implemented or not sufficiently active in the operation. Those are the domains which received the first SARPs in 2001 and have in most cases had directly applicable regulatory requirement for SMS most of this time.

ICAO published the first SARPs on safety management in 2001 (ICAO, 2017). The timeline for the introduction of the concerning SARPs from ICAO shows that the first were applicable to certified aerodromes and air traffic service providers in 2001, followed by air operators in 2006 and maintenance organizations in 2009. Training organizations followed in 2010 and some provisions for General aviation. First SARPs for Aircraft design and manufacturing organizations were applicable in 2013 (ICAO, 2017. Timeline for SMS SARPs)

2.4.2.1 Magnitude of change

In light of the questions above it seems rational to consider the size or magnitude of a change and how radical it is when the success of implementation is examined (Child, 2009). When there even turn out to be challenges to implement relatively small changes into organizations or processes even with some preparation and a plan, it doesn’t seem all to surprising that a regulatory requirement for a radical change to major organizational processes and systems applied to a whole industry may not go smooth and quickly. Such changes are certainly going to affect organizational culture and the individuals who belong to the organization resulting in resistance to the change (Bridges
2009; Hiatt 2006). Such changes are furthermore not likely to be successful unless a thorough change management process is planned for the change (Kotter 1995).

2.4.2.2 Type of change

A fair question would also be whether it matters what kind of change is being implemented? Do the same principles apply for changes in what could described with a metaphor and called hardware; i.e. infrastructure, equipment and material, as would for changes affecting more directly what could be called software of an operation; i.e. the people, organization or methods? In the aviation industry mainly two kinds of change management have evolved. This division is not formal and most likely more or less unintentional as it is not to be found in the ICAO SARPs (ICAO Annex 19, 2013 and; ICAO Document 9859, 2013). Those two variations of change management handling are in many ways similar but there is still a difference. The first kind are changes in relation to hardware mainly, such as changes in the infrastructure for example at an aerodrome, or in aerodrome or air traffic services equipment or closed functional systems. This kind of change is as all changes within an aviation organization managed with the so called change management process of the SMS. The change management process is a part of the SMS and involves identifying changes which affect safety and by default such identified changes should be referred to the safety risk management process of the SMS which consists of hazard identification, risk assessment and mitigation measures, see Figures 4 and 5 showing processes from the SMS framework in ICAO Annex 19 (2013). There are slight variations in the procedures of the change management process between aviation domains and there is some difference in how the SARPs are implemented into regulations in Member States (ICAO Annex 19, 2013, ICAO Doc. 9859, 2013; ICAO Doc. 9981, 2016 and; Regulation (EC) No 216/2008).
Figure 4. The Management of change in accordance with the ICAO SMS Framework in ICAO Annex 19 - An identified change should be referred to the Safety Risk Management process

Figure 5. An example of a Safety Assessment designed in accordance with the Safety Risk Management Process of the ICAO SMS Framework from ICAO Annex 19

The other form of change has to do with the software items such as the organizational structure and changes in processes and procedures. Those are organizational changes which often have stronger cultural or personal aspects relating to them and therefore may be a bit trickier to change successfully. They have more to do with the people’s aspect in the organization which in accordance to Hiatt (2006) and Bridges (2009) is a dimension that should not be overlooked. Of course changes in equipment and infrastructure have to be worked with and managed, for example if new computers are brought into the offices. This costs some inconvenience and calls for
personnel training and new habits and possibly new or altered procedures. Same has to do with building and opening a new runway or a taxiway on an aerodrome. Aerodrome personnel, air traffic controllers and pilots have to become aware of the new infrastructure and apply new or altered procedures etc. This costs additional training and some change of behaviour, it can even involve some attitude issues. Such issues however seem to be more common and more difficult to manage in the case of changes to organization or operation, for example if the fire department and the maintenance department on an aerodrome are merged. Same goes for changes in facilities if people connect their status to it, if it touches on their ego or what Bridges (2009) calls the very self of the person. For example, if a person is moved from private office to a common office space this is critical in light of change management. Such a change is not likely to be easy to manage, not for the person affected and not for the management.

The type of change is therefore likely to affect how well the change is going to be received by the people affected by the change. If it is not touching on the “very self” of the person or deep rooted cultural aspect, it might be easier to manage (Bridges, 2009).

The ICAO SMS Framework presents the model for change management which is described above and shown in Figures 4 and 5. When the model is compared to the models of Kotter and Bridges it can be seen that there is a difference. Firstly, Kotter’s eight steps to change (1995) are not to be found in the ICAO SMS framework although they could be voluntarily involved if the will and knowledge is in place with the personnel conducting the change management process. Any of the elements from the transition model Bridges presents (2009) cannot either be found in the ICAO SMS framework. Neither of these known models from the change management literature is to be found in the framework nor in any of the ICAO guidance material and therefore not generally in the training material and training courses provided by various entities on the subject. When looking at the ICAO provisions and guidance material it becomes a question if enough appropriate guidance material and training for the implementation of SMS has been provided? In the case of the parts of the SMS framework which touches on change management there is little to be found that connects to the literature of the change management discipline.
2.5 The Aviation System

2.5.1 General

Operations in the aviation industry are vast and complex. It can at minimum be considered to directly contain aircraft operators, flight training organizations, air navigation service providers, aerodrome operators, maintenance organizations, and manufacturers. The national aviation authorities have a specific role, in essence to approve and oversee organizations to ensure compliance to the applicable safety standards. International associations and international organizations can as well be considered a part of the industry. Each of these elements of the industry mentioned contain many sub-elements but in whole they form the “total aviation system” which is a concept that can be used to explain the system considering the interactions between the entities and interfacing of processes, and to attempt to develop a safer system in aviation. The concept of “total aviation system” has been used by industry speakers and organizations such as ICAO and EASA (Skybrary, 2014). Total systems theories have influenced the aviation sector and in particular in the development and application of safety management methods with the total aviation system approach. All the domains of the aviation industry interact in various ways in the operation and form the aviation system as a whole, or what can as well be called the total aviation system which is really a system of multiple interacting systems (Bo, B. 2007).

This aviation system consists of infrastructure, equipment, people, methods and environment. Back to the metaphor; some of the constituents of the system could be classified as the “hardware” of the system, mainly the infrastructure and equipment. They consist for example of aerodromes (runways, taxiways, aprons, safety areas and buildings) and some navigational installations which may be located anywhere on or outside of aerodromes. Equipment are for example visual aids at aerodromes, weather equipment for aviation purposes, aircraft, computers, navigation equipment and ground handling equipment. Constituents of the aviation system which might be considered the “software” of the system mainly belong to methods. Processes, procedures, work instructions, law and rules belong to the methods and so does computer software. The environment contains both hardware and software elements. Social environment would contain cultural aspects and relate to the efficiency and safety of the operation. The
people and human factor aspect of the aviation system is a major part of the system, the interaction of the human with the hardware and software.

All this put together form the whole of the aviation system which in fact provides a very efficient and safe mode of transport (Reason, 1997 and; Stolzer, et.al. 2008).

2.5.2 Systems approach

When looking at the aviation sector as a system of interacting systems of various complexity as described in chapter 2.5.1 above, a challenge can be identified of how to manage those systems, all their functions, constituents and interactions.

ISO (2015) defines a system as a set of interrelated or interacting elements (ISO 9000:2015). This is close to be in line with a dictionaries’ definition, as Collins Dictionary on-line (2017) defines a system as: “A group or combination of interrelated, interdependent, or interacting elements forming a collective entity; a methodical or coordinated assemblage of parts, facts, concepts, etc.”

In order to address the issue of managing the systems, ISO (2015) suggests that an organization establishes, implements, maintains and continually improves a management system, including the processes needed and their interactions, in accordance with requirements. ISO (2015) defines a management system as a: “set of interrelated or interacting elements of an organization to establish policies and objectives and processes to achieve those objectives.” (ISO 9000:2015)

ICAO has published provisions for its Member States to implement safety management systems in the aviation industry (ICAO Annex 19, 2013). ICAO has as well published provisions for the implementation of other management systems or elements form such systems, such as quality management systems. National Authorities and international organizations such as the EU through the European Commission and EASA have furthermore published regulatory framework that contains requirements for management systems. The interaction of various management systems is e.g. addressed in EASA regulations which contain requirements for a management system that is in fact an integrated management system containing various management systems, such as and including a safety management system. Other management systems relating to aviation organizations could e.g. be a quality management system, a financial
management system, a security management system, an occupational health and safety management system or an environmental management system (see Figure 6).

Figure 6. Integrated Management System (IMS)

As discussed above, there are many more systems within the total aviation system than management systems. For addressing the interaction between systems in aviation other than the management systems EASA has through its regulations required operators to put in place arrangements between the interacting systems often in the form of arrangements between organizations that have common interfacing safety related processes in cases where gaps have been identified, such as between the processes of an aerodrome operator and air navigation service provider, or a ground handling service provider, or an aircraft operator operating on the aerodrome.

Before leaving this paragraph on the subject of systems it should be mentioned that when aviation activities which take place within systems are examined, for example when errors or faults are investigated or the system is examined with the intention to improve a process, all aspects of the process or the system should be examined. For example, if an incident occurs where a vehicle collides with an aircraft on an apron it will not be likely to address the root cause to simply fire the driver. This will particularly not be useful if it is a default reaction to a collision. Instead the system should be examined in whole with a root cause analysis which looks at the whole system. It examines the driver of course (training, health, qualification, etc.), the vehicle itself (is it
functioning correctly, brakes, headlights, windows clear, etc.), the environment (markings on surface, flood lights, markers, weather, etc.), the rules and procedures. The root cause might turn out to be other than the driver not following instructions or rules.

2.5.3 Process approach

Systems as they are described above in 2.5.2 contain processes as parts of the methods element. According to ISO (2015) it contributes to effectiveness and efficiency of an organization to manage processes as a system. In addition, such an approach enables the organization to address the interrelationships and interdependencies of the processes of the system (ISO 2001:2015).

Gryna, Chua and DeFeo (2007) define a process as: “... a collection of activities that converts inputs into outputs or results” (p. 195). Inputs to a process can for example be equipment, people, materials, policies and environment. ISO (2015) defines a process as a set of interrelated or interacting activities that use inputs to deliver an intended result (ISO 9000:2015) and it furthermore promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a management system (ISO 9001:2015) (See Figure 7).

In accordance with theories of Walter A. Shewhart and W. Edwards Deming, a key item for managing processes and systems is to improve every process (Mauléon, C., & Bergman, B., 2009). Modern practices for management of processes and systems is based on adequate and continual improvement. Several methods have been suggested for continuous improvement of processes, systems, products and services (Sokovic, M., Pavletic, D., & Pipan, K.K., 2010). For managing and continually improve the processes and the system as a whole ISO recommends the Deming Cycle which also is called the Deming Wheel or the PDCA cycle (See Figure 8). Walter A. Shewhart and W. Edwards Deming were pioneers in the field of Quality Management and continual improvement.

Figure 7. A process (ISO 9000:2015)
(Mauléon & Bergman, 2009). The PDCA Cycle is based on the work of Deming who improved the foregoing Shewhart Cycle from 1939 and introduced in 1951 the PDCA cycle. The cycle has been further improved for example with the Plan-Do-Study-Act Cycle (PDSA) which Deming introduced in 1980 and 1986 (Moen, R., & Norman, C., 2006).

Financial benefits, customer satisfaction and competitive advantages in the market place have been shown to improve when even simpler quality improvement systems are put in place such as the transitioning from detection into prevention methods in the “right first time” approach (Farrington, D. W. 1988). For improvement methods, the PDCA cycle has been found more effective with its principle of continuously looking for better methods for improvement, both temporary improvements to respond quickly and permanent corrective action based on investigation and root cause analysis applied to improve the process.

In a central process, the actual results of an action are compared with a target or a set point. The difference between the two is then mentioned and corrective measures are adopted if the disparity becomes large. The repeated and continuous nature of continuous improvement follows this usual definition of control and is presented by the PDCA cycle. (Sokovic, et.al. 2010, p. 477)

![Figure 8. Plan-Do-Check-Act (PDCA) Cycle](image)

The PDCA cycle is a support for the principle of continuous improvement and according to Sokovic, et.al. (2010), it is important that the PDCA concept for continuous improvement is not only considered a tool in itself, but that its principles are embedded in the organizational culture.
2.6 Safety Management in Aviation

2.6.1 General

The aviation industry is a very safe mode of public transportation in comparison to other modes of transport and it is safe in comparison to many of the safety risks we as living human beings have to take frequently as we go about our daily activities in the modern high stressed and fast society (ICAO, 2017, iStars, Accident Statistics; Stolzer et.al. 2008; Reason, 1997). Most of the time we hardly ever consciously consider the variety of safety risks we frequently take and safety assessments for decision making we are doing all the time, when crossing a busy road, when walking past hazardous activities, when biking in the traffic, swimming on a sunny beach or driving our cars.

But what is safety and how do we ensure the best we can that something is as safe as reasonably practicable, and what are our objectives? Is it realistic to set the objective to zero accidents in aviation?

ICAO defines the term safety as: “The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.” (ICAO Annex 19, 2013. p. 1-2)

The high safety record of air transport is a well-known characteristic which is very important to the future viability of aviation as means of transport and a prerequisite for the continuation of a healthy sustainable aviation industry in the future. Aviation has done safety very well, it is almost like it is spontaneous, inbuilt and without effort that we fly safe even to the extent that one may wonder if there is any need for developing and implementing further means for safety. The general public hardly notices any struggles for safety, and may not consider the relationship between business objectives and safety objectives, the dilemma that involves the fact that safety costs money and there may be a temptation to cut on safety for more profit and in particular in times of business slow-down or changes. Professional management in aviation organizations has been dealing with this dilemma for decades as the industry grew from scratch to the modern safe transport system we all know. It soon became recognised that while safety costs money, it is much less than the cost of an accident where not only lives, property and equipment are lost, but in addition records has shown that accidents have the potential to cause the general public to lose confidence in air travel. In other words,
accidents are bad for business. Therefore, the public, the industry and the regulating authorities want to be assured of a certain safety level and see that safety management is placed as a core business function in the modern aviation organization (ICAO Doc. 9859, 2013).

It is true that catastrophic air disasters are very rare and high level of confidence can be observed in the safety of air travel, implying general satisfaction with the safety level and safety management of aviation organizations.

As air traffic grew through the late 20th century the conventional methods of reactive regulatory requirements following investigation of air accidents became less effective with ever more complex and prescriptive regulations which were amended every time an accident had occurred in order to prevent such an accident to re-occur. Global aviation activity has been forecast to continue to rise and this caused concern that these traditional methods for reducing risks to an acceptable level were not sufficient and new methods for managing safety evolved. The newer perspective focused on the assumption that no single element would meet the expectations for risk management, other factors should be considered in addition to the regulatory requirements and the active search for potential threats and trends is considered important to define best practices while ensuring that minimum standards are always met (ICAO Doc. 9859, Second Edition, 2009).

This enormous growth in air travel is a growing challenge to safety management in air transport and the growth is forecast to continue at this high rate in the next decades to come (IATA, 2016).

The challenges are mainly related to congestion of airspace and aerodromes, market demand for speed and regularity, high demand for equipment and human resources such as pilots, other air crew and ground personnel. In addition, there are several emerging issues which affect safety and safety management. Aviation now for example has to share the skies with remote piloted aircraft systems (drones) which is a challenge for air traffic management and air operations. Use of drones is growing fast and those activities are likely to boom in the very close future constituting a safety treat to aircraft in the airspace in particular and in the vicinity of aerodromes. This threat is particularly imminent now when the drone revolution is taking off and the aviation industry and
regulatory authorities have to respond properly and hopefully quickly enough. Cyber security is another emerging issue where authorities and industry have to act swiftly, as it is a safety treat which needs to be managed. Related but still very different is the general security threat to which responding activities have been growing enormously in scope since 2001. More new and future emerging issues are popping up, related to for example the commercialization of space travel and supersonic flight, new energy and propulsion systems. There is no stop in the interesting evolvements in aviation foreseeable so the demand for appropriate reaction in relation to safety management is not going to diminish any time soon.

So, although the safety record is good, the present and future challenges are many to keep the accident rate low, related to the evolution and changes in the aviation environment, techniques and demands.

By introducing SMS provisions ICAO provided tools and methods for the industry to prepare for this evolution. A mature SMS is a good bet on how to continue to manage safety so that aviation accidents can be kept at an acceptable level.

2.6.2 Safety Management

But how is safety managed, what is safety management and a safety management system?

Despite the possible notion that safety is a spontaneous, inbuilt and inseparable element of aviation, the fact is that safety has been introduced and consciously managed in aviation from the early days when mostly the conventional reactive approach was used, where after an accident or an incident and following an investigation an effort was made, usually with a regulatory approach, to improve technical specifications of failed equipment, procedures or training of persons.

The concern about the effectiveness of solemnly using the reactive approach to manage safety flaws called for the introduction of other means in addition to this traditional approach to manage safety have included the introduction of SMS which is based on principles of quality assurance, such as the continuous improvement cycle with senior management commitment, containing proactive safety assurance processes and proactive safety risk management (Stolzer et.al., 2008; ICAO Doc. 9859, 2013).
According to ICAO Doc. 9859 (2009), a proactive safety strategy means that information is aggressively sought from a variety of sources which may be indicative of emerging safety problems, based on the believe that the risk of accidents can be minimised by identifying vulnerabilities before failure occurs so corrective actions can be taken timely to reduce the risk. (Second Edition, p. 5-5)

The SMS is designed to be proactive rather than reactive. As an example of a proactive measure from the SMS is the voluntary safety reporting systems. The voluntary reporting is an addition to the more traditional mandatory reporting of incidents and accidents in aviation. With the voluntary reporting possibility, the personnel are invited to report near misses and any safety concerns they may have about the operation. This is important as it is in fact a proactive measure while the mandatory reporting is reactive. By offering this in the SMS, the management is reaching out to the personnel for information on actual or potential safety deficiencies that may not be captured by the mandatory incident reporting system. This is in line with researches that have shown that latent safety deficiencies have been detected by personnel in the daily operation but not communicated properly to prevent incidents and accidents.

A research into industrial safety in 1969 indicated that for every 600 reported occurrences with no injury or damage, there was some:

- 30 incidents involving property damage
- 10 accidents involving serious injuries; and
- 1 major or fatal injury

The 1-10-30-600 ratio pyramid shows wasted opportunities if investigative efforts are focused only on those rare occurrences where there is serious injury or significant damage (See Figure 9).
The research was made by Frank E. Bird Jr. during his study into industrial accidents where he examined 1,753,498 accidents reported by 297 operating companies. These companies represented 21 different industrial groups, employing 1,750,000 employees who worked over 3 billion hours during the exposure period analyzed. The 1:600 rule and the accident pyramid appears in this research (Bird, F. 1974).

The 1:600 rule is introduced in the ICAO Doc. 9859 (p. 4.6 to 4-7), mainly to draw attention to how much of aviation occurrences that are not serious incidents or accidents go unreported and “unnoticed”, and are not investigated. It’s argued that bringing those “unnoticed” occurrences into the light by reporting them and then processing them with sorting and investigation will show tendencies and trends, the building up for an accident. In other words, hundreds of reported occurrences will draw attention so that the accidents can be prevented. Reporting and processing the sort of occurrences that are not accidents or serious incidents is in line with the proactive approach to safety management.

The administration of industrial safety rests on the foundation that accident investigation results in the identification of cause followed by the appropriate response or correction in procedure. This approach can be referred as reactive safety, since the safety response mechanism occurs after an accident. The proactive safety response mechanism occurs when corrective action is taken after a non-event called a near-miss. [...] The 1-10-30-600 [1:600 rule] relationships indicate the essential value of proactive safety and the prevention of accidents depends on addressing the near-misses. (Kecojevic, V. and Radomsky, M., 2005, p. 747-748)
The factors contributing to such accidents may be present in hundreds of undetected or latent occurrences or minor incidents and could be identified – before serious incidents or accidents occur. Effective safety management requires that personnel and management identify and analyze hazards before they result in accidents.

Furthermore, as detailed above in chapter 2.5 the modern safety management in aviation is ever more based on a process approach and a systems approach which is in line with the ISO standards (ISO 2000.2015 and ISO 2001:2015), and the safety assurance and oversight is ever more evolving into being regulated with objective based regulations and risk based oversight which is sometimes called performance based oversight.

2.6.3 ICAO and SMS

ICAO Annex 19 (2013) defines safety management system as: “A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures” (p. 1-2). Amendment 1 to Annex 19 which became effective 11 July 2016 with the applicability date of 7 November 2019 distinguishes in the amended definition of SMS between the “accountability” and “responsibilities” within the organization (ICAO, State letter AN 8/3.1-16/16. 2016. pg. 9). This new distinction between the two terms clarifies the different meaning in the English language between the person who is responsible for executing a task or performing a procedure, and on the other hand the accountability carried by the most senior executive within an aviation organization (CEO / Director General, etc.) who is and remains ultimately accountable for the safe operation of the organization. The difference in essence is that while accountability can never be delegated, responsibility can be delegated.

The definition of SMS was developed at ICAO, based on quality assurance principles, in relation to its contracting states but ICAO, based on the Chicago Convention, is the main international body influencing regulation, safety and efficiency of international civil aviation. ICAO develops standards and recommended practices (SARPs) for international civil aviation. Currently the ICAO Contracting States are 192 (ICAO 2017. Member States List).
ICAO is a specialized agency of the United Nations, a main actor in the field of safety, efficiency and regularity of international civil aviation:

The Convention on International Civil Aviation (also known as the Chicago Convention) was first signed on 7 December 1944. Subsequently, a specialized agency of the United Nations, the International Civil Aviation Organization (ICAO) was established as provided in the Convention. ICAO develops SARPs for the safety, efficiency and regularity of international civil aviation which are published in Annexes to the Convention. ICAO is headquartered in Montreal, Canada and also operates seven regional offices. Further information on ICAO can be found at www.icao.int. (Airports Council International Safety and Technical Standing Committee, 2014. p. 1)

The ICAO SARPs are developed and adopted under the provisions of the Convention. On the date when the concerning SARPs become applicable the ICAO Contracting States have obligation to implement the standards into their national law.

Standards are defined on the ICAO webpage, *Making an ICAO Standard* (2017) as: “Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; ...” A recommended practice is defined similarly except its uniform application is merely recognized as desirable in the interest of safety or regularity of international air navigation, and its implementation into national law is therefore not mandatory for the Contracting States, but it is stated that they will endeavour to conform in accordance with the Convention (ICAO, 2017. *Making an ICAO Standard*). By these definitions it can be seen that the importance of the ICAO SARPs, and the influence they have on the aviation system, its safety, organization and efficiency is high. All major aviation organizations and associations recognize the ICAO SARPs and in fact it can be stated they are the world wide commonly agreed upon and accepted standards for the aviation system.

Presently there are 19 annexes to the Convention, each containing SARPs for the various domains and areas to which the Convention applies. *Annex 19, Safety Management* (2013) is the newest annex published by ICAO, it became applicable for the ICAO Contracting States on 14 November 2013. It contains among other items the accumulated sector specific SARPs for SMS from six of the aviation domains or sectors annexes, which were applicable in these domains from 2001 onwards (Skybrary, 2016).
These pre-existing SMS requirements were transferred from ICAO Annex 1 – Personnel Licensing, Annex 6 – Operation of Aircraft, Annex 8 – Airworthiness of Aircraft, Annex 11 - Air Traffic Services, Annex 13 – Aircraft Accident and Incident Investigation and Annex 14 – Aerodromes, Volume 1 – Aerodromes Design and Operation. The SARPs contain requirements for the contracting states and relevant service providers and operators, which are organizations in the aviation industry with the obligation to implement SMS as well as a State Safety Program (SSP) requirements containing certification, safety performance and oversight requirements for the Contracting States national aviation authorities.

Annex 19 on safety management (2013) contains the following table of contents:

FOREWORD
CHAPTER 1. Definitions
CHAPTER 2. Applicability
CHAPTER 3. State safety management responsibilities
CHAPTER 4. Safety management system (SMS)
CHAPTER 5. Safety data collection, analysis and exchange
APPENDIX 1. State safety oversight system
APPENDIX 2. Framework for a safety management system (SMS)
ATTACHMENT A. Framework for a State safety programme (SSP)
ATTACHMENT B. Legal guidance for the protection of information from safety data collection and processing systems

(ICAO. 2013. Annex 19 Safety management)

The ICAO SMS framework for the service providers and operators in the industry, containing four components and twelve elements, is outlined and detailed in Appendix 2 to the Annex, and is as follows:

Framework for a Safety Management System (SMS)

1. Safety policy and objectives
   1.1 Management commitment and responsibility
   1.2 Safety accountabilities
1.3 Appointment of key safety personnel
1.4 Coordination of emergency response planning
1.5 SMS documentation

2. Safety risk management
   2.1 Hazard identification
   2.2 Safety risk assessment and mitigation

3. Safety assurance
   3.1 Safety performance monitoring and measurement
   3.2 The management of change
   3.3 Continuous improvement of the SMS

4. Safety promotions
   4.1 Training and educations
   4.2 Safety communication

(ICAO. 2013. *Annex 19 Safety Management*)

In addition to the four components and the twelve elements which are by ICAO considered the minimum to comprise an SMS, there are sub-elements and further elements which can be found in other documentation such as the ICAO Doc. 9859 (Second Edition 2009 and Third Edition 2013). Elements of an SMS can be systems or processes which contain procedures and work instructions. The following picture describes a functioning SMS with components, elements and some sub-elements (Figure 10):
The concepts of SMS in its title are made of three words: Safety, Management and System, all of which can be examined closer to facilitate understanding of the purpose and design of an SMS.

The objective for safety level, according to the ICAO definition from Annex 19 which is mentioned above (2013. p. 12), is to bring safety to a level which can be considered to be “acceptable”.

The ICAO Doc. 9859 (2013) maintains that the concept of safety in aviation must encompass relatives rather than absolutes and it can therefore not be explained with such statements as “zero accidents” or “freedom from hazards” as that contains an assumption that safety can be managed to an absolute control while the fact is that:

... while the elimination of accident and/or serious incidents and the achievement of absolute control is certainly desirable, they are unachievable goals in open and dynamic operational contexts. Hazards are integral components of aviation operational contexts. Failures and operational errors will occur in aviation, in spite
of the best and most accomplished efforts to prevent them. No human activity or human-made system can be guaranteed to be absolutely free from hazards and operational errors. (ICAO Doc. 9859, 2013, p. 2-1 and 2-3)

The management concept of the SMS can be seen in this ICAO definition of safety above where the safety risks are reduced and controlled or in another words, the safety risks are managed to an acceptable level. This is consistent with theories of the management of other aspects. In the context of quality management Gryna, Chua and DeFeo (2007) state that: “Managing for quality is the process of identifying and administering the activities needed to achieve the customer-driven objectives of an organization” (p. 19). They furthermore say that planning, control and improvement, the three managerial processes of financial management, apply to quality (Gryna et.al. 2007). In addition, ICAO has explained that the processes of safety management in aviation are based on quality management and quality assurance principles (ICAO Doc. 9859, Second Edition, 2009). All this put together indicate the approach to manage safety in aviation introduced by ICAO is based on the assumption that safety can by managed in accordance with similar principles as quality is managed in quality management systems.

As an example and based on the PDCA information in paragraph 2.5.3 in this paper, a suggestion for items that could be considered for the continual improvement cycle in relation to an SMS may include but are not limited to:

Table 1. PDCA Cycle – Possible items to consider in relation to SMS

<table>
<thead>
<tr>
<th>PLAN</th>
<th>DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Procurement and projects</td>
</tr>
<tr>
<td>The quality/safety concept</td>
<td>Processes capability and reliability</td>
</tr>
<tr>
<td>Finance</td>
<td>Material and service</td>
</tr>
<tr>
<td>Legal considerations / Regulations</td>
<td>Service safety and quality</td>
</tr>
<tr>
<td>Standards and recommended practices</td>
<td>Documentation and Records</td>
</tr>
<tr>
<td>Best practices</td>
<td>Change management</td>
</tr>
<tr>
<td>Design</td>
<td></td>
</tr>
<tr>
<td>Product Liability</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td></td>
</tr>
</tbody>
</table>

With these items in mind and in a very simplified way, a PDCA cycle in relation to an aviation SMS is presented in Figure 11.
As indicated with the title of this paper, it examines in particular change management as a theory or a discipline and its possible role in the application of organizational changes such as the implementation of a new management system based on methods which are different from a particular industry’s traditional methods or traditional organizational culture.

Considerable number of concepts in this paper are specific to the aviation industry and in some instances abbreviations are used, particularly abbreviations which are commonly used in the aviation industry or if the abbreviated concept appears often in this paper. Definitions and abbreviations can be found in Annex 1 to this paper and any further definitions if needed can be found in the relevant ICAO annexes to the Chicago Convention and in *PANS ICAO Abbreviations and Codes, Doc. 8400* (ICAO, 2007).
3 Research

3.1 General

In accordance with the theory that safety management systems based on quality management principles would be the way ahead for future improvement of safety management in aviation, ICAO published SARPs 2001 and onwards, that require aviation organizations to implement a SMS and aviation authorities to establish a SSP. Limited guidance material was published with the provisions and was in particular limited about organizational change management which could be applied to assist management during the transition from the traditional methods of safety management to the new way of using a SMS.

Change management literature contains theories about changes and change management within the organizational context. The theories offer various solutions based on methods for planning and executing changes, most of them some kind of a phased approaches arranged into step-by-step implementation processes (Bridges, 2009; Hiatt, 2006; Kotter, 1995; Lewin, 1947 and 1951).

In order to examine if relevant management and personnel in aviation organizations consider change management processes beneficial when a management system is implemented, a quantitative deductive research was conducted. The research consisted of a survey which also contained questions about how participants evaluate the status of SMS implementation and how successful they consider the implementation to have been. A deductive method can be used to view a relationship between a theory and research, where data is collected to test a hypothesis which is suggested from consideration of a theory (Bryman, A. and Bell, E., 2007).
The research was conducted to check the hypothesis that the application of a “change management process” would be beneficial to a successful implementation of a SMS in aviation organizations. The presumption for the hypothesis is that the implementation of a management system, such as a SMS is considered to be a major change to any organization.

3.1.1 Research Questions

The questionnaire was designed to assist answering the following research questions:

- How successful has the implementation of SMS been in the aviation industry?
- What influence will it have on the implementation of SMS if a change management process is put in place before the SMS is implemented?

3.1.2 Research Method

The research method used for the research following this paper is a survey research which is based on cross-sectional design, sometimes called a social survey design (Bryman and Bell, 2007).

A survey research comprises a cross-sectional design in relation to which data are collected predominantly by questionnaire or by structured interview on more than one case (usually quite a lot more then one) and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables (usually many more than two), which are then examined to detect patterns of association. (Bryman and Bell, 2007, p. 56)
3.1.3 Survey

The survey contained a questionnaire with 24 questions which were sent to 600 participants via the “Survey Monkey” web based survey platform (See an example of e-mail message sent to participants in Annex 2 to this paper). Answers to the survey were only received through the web based platform where received data was documented, examined and prepared for presentation. The data that was used for the paper was selected and extracted from the web based platform with the platform tools and worked into the paper manually.

The 24 questions were designed with four different objectives which can be seen in Annex 3 to this paper where the questions have been colour coded in the following way:

- Firstly, there are questions in the yellow colour which are background questions, designed to give the researcher a tool to categorize the organization and position the participant in a region etc.

- Secondly, question with blue colour are connected to the design of SMS and the participant’s understanding of SMS. This gives the researcher the possibility to detect and interpret from the answers if the participant has sufficient understanding and knowledge but this might be a weak point in the research. If the only questions provided in the survey connected directly with a research question, i.e. “how has the implementation been going?”, it is not unlikely that the answers will be something like; “very well” and therefore increased possibility of the answer being imprecise as the participant may think the implementation has been going well but in fact the SMS might not be functioning, and design and understanding of the system may be insufficient. This is in fact what has repeatedly been reported from audits of SMS’ last few years. Therefore, the survey is designed with questions which go beyond the direct questions on the subject in order to get a chance to interpret/detect for example if the participant reports that all is good with the system but it is in fact lacking and understanding is not sufficient.

- Thirdly, questions in green colour are connected to change management but are still designed so that the participant does not need such training as a specific change management course to answer the questions.

- Finally, questions with no color, these are questions which concern the research questions directly.

3.1.4 Participants

The participants were from 10 types of aviation entities, plus other:

- Aerodrome Operators
- Aircraft Operators
Air Navigation Service Providers

Maintenance Organizations

Flight Training Organizations

Ground Handling Service Providers

National Aviation Authorities

International Organizations

International Associations

Specialists / Consultants in regards to operation or safety and/or quality management in aviation

Other (In which case the participant was asked about what kind of entity she presented)

The web link to the questions on Survey Monkey was sent via e-mail to entities / participants (See samples of text in Annex 2 to this paper). The e-mails were sent to the most appropriate or relevant person which was possible to locate with the organization which would be on management level, either the Quality and/or Safety Manager or another person from management. When such a person could not be located the e-mail was sent to the organization official email with a request for forward it to Quality / Safety Manager or senior management. The objective was to get the most appropriate person to answer the questionnaire as knowledge of the subject is essential for qualification of answers.

3.1.5 Limitations to the research

There are several limitations to the research which can be identified. The implementation of SMS to aviation is a very specialized area requiring specialized knowledge and experience in the aviation world and in relation to safety management. The knowledge and use of change management theories and processes are also quite specialized and it is not certain that the participants from the aviation organizations had sufficient specialized knowledge in this area to evaluate sufficiently the effect of a change management process with the changes.

Furthermore, there is a possible limitation to the research that the questionnaire was not distributed equally between geographical areas (see Table 5 - Data from Question 3).
In addition, there is a similar possible limitation to the research due to the fact that distribution of participants is not equal between aviation domains (see Table 2 – Data from Question 1).

Finally, another noticeable limitation might come from that the survey was sent to far more of larger organizations than small ones for similar reasons as before (see table 4 – Data from Question 2).
4 Conclusions

4.1 General

This chapter presents main conclusions from the research, where each of the 24 survey questions are discussed. The questions are discussed in badges in accordance with subject, see color codes in Annex 3 to this paper. First in 4.2 background questions (3 questions) which are color coded yellow. Then in 4.3 blue questions (9 questions) related to construction of an SMS and the participants understanding of a SMS. In 4.4 green questions (4 questions) which are related to change management and finally in 4.5 white questions (7 questions) which relate directly to the research questions. The last question was not a part of a badge; it was for comments.

The survey was sent out on October 24th 2015 and was open for responses for a month until November 24th 2015. The total response was 190 from the 600 recipients.

4.2 Background questions

This chapter contains background questions which enable the researcher to determine information about the number of responses received from various entities and regions.
4.2.1 Question 1: Type of organization you work(ed) for?
Answered 189 / Skipped 1

![Bar chart showing the distribution of organization types.]

Figure 13. Type of organization

Table 2. Type of Organization - Responses

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerodrome operator</td>
<td>33.33%</td>
</tr>
<tr>
<td>Aircraft operator</td>
<td>13.76%</td>
</tr>
<tr>
<td>Air navigation service provider (e.g. ATS, MET, CNS, AIS)</td>
<td>8.47%</td>
</tr>
<tr>
<td>Maintenance organization</td>
<td>3.17%</td>
</tr>
<tr>
<td>Flight training organization</td>
<td>4.23%</td>
</tr>
<tr>
<td>Ground handling service provider</td>
<td>4.76%</td>
</tr>
<tr>
<td>National aviation authority</td>
<td>13.23%</td>
</tr>
<tr>
<td>International organization (e.g. ICAO, EASA)</td>
<td>2.65%</td>
</tr>
<tr>
<td>International association (e.g. ACI, IATA, CANSO)</td>
<td>4.76%</td>
</tr>
<tr>
<td>Specialist / consultant in regards to operations or safety and/or quality management in aviation.</td>
<td>6.88%</td>
</tr>
<tr>
<td>Other</td>
<td>4.76%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Type of Organization - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>If other please specify what:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aircraft Dispatch, Dangerous Goods and Aviation Security training</td>
</tr>
<tr>
<td>2</td>
<td>Aerolineas Argentinas Flight Dispatcher</td>
</tr>
<tr>
<td>3</td>
<td>U.S. FAA</td>
</tr>
<tr>
<td>4</td>
<td>National Association</td>
</tr>
<tr>
<td>5</td>
<td>Airline</td>
</tr>
<tr>
<td>6</td>
<td>Aerodrome, ANS service provider, aircraft operator</td>
</tr>
<tr>
<td>7</td>
<td>Aircraft design and manufacture</td>
</tr>
<tr>
<td>8</td>
<td>I represent ACI-NA, one of five regional affiliates of ACI World.</td>
</tr>
<tr>
<td>9</td>
<td>Airline</td>
</tr>
<tr>
<td>10</td>
<td>retired</td>
</tr>
<tr>
<td>11</td>
<td>Airport manager</td>
</tr>
<tr>
<td>12</td>
<td>aerodrome and ansp operator</td>
</tr>
</tbody>
</table>

The questionnaire was not distributed equally between aviation domains mainly because the researcher had better channels to send to some domains. This is reflected in Table 2 where it can be seen that 60.32% of the received responses were from 3 domains: 33.33% from Aerodrome Operators, 13.76% from Aircraft Operators and 13.23% from National Aviation Authorities. The remaining ≈40% were received from the other 7 domains and participants classified as “others” (specified in Table 3). The reason that might explain this is that the researcher had better connections or channels to distribute the survey to the organizations in the top ≈60%. It affects this also that most of the organizations of the 7 domains in the remaining ≈40% are smaller and in some cases they do not have, or just recently have had a direct requirement for SMS although they all belong to aviation and should be able to judge some pros and cons of an SMS or even voluntarily started implementation. Why they may not have direct requirements yet or just recently could be of several reasons, one being that no ICAO SARPs have been developed for e.g. Ground Handling Service Providers and Consultants and therefore unlikely to be found in national regulations. Another reason is that some Member States of ICAO had not yet for some domains implemented the ICAO SARPs into their national legislation yet.

It is noticeable that 9 participants answer that they belong to the “Other” group but still 12 participants put a remark into the remark box which is intended for the participants responding “Other”. When those remarks are examined it can be seen that those extra remarks were unnecessary as most of the remarks in fact describe a position which belongs in one of the domains, all except: national association, aircraft design and
manufacturer and possibly the retired one as she doesn’t explain what position she is retired from (see Table 3).

4.2.2 Question 2: Size of organization

Answered: 188 / Skipped 2

The survey was sent to more of larger organizations than small ones. This is mainly because there are better available channels to get in contact with larger organizations. Thus 65.43% of received answers come from organizations larger than 200 personnel and ≈75% come from organization with over 100 personnel (See Table 4 Size of organization – Number of personnel).
4.2.3 Question 3: Region?

Answered 188 / Skipped 2

![Bar chart showing regions and responses](image)

**Figure 15. Regions**

**Table 5. Regions - Responses**

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>6.38%</td>
</tr>
<tr>
<td>Asia and the Pacific</td>
<td>8.51%</td>
</tr>
<tr>
<td>Europe</td>
<td>60.11%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>6.91%</td>
</tr>
<tr>
<td>North-America</td>
<td>18.09%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>188</strong></td>
</tr>
</tbody>
</table>

The data from question 1 shows that distribution of participants is not equal between regions. The received responses are approximately in line with the number of surveys sent to each region from the 600 surveys that were sent to organizations. Responses received from participants in Europe were 60.11% and 18.09% were from North-America. The remaining 21.8% of responses were received from other regions where 6.38% came from Africa, 8.51% from Asia and the Pacific and 6.91% from Latin America and the Caribbean.

4.3 Construction of SMS and understanding of SMS

The questions in this chapter enables the researcher to understand better the level of understanding and knowledge of the participants in regards to SMS and if the implementation is in line with principles and intentions for the operation of such systems.
4.3.1 Question 6: Who is ultimately accountable for safety in the organization?

Answered 156 / Skipped 34

![Figure 16. Ultimate accountability](image)

Table 6. Ultimate accountability - Responses

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Manager</td>
<td>7.69%</td>
</tr>
<tr>
<td>CEO/MD/DG</td>
<td>69.23%</td>
</tr>
<tr>
<td>Quality Manager</td>
<td>1.28%</td>
</tr>
<tr>
<td>An Operational Manager (e.g. aerodrome manager, COO, airfield operations manager, Vice president of flight operations, head of section or head of division)</td>
<td>12.82%</td>
</tr>
<tr>
<td>Other</td>
<td>8.97%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>156</strong></td>
</tr>
</tbody>
</table>

Table 7. Ultimate accountability – Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>If other please specify who:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accountable Manager</td>
</tr>
<tr>
<td>2</td>
<td>We selected a different person for each airport</td>
</tr>
<tr>
<td>3</td>
<td>Accountable Manager</td>
</tr>
<tr>
<td>4</td>
<td>Accountable Manager</td>
</tr>
<tr>
<td>5</td>
<td>I provide services for multiple airports. This position varies</td>
</tr>
<tr>
<td>6</td>
<td>Accountable Manager</td>
</tr>
<tr>
<td>7</td>
<td>Director General</td>
</tr>
<tr>
<td>8</td>
<td>Compliance &amp; Safety Manager</td>
</tr>
<tr>
<td>9</td>
<td>Executive Director</td>
</tr>
<tr>
<td>10</td>
<td>Also called accountable manager</td>
</tr>
<tr>
<td>11</td>
<td>Accountable manager is my COO</td>
</tr>
<tr>
<td>12</td>
<td>As an association, we do not need to implement an SMS program. However, in the context of our office environment, our Senior VP for Administration has this responsibility.</td>
</tr>
<tr>
<td>13</td>
<td>All employees, accountability lies with the AE or accountable executive</td>
</tr>
<tr>
<td>14</td>
<td>Human Resources</td>
</tr>
<tr>
<td>15</td>
<td>everyone</td>
</tr>
<tr>
<td>16</td>
<td>Human Resources</td>
</tr>
<tr>
<td>17</td>
<td>Unclear</td>
</tr>
</tbody>
</table>
The responses to this question are very interesting, as this is a basic question for an understanding of accountability for safety within an aviation organization. Accountable manager for an aviation organization is the top manager, usually with a title such as the Chief Executive Officer (CEO), the Managing Director (MD) or the Director General (DG). Although some accountable managers undoubtfully would like to delegate their accountability for safety in the organization, they simply cannot. The media and public would be quick to locate the ultimate accountable manager after a disaster. The question touches on this interesting subject which has been discussed a lot within the aviation safety management world and could be studied better, that is the difference in „responsibility“ and „accountability“. ICAO Document 9859 (2013) explains these terms further and there is it stated that accountability should not be delegated while responsibility can be delegated. In Commission Regulation (EU) No 139/2014 it is stated that ultimate responsibility remains with the accountable manager although she can delegate her responsibilities.

It is of a concern that after all this time of SMS implementation with great effort and vast discussions industry wide, still 30% of the participants cannot name the top manager as ultimately accountable for safety. These are the results although the participants were selected from personnel which should have the most relevant knowledge and experience regarding safety management.
4.3.2 Question 7: Who has primary responsibility for maintaining and applying the SMS in daily operations?

Answered 150 / Skipped 40

Figure 17. Primary daily responsibility for SMS

Table 8. Primary daily responsibility for SMS - Responses

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Manager</td>
<td>9.33%</td>
</tr>
<tr>
<td>An operational manager</td>
<td>24.67%</td>
</tr>
<tr>
<td>CEO/MD/DG</td>
<td>7.33%</td>
</tr>
<tr>
<td>Safety Manager</td>
<td>51.33%</td>
</tr>
<tr>
<td>Other</td>
<td>7.33%</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 9. Primary daily responsibility for SMS - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>If other please specify who:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We selected a different person for each airport</td>
</tr>
<tr>
<td>2</td>
<td>SMS Officer</td>
</tr>
<tr>
<td>3</td>
<td>Safety Management System (SMS) Coordinator</td>
</tr>
<tr>
<td>4</td>
<td>See comment above</td>
</tr>
<tr>
<td>5</td>
<td>Quality &amp; Safety Manager</td>
</tr>
<tr>
<td>6</td>
<td>Compliance &amp; Safety Manager</td>
</tr>
<tr>
<td>7</td>
<td>One person is responsible for maintaining the SMS, but all managers are responsible for applying the SMS</td>
</tr>
<tr>
<td>8</td>
<td>we all have a responsibility for applying the SMS in the daily operations</td>
</tr>
<tr>
<td>9</td>
<td>VP Ops</td>
</tr>
<tr>
<td>10</td>
<td>&amp; All Department Heads/Managers</td>
</tr>
<tr>
<td>11</td>
<td>No SMS in my organisation</td>
</tr>
<tr>
<td>12</td>
<td>does not apply</td>
</tr>
<tr>
<td>13</td>
<td>We do not have an SMS program.</td>
</tr>
<tr>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>15</td>
<td>See e-mail note on Question 7.</td>
</tr>
<tr>
<td>16</td>
<td>SMS is not required</td>
</tr>
<tr>
<td>17</td>
<td>Section Heads</td>
</tr>
<tr>
<td>18</td>
<td>Quality and Safety office</td>
</tr>
<tr>
<td>19</td>
<td>All operational managers</td>
</tr>
<tr>
<td>20</td>
<td>Human Resources</td>
</tr>
<tr>
<td>21</td>
<td>Human Resources</td>
</tr>
</tbody>
</table>
Over 60% of the participants choose either the Safety Manager or the Quality manager as having the daily primary responsibility for applying the SMS. This is in line with the principle and practice that a person maintaining the SMS and applying it to the daily operation should not be an operational manager or her personnel in order to ensure independence which is the basis for the impartiality of the audits and objectivity of the audit conclusions (ISO 19011:2011). The person responsible for the daily operation of the SMS should according to this, not oversee and audit/inspect her own work. The person managing the SMS should in accordance with this principle and in accordance with aviation requirements e.g. from the provisions in ICAO Document 9859 (2013) and in Commission Regulation (EU) No 139/2014 have direct access and a direct reporting line to the accountable manager and not report to an operational manager.

It is of slight concern that 24.67% of the participants answered that an operational manager had primary responsibility for maintaining and applying the SMS in daily operation.

The 7.33% who answer that the CEO/MD/DG had this responsibility is still in line with the principle that this person is in fact the accountable manager and is in this way also accountable for the daily operation of the SMS. However in most cases the accountable manager delegates the “responsibilities” for the daily operation to another person.
4.3.3 Question 8: SMS is based on QA principles (Quality Assurance Principles to manage safety)?

Answered 158 / Skipped 32

Figure 18. SMS is based on QA principles

Table 10. SMS is based on QA principles - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.16%</td>
<td>6.96%</td>
<td>13.92%</td>
<td>37.34%</td>
<td>37.34%</td>
<td>1.27%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>22</td>
<td>59</td>
<td>59</td>
<td>2</td>
<td>158</td>
</tr>
</tbody>
</table>

Table 11. SMS is based on QA principles - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>To a a point. But there is a difference in that QMS checks whether you are following the procedures. SMS also checks whether the procedures are correct.</td>
</tr>
<tr>
<td>3</td>
<td>QA is an element of an SMS program but is not the basic principle.</td>
</tr>
</tbody>
</table>

Almost 75% of the participants agree or strongly agree that a SMS is based on quality assurance principles and that shows knowledge and understanding of the SMS. Only ≈10% strongly disagree or disagree with the statement. There are ≈14% who are uncertain and choose neither nor.
4.3.4 Question 9: In the organization, there is a clear difference between a “safety process” (e.g. daily runway inspections) and a “safety management system’s process” (e.g. the risk management process)?

Answered 157 / Skipped 33

![Graph showing responses](image)

**Figure 19. Clear difference between a safety process and a SMS process**

**Table 12. Clear difference between a safety process and a SMS process - Responses**

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>4.46%</td>
<td>10.19%</td>
<td>5.10%</td>
<td>40.76%</td>
<td>35.67%</td>
<td>3.82%</td>
<td>157</td>
</tr>
<tr>
<td>Count</td>
<td>7</td>
<td>16</td>
<td>8</td>
<td>64</td>
<td>56</td>
<td>6</td>
<td>157</td>
</tr>
</tbody>
</table>

**Table 13. Clear difference between a safety process and a SMS process - Responses - Other**

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
</tbody>
</table>

Over 76% agree or strongly agree that there is a clear difference between a safety process and a safety management systems process in their organization. This shows understanding and knowledge about the difference between direct safety processes and safety management processes which belong to the SMS. There are still 15% who strongly disagree or disagree with the statement.
4.3.5 Question 10: There is a mandatory reporting system (procedure) in place in the organization?

Answered 158 / Skipped 32

![Bar chart showing responses to Question 10]

**Figure 20. Mandatory reporting system in place**

**Table 14. Mandatory reporting system in place - Responses**

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.90%</td>
<td>5.06%</td>
<td>3.80%</td>
<td>20.89%</td>
<td>62.03%</td>
<td>6.33%</td>
<td>158</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>6</td>
<td>33</td>
<td>98</td>
<td>10</td>
<td>158</td>
</tr>
</tbody>
</table>

**Table 15. Mandatory reporting system in place – Responses - Other**

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There are no responses.</td>
</tr>
</tbody>
</table>

Almost 83% agree or strongly agree that there is a mandatory reporting system in place with their organization. This answer should be very close to 100% as there are regulatory requirements for mandatory occurrence reporting mostly world wide. It is a bit of a concern that still 11% strongly disagree or disagree with the statement and almost 4% are neither nor. Specially when 6.33% of participants mark N/A which could be considered close to normal for participants from this variation of organization as of course there are some organizations which might not have this, e.g. individual consultants, international organizations and international associations.
4.3.6 Question 11: There is a voluntary safety reporting system (procedure) in place in the organization?

Answered 158 / Skipped 32

Table 16. Voluntary reporting system - Responses

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>3.16%</td>
<td>4.43%</td>
<td>5.70%</td>
<td>32.28%</td>
<td>49.37%</td>
<td>5.06%</td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>51</td>
<td>78</td>
<td>8</td>
<td>158</td>
</tr>
</tbody>
</table>

Table 17. Voluntary reporting system - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>But not well implemented</td>
</tr>
</tbody>
</table>

Over 81% agree or strongly agree that there is a voluntary reporting system in place in their organization. This is a high percentage considering that the participants come from such a variety of organizations, domains and geographical area. Voluntary reporting systems are not yet a mandatory regulatory requirement in many instances. This indicates maturity in understanding and design of the SMS. Presuming that the participants possess necessary knowledge of the different types of reporting systems.
4.3.7 Question 12: Just Culture principles are stated in the Safety Policy of the organization?

Answered 156 / Skipped 34

Figure 22. Just culture in Safety Policy

Table 18. Just culture in Safety Policy - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.49%</td>
<td>7.05%</td>
<td>6.41%</td>
<td>28.21%</td>
<td>46.15%</td>
<td>7.69%</td>
<td>156</td>
</tr>
</tbody>
</table>

Table 19. Just culture in Safety Policy - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or “don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We have a separate Just culture policy</td>
</tr>
<tr>
<td>2</td>
<td>x</td>
</tr>
</tbody>
</table>

Almost 75% agree or strongly agree to that just culture principles are stated in their organization’s safety policy. This ratio is rather high but bearing in mind that this is present in the ICAO provisions (Doc. 9859, 2013) and in the Commission Regulation (EU) No 139/2014.
Question 13: The person managing the daily operation of the SMS must have knowledge, understanding and training both in QA principles and in aviation principles such as design, maintenance or operation?

Answered 158 / Skipped 32

Figure 23. SMS Manager’s qualification both in QA and Aviation

Table 20. SMS Manager’s qualification both in QA and Aviation - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00%</td>
<td>6.33%</td>
<td>8.86%</td>
<td>41.77%</td>
<td>38.61%</td>
<td>4.43%</td>
<td>158</td>
</tr>
</tbody>
</table>

Table 21. SMS Manager’s qualification both in QA and Aviation - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It is important that the person managing the SMS understands a bit about the risks he/she is managing.</td>
</tr>
<tr>
<td>2</td>
<td>Unclear what is meant by aviation principles. Also see answer to #7.</td>
</tr>
</tbody>
</table>

This question relates to the debate whether a person managing the daily operation of the SMS needs to have knowledge and training both in the quality assurance principles and in the concerning aviation domain. Should a SMS Manager with an airline for example have had a pilot’s training or would it be sufficient if she only had qualification and training as QA specialist? Or if put the other way around, could an air traffic controller be the SMS Manager for an ANSP and not have special QA qualification and training? This is a question which has been asked a lot over the last few years in relation to the implementation of SMS.

Over 80% of the participants agree or strongly agree with that the person managing the SMS should have both the QA and the specific domain’s knowledge, understanding and training.
4.3.9 Question 14: Other management should have some knowledge and training in QA principles in addition to their operational / aviation principles?

Answered 157 / Skipped 33

![Graph showing responses to Question 14](image)

Figure 24. Other managers qualification both in QA and Aviation

Table 22. Other managers qualification both in QA and Aviation - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00%</td>
<td>1.91%</td>
<td>8.92%</td>
<td>47.77%</td>
<td>39.49%</td>
<td>1.91%</td>
<td>157</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>14</td>
<td>75</td>
<td>62</td>
<td>3</td>
<td>157</td>
</tr>
</tbody>
</table>

Table 23. Other managers qualification both in QA and Aviation - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There are no responses.</td>
</tr>
</tbody>
</table>

There is even stronger support to the statement that other management (than SMS Managers) should have some knowledge and training in QA principles, but not only in their specific domain. 87.26% either agree strongly or agree with this statement. The participants show very strong agreement here. The non-QA managers would usually be educated and experienced in one of the aviation domains or possibly in subjects such as business and management. It would in fact be interesting to ask this question specifically with the business and management managers in mind.

4.4 Questions regarding change management

The questions in this chapter concern change management. They provide the researcher with information from the participants about the changes involved with implementing a SMS and if change management was considered in relation to the changes.
4.4.1 Question 20: Implementation of SMS is/was a large change for the organization?

Answered 152 / Skipped 38

![Graph showing responses to the question](image)

Figure 25. Implementation of SMS a large change

Table 24. Implementation of SMS a large change – Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00%</td>
<td>11.18%</td>
<td>19.74%</td>
<td>41.45%</td>
<td>22.37%</td>
<td>5.26%</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>17</td>
<td>30</td>
<td>63</td>
<td>34</td>
<td>8</td>
<td>152</td>
</tr>
</tbody>
</table>

Table 25. Implementation of SMS a large change - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Depends on airport</td>
</tr>
<tr>
<td>2</td>
<td>12 years ago</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>X</td>
</tr>
</tbody>
</table>

One of the core questions this paper addresses is the question about the size or the magnitude of the change of implementing a management system, such as a SMS into an organization. According to ICAO Doc. 9859 (2009) the implementation of a SMS is a significant change to any organization. While none of the participants strongly disagreed, still only 63.92% answered that they agreed or strongly agreed to the question. The third largest group is the neither nor with 19.74%. Disagreement was 11.18%. Possibly some of the participants believe their organization already had safety management measures in place which minimized the change of implementing a SMS. From one of the remarks the participant indicates that her organization has already implemented SMS 12 years ago. The fact is that 12 years ago very few SMS’ were
already implemented and actively functioning in the aviation industry (ICAO, 2017, Timeline). It is noticeable that 38 participants skip this question.

4.4.2 Question 21: A change management process was implemented in relation to the implementation of SMS in the organization?

Answered 148 / Skipped 42

![Figure 26. A change management process implemented in relation to the implementation of SMS](image)

Table 26. A change management process implemented in relation to the implementation of SMS - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.03%</td>
<td>10.81%</td>
<td>23.65%</td>
<td>41.22%</td>
<td>13.51%</td>
<td>8.78%</td>
<td>148</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>35</td>
<td>61</td>
<td>20</td>
<td>13</td>
<td>148</td>
</tr>
</tbody>
</table>

Table 27. A change management process implemented in relation to the implementation of SMS - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>Not at all airports</td>
</tr>
<tr>
<td>4</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>But it should have been</td>
</tr>
<tr>
<td>6</td>
<td>x</td>
</tr>
<tr>
<td>7</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>x</td>
</tr>
</tbody>
</table>

Only ≈55% of the participants indicate that a special change management process was implemented in relation to the implementation of SMS to their organization. ≈13% strongly disagree or disagree and the remaining participants choose neither nor or find the question not applicable. This is indicative of rather low emphasis on the implementation of the SMS, or possibly that the management didn’t realise how much a
change it is to implement such a system that affects the core values and culture of organizations (Child 2009; Bridges, 2009; Kotter, 2005; Hiatt 2006). It is noticable that 42 participants skip the question.

4.4.3 Question 22: A person (e.g. a project manager / implementation manager) was assigned to manage the implementation of SMS in the organization I work(ed) for?

Answered 151 / Skipped 39

![Bar chart showing responses to Question 22]

Figure 27. A person assigned to manage the implementation of the SMS

Table 28. A person assigned to manage the implementation of the SMS - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.65%</td>
<td>11.92%</td>
<td>11.92%</td>
<td>40.40%</td>
<td>25.17%</td>
<td>7.95%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>18</td>
<td>61</td>
<td>38</td>
<td>12</td>
<td>151</td>
</tr>
</tbody>
</table>

Table 29. A person assigned to manage the implementation of the SMS - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>This is a Yes/No question.</td>
</tr>
<tr>
<td>3</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>x</td>
</tr>
</tbody>
</table>

65.57% of the participants strongly agree or agree to that a project manager or an implementation manager was assigned to manage the implementation of the SMS in their organization. This is already indicative of a higher percentage then one could expect after the 55% in question 4.4.2. Assigning a special implementation manager is in fact one indication that a change management process was put in place. Less then 15%
answer that they strongly disagree or disagree to the question and ≈8% answer that the question is not applicable.

4.4.4 Question 23: Implementation of a „change management“ process is useful when management systems are implemented?

Answered 153 / Skipped 37

Figure 28. Useful to implement a change management process when SMS is implemented

Table 30. Useful to implement a change management process when SMS is implemented - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.65%</td>
<td>1.31%</td>
<td>5.88%</td>
<td>45.75%</td>
<td>45.10%</td>
<td>1.31%</td>
<td>153</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>9</td>
<td>70</td>
<td>69</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table 31. Useful to implement a change management process when SMS is implemented - Responses - Other

# | Please mark X for “don’t know” or “don’t want to answer”:
---|-----------------------------------------------
1  | x                                            
2  | x                                            

It is interesting the 90.85% of the participants agree or strongly agree that an implementation of a change management process is beneficial when management systems are implemented. This shows a strong support for planning and managing a significant change.

4.5 Questions related directly to the research questions

The questions in this chapter are directly related to the research questions of how successful the implementation of SMS has been and what influence it might have on the implementation of SMS if a change management process is put in place before the SMS is implemented?
4.5.1 Question 4: The organization I work(ed) for:

Answered 188 / Skipped 2

![Bar chart showing implementation status](image)

Figure 29. Implementation status

Table 32. Implementation status - Responses

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has not implemented a Safety Management System (SMS) but is required to do so</td>
<td>4.26%</td>
</tr>
<tr>
<td>Is in an implementation phase for SMS</td>
<td>23.40%</td>
</tr>
<tr>
<td>Has successfully implemented SMS</td>
<td>58.51%</td>
</tr>
<tr>
<td>Is not required to implement SMS</td>
<td>13.83%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

This question does give background information in addition to being a direct question in regards to the research questions. It shows that 58.51% of the participants indicate that their organization has already successfully implemented a SMS. It furthermore shows that the participants indicate that 23.4% of the organizations are presently in an implementation phase. They indicate that 13.83% are not required to implement a SMS which can be because of the domain doesn’t yet have the requirement (e.g. Ground Handling Service Providers) or the national regulations have not implemented the requirements yet. The participants indicate that 4.26% of the organizations that have a requirement to implement the SMS have not done so.
4.5.2 Question 5: There is a regulatory requirement for the organization I work(ed) for to implement a SMS?

Answered 157 / Skipped 33

Figure 30. There is a regulatory requirement in place for the implementation of SMS

Table 33. There is a regulatory requirement in place for the implementation of SMS - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.28%</td>
<td>3.82%</td>
<td>3.82%</td>
<td>12.74%</td>
<td>64.97%</td>
<td>6.37%</td>
<td>157</td>
</tr>
</tbody>
</table>

Table 34. There is a regulatory requirement in place for the implementation of SMS - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FAA has not finalized Rulemaking</td>
</tr>
<tr>
<td>2</td>
<td>However, the organisation I work for is implementing a regulatory management system as part of the SSP.</td>
</tr>
<tr>
<td>3</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>x</td>
</tr>
</tbody>
</table>

77.71% of the participants agree or strongly agree that their organization has a requirement to implement a SMS. 12% strongly disagree or disagree but 3.82% are neither nor and therefore seem not to be certain if there is a requirement, and N/A are 6.37%. Together these ≈10% may not know if the requirement is there or there may be another reason.
4.5.3 Question 15: SMS is beneficial for aviation safety in the organization I work(ed) for?

Answered 155 / Skipped 35

Figure 31. SMS is beneficial for aviation safety in the organization

Table 35. SMS is beneficial for aviation safety in the organization - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.65%</td>
<td>0.65%</td>
<td>3.87%</td>
<td>24.52%</td>
<td>65.81%</td>
<td>4.52%</td>
<td>100%</td>
</tr>
</tbody>
</table>

|                  | 1         | 1                            | 6     | 38             | 102  | 7     | 155 |

Table 36. SMS is beneficial for aviation safety in the organization – Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or “don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There are no responses.</td>
</tr>
</tbody>
</table>

Over 90% of the participants agree or strongly agree that SMS is beneficial for aviation safety in their organization. This is a very indicative percentage and shows support for SMS. Only 1.3% strongly disagree or disagree to the question.
4.5.4 Question 16: SMS is beneficial for aviation safety in general (the whole industry world wide)?

Answered 157 / Skipped 33

Figure 32. SMS is beneficial for aviation safety in general

Table 37. SMS is beneficial for aviation safety in general - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00%</td>
<td>0.64%</td>
<td>1.91%</td>
<td>22.93%</td>
<td>73.89%</td>
<td>0.64%</td>
<td>157</td>
</tr>
</tbody>
</table>

Table 38. SMS is beneficial for aviation safety in general – Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly agree, however needs to be supported from executive group in the company to achieve or receive buy in from all levels</td>
</tr>
</tbody>
</table>

96.82% agree or strongly agree that SMS is beneficial for aviation safety in general in the industry. This again is a very strong support for SMS. Noone strongly disagrees and only 0.64% disagree. Only 1.91% is neither nor and this is also interesting and indicates that there is very strong believe in benefits of an SMS for aviation safety in general.
4.5.5 Question 17: The process of implementing and maintaining an active and functioning SMS in the organization has been successful?

Answered 156 / Skipped 34

Figure 33. The process of implementing and maintaining SMS has been successful

Table 39. The process of implementing and maintaining SMS has been successful - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.28%</td>
<td>6.41%</td>
<td>10.90%</td>
<td>48.72%</td>
<td>25.64%</td>
<td>7.05%</td>
<td>156</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>17</td>
<td>76</td>
<td>40</td>
<td>11</td>
<td>156</td>
</tr>
</tbody>
</table>

Table 40. The process of implementing and maintaining SMS has been successful - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for “don’t know” or “don’t want to answer”:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In some airports yes and in others no</td>
</tr>
<tr>
<td>2</td>
<td>Too early to say</td>
</tr>
<tr>
<td>3</td>
<td>The improvement continues</td>
</tr>
</tbody>
</table>

74.36% of the participants agree or strongly agree to the statement that the process of implementing and maintaining an active and functioning SMS in the organization has been successful. This is a high ratio, considering that the question is not only about if the implementation has been going well, but it also includes if it has been going well in regards to that the system is active and functioning. Only 7.69% answer that they strongly disagree or disagree and 10.90% neither nor which could indicate that just under 20% are not satisfied about the success of the implementation.
4.5.6 Question 18: Sufficient guidance was provided/made available (e.g. from ICAO and Authorities) for the implementation of SMS?

Answered 154 / Skipped 36

![Bar Chart]

Figure 34. Sufficient guidance has been provided from ICAO and Authorities

Table 41. Sufficient guidance has been provided from ICAO and Authorities - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.60%</td>
<td>14.29%</td>
<td>23.38%</td>
<td>38.31%</td>
<td>16.23%</td>
<td>5.19%</td>
<td>154</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>36</td>
<td>59</td>
<td>25</td>
<td>8</td>
<td>154</td>
</tr>
</tbody>
</table>

Table 42. Sufficient guidance has been provided from ICAO and Authorities - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>FAA</td>
</tr>
<tr>
<td>3</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>TC gave mixed messages for the first 5 years of implementation</td>
</tr>
<tr>
<td>5</td>
<td>x</td>
</tr>
</tbody>
</table>

54.54% of the participants agree or strongly agree to that a sufficient guidance has been provided from ICAO and authorities from the implementation of a SMS. Only ≈17% strongly disagree og disagree and interestingly 23.38% neither agree nor disagree which makes ≈40% of the participants either disagreeing or being uncertain.
4.5.7 Question 19: Sufficient relevant training has been provided for implementing SMS?

Answered 157 / Skipped 33

![Bar chart showing responses to Question 19]

Figure 35. Sufficient relevant training has been provided for implementing SMS

Table 43. Sufficient relevant training has been provided for implementing SMS - Responses

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.82%</td>
<td>10.83%</td>
<td>19.75%</td>
<td>43.95%</td>
<td>15.92%</td>
<td>5.73%</td>
<td>157</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>31</td>
<td>69</td>
<td>25</td>
<td>9</td>
<td>157</td>
</tr>
</tbody>
</table>

Table 44. Sufficient relevant training has been provided for implementing SMS - Responses - Other

<table>
<thead>
<tr>
<th>#</th>
<th>Please mark X for &quot;don’t know&quot; or &quot;don’t want to answer&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>Varied by airport</td>
</tr>
</tbody>
</table>

Almost 60% of the participants agree or strongly agree that sufficient relevant training has been provided for implementing SMS. ≈15% either strongly disagree or disagree and ≈20% are uncertain which makes ≈35% disagreeing or being uncertain.

4.6 In addition

4.6.1 Question 24: Is there anything you want to add or comment on the survey or the implementation of SMS in the organizations you work(ed) for?

Answered 53 / Skipped 137

See responses table color coded in Annex 4.

Question 24 was an open question, a text box large enough for couple of paragraphs; the participants could decide if they wanted to comment on the survey, on the implementation of SMS or in fact something else which would come into mind while
answering the survey. Responses to this question were 53, thereof two which were about the survey construction itself and nine which were deemed not meaningful for the survey. The remaining 42 were categorized (see Annex 4) into nine categories:

- Cultural issues
- Guidance and training
- Connection to other systems
- Lack of requirements or lack of systems
- Management support
- Time factor and teamwork
- Satisfaction with SMS
- Nothing/no relevance
- Discrepancies with the SMS and/or non-compliant methods/design of SMS

For cultural issues there were 4 comments received and they were all about the challenge of the implementation of changes because the changes affect culture. One commenter wrote: “Main challenge in implementing Safety Management System in one organization is about changing someone’s culture and mentality not about procedures!” and another one wrote: “Culture is the most challenging part of implementation, if it was to be done again, companies should be encouraged to give regard and understanding to their present state in order to address or implement properly/efficiently, otherwise time and funds may be allotted unwisely in those first few years and safety could be compromised during the implementation phases where present culture has not been fully understood”.

Regarding Guidance and training three responses were received, mainly relating to lack of guidance and training. That insufficient or not relevant guidance had been provided and that the systems principles called for different education and training from normal training in the domains, and recurrent training was missing.

Most of the comments were on connection to other systems and in general they brought the message that there is a connection and it is in most cases to other
management systems, such as QA or other safety programs which in fact are based on QA principles.

Six comments were received on lack of requirements or lack of systems. Five of them relate to that the concerned organization is not required to have in place a SMS. One is relating to that the organization hasn’t yet fully implemented the SMS.

Four comments were received on management support. They are all about the necessity for full management support for implementing SMS.

Five responses were about time factor and teamwork. The participants commented that the implementation of a SMS was time consuming, that it was a major change and that teamwork was necessary, everyone had to be on board.

Two participants commented on satisfaction with SMS that they were pleased with SMS, that is worked well and is a strong basis for decisions. Useful to ensure safety and good for the reputation of the organization.

There were 11 responses with little or no relevance to the subject, but couple of those comments were comments about the survey itself.

Finally, there were six comments deemed to indicate discrepancies with the SMS and/or non-compliant methods/design of SMS. For example, a comment about how SMS was part of operational section. Another comment where the SMS is described as simply set of documents and insufficient engagement of staff. One about SMS should be maintained by safety manager and not an operational manager, which is of course correct but this participant indicated her system as maintained by operational manager. Then there is a comment about the SMS being stuck in the safety office and managers would not be engaged or working in line with an SMS. A comment about management posing challenges, which might mean that the management is not competent in regards to SMS. Finally, there is a comment about lack of change management process which the commenter believes would have been good to have before the changes were initiated.
5 Discussion

5.1 General

The subject of this paper is change management. By looking at vast changes concerning safety management which have been on-going within the aviation industry over the last decade and a half, change management theories and literature are studied and some conclusions are drawn from it in connection with these changes.

A research was conducted in connection with this paper. It consisted of a survey with 24 questions sent to 600 aviation organizations worldwide. The target group were personnel within management, in particular quality- and safety management personnel of the selected organizations. The questions in the survey relate to the research questions for this paper of how successful the implementation of SMS has been in the aviation industry and what influence it would have on the implementation of SMS if a change management process were put in place before the SMS is implemented?

5.2 History of the changes

ICAO developed provisions already from 2001 requiring certain organizations within the industry to implement a SMS and guidance material five years later which described principles and structure of such a management system (ICAO. Doc. 9859, 2006). At the time ICAO was not conducting structured impact assessments with implementation plans as the organization started doing recently. The SMS provisions have however grown and matured and by 2013 when Annex 19 on Safety Management was published, the provisions included most service providers and the member states with special provisions for framework for a State Safety Program, which is the State’s equivalent to the SMS of a service provider. Implementation has not been straightforward and smooth and status of implementation is variable among the 192 ICAO Member States and findings from audits on the SMS’ are common on such issues as the structure, organizational location of the safety processes and maybe the most serious the functionality of the systems. Sometimes SMS’ have been found to be copied/pasted off the shelf paperwork, a dusty binder instead of living documents, not tailored to the organization and not supported sufficiently by senior management.
5.3 Theoretical Introduction

The academic discussion of changes in chapter 1 of this paper focuses on change management models and the academics who wrote them. Certain aspects of their theories are in harmony although their detailed views on certain issues differ somewhat. All of them emphasize some kind of phased approaches. Some suggest a well defined step-by-step method (Kotter, 1995), while others look at phases which in cases should be managed (Bridges, 2009; Lewin, 1951) and Hiatt (2006) describes elements which fall into a natural order of a person’s experience while going through a change. Another issue which all of them consider important is the people’s aspect in regards to changes. This is of course strongly related to culture (Bridges, 2009; Hiatt 2006). The people and culture are introduced and discussed further in chapter 2.

As part of the people discussion chapter 2 looks at personnel which is affected by a change, and how significant the experience of changes is for people. The chapter further discusses managers and their role as managers and leaders. Groups and teams are discussed and special roles in change management such as role of change managers, project managers and consultants. The conclusion is that in fact all of these can act as sufficient change managers or change leaders. Sometimes the specialities such persons have are not fully in line with best fit change management leaders but this is never absolute.

Culture is discussed from several angles, it’s a vast concept, one of the most important aspect affecting changes and it is everywhere, it divides into many sub-cultures such as national culture, professional culture, organizational culture, corporate and safety culture. The effect of culture and people is considered of highest importance in the light of change management and information from this paper, the theoretical, professional and research parts. ICAO has identified and published in guidance material information about culture as foundation for human performance and cultural effects on safety management and in that relation an enthusiastic reader can understand that there can be cultural implications and challenges in regards to changes although direct guidance in relation to the change of implementing the SMS is not provided (ICAO. Doc. 9859, 2009 and 2013).
5.4 Connection to aviation

Considerable introduction is made into the world of aviation which is a very large regulated industry and into safety management practices. This includes introducing the players and the field and is necessary to properly connect the subjects. Changes are discussed and the aviation system is introduced and connected to the changes.

The research is considered in detail and the responses to the survey questions. The intention is to introduce the theory, discuss the main elements affecting changes and change management and connect it to the vast changes in the aviation world that have been on-going in regards to safety management. Of course, in a small paper like this one examination is not a deep cut enough to thoroughly turn around every stone in connection with the subjects, but it is the believe of the researcher that this paper can be a foundation for further inquiry into these very interesting subjects and bearing in mind the shortage of research papers and academic writing in aviation and in the very subject of change management in aviation.

5.5 Research conclusion

The hypothesis which was founded before the research questions were asked, presuming that implementation of SMS is a major change, was that the application of a “change management process” would be beneficial to a successful implementation of SMS in aviation organizations. The research questions were designed to four themes or badges: background questions, construction of SMS and understanding of SMS, questions regarding change management and finally questions related directly to the research questions.

It is noticeable how many participants skip some questions which may possibly be a indication of lack of understanding.

5.5.1 Background questions

From the 600 surveys that were sent out the majority went to 3 domains and the responses were in line with that. This was because the researcher had better channels to send surveys to the relevant personnel in these domains. By relevant personnel, it is meant that the target group of participant were not just any person working for organizations in the domains, but relevant or appropriate persons for the subject,
mainly quality- and/or safety managers, or persons from senior management. This was the case for the vast majority. In some instances, especially for domains with less channels to contact such as Flight Training Organizations the survey was sent on general e-mails. This led to lower response rate from those organizations. However, this was a small minority of the recipients. Majority of the surveys were sent to participants in large organizations, with over 100 personnel and majority was sent to the European and North-American regions and the responses are reflecting this quite well. The reasons for this is the same as before, that is the channels to send to organizations in those regions are better.

5.5.2 Questions on construction of SMS and understanding of SMS

It is important when looking into a matter like this one to ask some questions to realize what is the level of knowledge and understanding of the concerning subjects amongst the participants and in this case it is also interesting to get some indication of the situation within the domains and industry, how well does people understand what is intended of them? In most cases the understanding is around 70%. This is relatively low considering the participants are relevant personnel and should know the systems better. For example, it is a concern that 25% think that an operational manager should have primary responsibility for maintaining and applying the SMS in daily operations. This should generally not be an operational manager as that breaches the independence and objectivity of the person. This might indicate misunderstanding or confusion between safety processes and safety management processes but the safety processes belong to operational managers while the safety management processes belong to and independent, objective person with a direct reporting line not to the operational manager but to the top manager of the organization, usually the CEO. In the same manner 25% of the participants do not with certainty connect the SMS to QA principles and that is of a concern. It might mean that they are not familiar with the foundations and origins of QA and SMS at all. The relations are rather clear if one has fundamental education and knowledge in QA systems. In general, in this badge of questions 20% - 25% are not certain about some of the main principles of the SMS. This number may not seem too high but again, considering that the questions are aimed to relevant personnel
and the questions are fundamental but important for the proper functionality of the system, it could be considered rather high.

Considering these findings; qualification, experience and training of the relevant personnel hired to work with these systems might possibly be improved.

5.5.3 Questions regarding change management.

It was considered important to look at the view participants had on the changes and change management. The purpose was furthermore to attempt to reveal something about the understanding of change management. In the aviation industry some persons look at change management mainly for managing changes to functional systems (such as ATM/ANS systems), equipment, infrastructure or the alike and do not connect it as well to organizational changes and changes to management etc.

It was a bit surprising that 30% of the participants indicated that the implementation of SMS was not a large change. One of the grounds for this paper was in fact that the implementation of a management system would be a major change to any organization. There are several possibilities for this percentage being so high, one is that there is not sufficient understanding of the systems and the cultural changes necessary to make a successful integration of such a system into the operation, or possibly a certain percentage had already implemented for example a QMS in which case the transition might be smoother. Still another reason might be what meaning is put into the word “implementation”, is it merely to copy/paste the papers or is it an actually functioning system, or is it considered implemented when only some basic processes of the SMS are starting to function such as the safety reporting system or the safety risk management process. In organizations of the size of most of the respondents a SMS would be a rather large system consisting of many processes and functions. Of course a SMS is scalable to size and complexity of an organization and it can also have just some of the processes up and running and than it is always a question of when the system can be considered implemented.

In more than 50% of the answers it was indicated that a change management process had been implemented during the implementation phase. The question is not very detailed and one can speculate whether this means that something was put in place or if it means that a change planning was made and a step-by-step process introduced.
even with personnel to follow up on it. This is not too clear but at least over half of the participants indicate that a change management process was in place. Over 65% indicate that a special project/implementation manager was assigned to the implementation. It is common that a particular person is assigned to the SMS implementation but variable whether it is one of the internal persons or managers who usually would get some special training of various relevance lasting usually from a day or two up to a week each course, or if it is a person from outside the organization such as a specialist in change management or a project manager of some sort. It might be interesting to investigate this better and also what are the differences if any between a typical specialist from outside versus a specially trained inside person. How quick can a person become specialized in complex implementation of this nature? It was a strong indication of support for change management application to such changes to see that over 90% of the participants indicated that a change management process would be useful when a SMS is implemented. This might indicate that the participants had experienced some unexpected complications during the changes which they believe might have been prevented or solved more easily if a special process would have been in place for the changes.

5.5.4 Questions related directly to the research questions
A little under 60% of the participants indicate that their organization has successfully implemented a SMS. Again this question is not detailed enough to detect the various possible reasons for this answer. 23% say that the organization is in an implementing phase. The percentage for organizations which have not implemented but are required to is very small or 4.26%. This shows that most organizations are doing what they are supposed to. However, it is not easy to tell from the data what is behind the answers. Are the full systems fully implemented or are the participants marking that the SMS is implemented when only some of the processes are up and functioning? This would be interesting to investigate further. Most of the organizations have a requirement to implement SMS but 12% don’t and 3.82% seem not to know as they answer neither nor. It seems to be a good ratio that has the requirement but of course it is of concern that some participants do not know the regulatory status as the participants are relevant personnel, however it could be argued that 3.82% is low enough to be within normal
limits and probably not everyone of the participants were a relevant person although they were the target group and the surveys were directly sent to such person in most cases.

Over 90% believe that SMS is beneficial for their organization and almost 97% believe it is beneficial for the whole industry. This is very good news although again it must be kept in mind that the participants are relevant persons, there might be a different outcome if operational personnel affected by SMS in their daily work would be the target group. It is interesting that 75% mark that the process of implementing and maintaining an active and functioning SMS has been successful in their organization. In particular, the words “active and functioning” should ring a bell but still the score is this high. One of the main challenges about SMS in aviation organizations has been the activity or the functioning of the systems. It’s all too common that SMS’ have been adapted from off-the-shelf model solution and not designed to the needs of the particular organization. SMS’ have to be tailored to the needs of the particular organization, and models and frameworks can only be a frame of reference when designing or tailoring the system. It might be that participants mark agree or strongly agree judging from well functioning parts of the SMS, but that the whole of the SMS is working so good is at least to say, a very good score. Here, there would be an interesting subject to investigate further, make a deeper cut. There is also a rather high score (54.54% agree or strongly agree) to that sufficient guidance has been provided by ICAO and authorities. The provisions of ICAO Annex 19 have been published of course and the guidance with it has been the ICAO Doc. 9859 (2006; 2009 and 2013). This guidance describes the systems and their functionality but they do not provide guidance for change management in relation to implementing the systems. The closest is a gap analysis and phased implementation model is provided for guidance plus the change management process itself which is internal in the SMS and in most cases not used for implementing the system itself.

Majority (60%) seem satisfied with the training provided marking agree or strongly agree. However, 15 don’t think it is enough and 20% are neither nor. There may be a difference in how the participants interpret enough training and also there may be
different view of what is relevant training. From the data at least there seems to be a room for improvement in the qualification and training for SMS.

5.6 Concluding remarks for these discussions

After looking at the data collected from the research it is evident that not all questions are answered to the full detail and there is room for more examination to conclude further about the subjects. However, the data is indicating that the implementation of SMS in the aviation industry is slowly improving. The selected participants which are from a target group of relevant personnel indicate that the SMS is on track to become well implemented and that they are generally pleased with the SMS. This is good news for the industry and authorities alike and for the travelling public. It provides reasons to predict that SMS which is properly designed, tailored to each organization and functioning in the operation, will at the end of the day be in place with most of the organizations in the industry. Such point in time is not yet clear though as there are some challenges remaining, for example that not all domains or regions have started implementation and considering that the process started over 15 years ago gives indication of at least few more years until the outcome will become satisfactory. The data suggests however that a total failure of the intentions of requiring SMS for the industry will probably not be the case. Smaller failures can usually not be avoided in the implementation, especially in regards to large changes. When failures are studied in relation to organizational learning it shows that smaller failures may end up beneficial for the whole process. It shall however be noted that failures should be avoided as to many of them or to large failures can result in a total failure of a project or a change. It shall also be noted that SMS’ like other management systems based on the QA principles are under the PDCA cycle for continuous improvement and in that sense it can be said that they are never fully done and finished.

This is the situation and prediction that the data is indicating, and from the data it can furthermore be seen that the guidance material, although quite good on systems design and operational aspects, did not include enough appropriate guidance for the changes of implementing a management system. The training material provided needs to be relevant to changes and connect to the Change Management discipline and its theories and models. ICAO has recently started to conduct impact assessments with
implementation plans and oversight evaluation. This was not the case when SMS SARPs were issued. It may be that if such appropriate planning for this change had been made and published with the provisions the implementation might have been smoother and it might have taken short time. Instead of almost every organization and personnel having to invent the wheel on what an SMS is and how to implement it, appropriate change management guidance might have guided the industry to a more straight-in approach and landing.

The data supports the hypothesis that the application of a “change management process” would be beneficial to a successful implementation of a SMS in aviation organizations”
6 Summary

This paper started with theoretical introduction and discussion of some of the most recognized literature and theories from scholars and influencers in the field of change management. The models studied emphasized the people affected by changes and the importance of culture in changes. The scholars divide the change process into phases, and although they describe these phases in different ways a common theme they suggest is some sort of a phased approach to manage and facilitate the change process.

In chapter two some of the main elements to consider in regards to a change management process were discussed. Changes were discussed in relation to a learning process and organizational learning considering e.g. theories on double and triple loop learning. It would be interesting and beneficial to study these concepts and theories further in relation to changes within organizations.

Included in the main element considered was the “people’s aspect” in relation to changes, e.g. role of personnel which can be considered change agents and the leaders of changes within organizations, such as but not limited to various managers and persons with special tasks such as consultants in regards to the management of changes. Culture was furthermore discussed as one of the main elements affecting the successful implementation of changes. Some sub-cultures were introduced and connected to changes, such as national, professional and organizational cultures and safety culture was discussed and just culture principles as it appears in aviation.

The aviation system was introduced and connected to change management with reference to vast changes which have been on-going in safety management practices in aviation. Safety management practices in aviation were discussed.

A research was conducted in the form of a survey to examine the status of the implementation of Safety Management Systems in aviation organizations. Construction and understanding of the systems was looked at, as well as the change management process in regards to these changes. The research questions were the foundation of the survey questions and in general the responses from the participants provided answers
that supported that the application of a change management process would be beneficial for the implementation of a Safety Management System in aviation organizations.

When the research results were studied and the data examined, many new questions arose which would be interesting and without doubt beneficial to study further. The research was not a deep enough cut to study some of the interesting elements into the details they deserve. There is a good opportunity and a need to investigate further the subjects this paper touches on, especially considering the relatively low number of academic papers, researches and studies in this area of change management and of management systems, aviation management, structure and behavioural aspects in the organizational setting.
References


Annexes

Annex 1

Abbreviations and Definitions

Abbreviations

ACI - Airport Council International
ANSP – Air Navigation Service Provider
CANSO - Civil Air Navigation Services Organisation
EASA - European Aviation Safety Agency
EFTA – European Free Trade Association
EU – European Union
IATA - International Air Transport Association
ICAO - International Civil Aviation Organisation
IFALPA - International Federation of Air Line Pilots’ Associations
N/A – Not Applicable
QA – Quality Assurance
QMS – Quality Management System
SARP – Standards And Recommended Practices (often called provisions)
SMS - Safety Management System

Definitions

**Accident** - An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to
move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:
   — being in the aircraft, or
   — direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
   — direct exposure to jet blast,
   except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:
   — adversely affects the structural strength, performance or flight characteristics of the aircraft, and
   — would normally require major repair or replacement of the affected component,
   except for engine failure or damage, when the damage is limited to a single engine (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

Note 1.— For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified, by ICAO, as a fatal injury.

Note 2.— An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located. (ICAO, Annex 13. 2010. p. 1-1)

**Chicago Convention** - Convention on International Civil Aviation and it Annexes, signed in Chicago 7 on December 1944. ICAO Doc. 7300

**Incident** - An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation. (ICAO, Annex 13. 2010. p. 1-2)
Safety Management System (SMS) - A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures. (ICAO, State letter, Amendment 1 to Annex 19. 2016. p. 9)

Serious incident - An incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note 1. — The difference between an accident and a serious incident lies only in the result. (ICAO, Annex 13. 2010. p. 1-2 – 1-3)

-END-
Annex 2

Examples of E-mails sent to participants

An example of an E-mail sent with the Survey to a known participant

Dear Sir/Madam,

I would appreciate few minutes from your time to answer this short survey. The survey is a part of my MS research in Strategic Management. The research examines factors that affect implementation of Safety Management Systems (SMS) in aviation organizations. One of the main objectives of the research is to improve the implementation of SMS. Your answers are highly appreciated and important for the research success.

Full confidentiality is ensured and no attempt will be made to identify participants and their answers.

https://www.surveymonkey.com/r/smschange

Please feel free to contact me directly via phone or e-mail.
Gudjon Atlason, University of Iceland, School of Business (http://english.hi.is/)
Phone: +(354)-820-1445 / E-mail: gua22@hi.is

An example of an E-mail sent to an organization’s general E-mail address

Dear Sir / Madam,

Could I kindly ask you to be so kind to forward this E-mail to Head of Training and person(s) responsible for Safety- and/or Quality Management at the Flight training organization?

Dear Sir / Madam
Head of training
Safety - QA Management,

I would appreciate few minutes from your time to answer this short survey? The survey is a part of my MS research in Strategic Management. The research examines factors that affect implementation of Safety Management Systems (SMS) in aviation organizations. One of the main objectives of the research is to improve the implementation of SMS. Your answers are highly appreciated and important for the research success.

Full confidentiality is ensured and no attempt will be made to identify participants and their answers.

https://www.surveymonkey.com/r/smschange

Please feel free to contact me directly via phone or e-mail.

Gudjon Atlason, University of Iceland, School of Business (http://english.hi.is/)
Phone: +(354)-820-1445 / E-mail: gua22@hi.is
Annex 3

Questions from the survey
The following is a key for the color coding below, on the questions from the survey:

Yellow
Background questions, in order to map the organization and locate the participant in a region.

Blue
Questions regarding the construction of an SMS and the participants understanding of SMS. The questions give the researcher information about how their SMS is designed and a possibility to see/interpret from the answers if the participant has appropriate understanding and knowledge which might be a weak link in the research. If the survey only contains questions with direct reference to the research questions, e.g. “how has the implementation been going?” it is possible that the answer would simply be; “very well” and that might be a imprecise or incorrect answer as the participant might report or even think the implementation has been going well but in fact the system might not be active/functioning properly. Her assumption might be based on insufficient knowledge and understanding.
Such discrepancies have frequently been seen during audits of safety management systems during the last few years. By asking in this manner, the researcher is looing deeper than the direct questions and asking in a way that provides a possibility to interpret answers. E.g. if a participant answer that all is good, but still some parts of a system are missing or insufficient understanding is revealed.

Green
Questions regarding change management. The questions are designed in the way that the participant doesn’t need specialized knowledge in change management, such as a change management course, to answer them.

Not colored (white)
White questions directly related to the research questions.

Survey Question List – Color Coded

1. Type of organization you work(ed) for
   A. Aerodrome operator
   B. Aircraft operator
   C. Air Navigation Service Provider (i.e. ATS, MET, CNS)
   D. Maintenance organization
   E. Flight Training Organization
   F. Ground Handling Service Provider
   G. National aviation authority
   H. Int’l organization (i.e. ICAO/EASA)
   I. Int’l association (i.e. ACI, IATA)
J. Specialist / Consultant in regards to operations or safety and/or quality management in aviation
K. Other (If other please specify what): _______________________

2. Size of organization (number of employees)
   A. 1-20
   B. 21-50
   C. 51-100
   D. 101-200
   E. Over 200

3. Region?
   A. Africa
   B. Asia and the Pacific
   C. Europe
   D. Latin America and the Caribbean
   E. North-America

4. The organization I work(ed) for:
   A. Has not implemented SMS but is required to do so
   B. Is in an implementation phase for SMS
   C. Has successfully implemented SMS
   D. Is not required to implement SMS

5. There is a regulatory requirement for the organization I work(ed) for to implement an SMS?
   (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)

6. Who holds ultimate accountability for safety in the organization?
   A. Safety Manager
   B. CEO/MD/DG
   C. Quality Manager
   D. An Operational Manager (e.g. aerodrome manager, COO, airfield operations manager, Vice President of flight operations, head of section or head of division)
   E. Other (if other please specify who): _______________________

7. Who has primary responsibility for maintaining and applying the SMS in daily operations?
   A. Quality Manager
   B. An operational manager
   C. CEO/MD/DG
   D. Safety Manager
   E. Other (If other please specify who): _______________________

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<td>8.</td>
<td>SMS is based on QA principles (Quality assurance principles to manage safety)? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>9.</td>
<td>In the organization, there is a clear difference between a “safety process” (e.g. daily runway inspections) and a “safety management system’s process” (e.g. the risk management process)? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>10.</td>
<td>There is a mandatory reporting system (procedure) in place in the organization? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>11.</td>
<td>There is a voluntary safety reporting system (procedure) in place in the organization? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>12.</td>
<td>Just culture principles are stated in the safety policy of the organization? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>13.</td>
<td>The person managing the daily operation of the SMS must have knowledge, understanding and training both in QA principles and in aviation principles such as design, maintenance or operation? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>14.</td>
<td>Other management should have some knowledge and training in QA principles in addition to their operational / aviation principles? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>15.</td>
<td>SMS is beneficial for aviation safety in the organization I work(ed) for? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>16.</td>
<td>SMS is beneficial for aviation safety in general (the whole industry world wide)? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>17.</td>
<td>The process of implementing and maintaining an active and functioning SMS in the organization has been successful? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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<td>18.</td>
<td>Sufficient guidance was provided/made available (e.g. from ICAO and Authorities) for the implementation of SMS? (Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A)</td>
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| 19. | Sufficient relevant training has been provided for implementing SMS?  
(Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A) |
| 20. | Implementation of SMS is/was a large change for the organization?  
(Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A) |
| 21. | A “change management” process was implemented in relation to the implementation of SMS in the organization?  
(Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A) |
| 22. | A person (e.g. a project manager) was assigned to manage the implementation of SMS in the organization I work(ed) for?  
(Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A) |
| 23. | Implementation of a “change management” process is useful when management systems are implemented?  
(Strongly disagree - Disagree - Neither agree nor disagree – Agree - Strongly agree – N/A) |
| 24. | Is there anything you want to add or comment on the survey or the implementation of SMS in the organizations you work(ed) for? _______________|

Definitions for the purpose of answering the questionnaire were provided with the survey:

Some of the following questions refer to the organization you work(ed) for and other refer to your opinion.

Definitions and Abbreviations

**CEO/MD/DG** – Describes the position of the most senior manager in an organization which is an association, institute, corporation or a company, typically reports to a board of directors.

**Change management** – A systematic approach to manage a change.

**Change management process** – A defined and implemented process based on a systematic approach to manage a change.

**ICAO** – International Civil Aviation Organization
Management system - management systems such as Quality Management System, Security Management System, Environmental Management System, Safety Management System, etc.

QA – Quality Assurance

SMS – safety management system - A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

-END-
Annex 4

Color coded table with answers to question 24

Question 24: Is there anything you want to add or comment on the survey or the implementation of SMS in the organizations you work(ed) for?

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<tr>
<th>#</th>
<th>Responses</th>
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<tr>
<td>1</td>
<td>Cultural change and corporate “buy in” is very difficult.</td>
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<tr>
<td>4</td>
<td>Main challenge in implementing Safety Management System in one organization is about changing someone’s culture and mentality not about procedures! Good judgment comes from experience. Unfortunately, the experience usually comes from bad judgment.</td>
</tr>
<tr>
<td>44</td>
<td>Culture is the most challenging part of implementation, if it was to be done again, companies should be encouraged to give regard and understanding to their present state in order to address or implement properly/efficiently, otherwise time and funds may be allotted unwisely in those first few years and safety could be compromised during the implementation phases where present culture has not been fully understood</td>
</tr>
<tr>
<td>50</td>
<td>A better Safety culture</td>
</tr>
<tr>
<td>2</td>
<td>The FAA guidance on SMS has not been very straightforward, so airports are behind the rest of the world.</td>
</tr>
<tr>
<td>32</td>
<td>Implementation is in part an academic exercise meaning that it takes intelligence. The process implies a capability to do it. That is not always the case. Mechanics are not necessarily equipped to do something this sophisticated.</td>
</tr>
<tr>
<td>42</td>
<td>Once implementation has been completed, there is not enough ongoing training or refresher training in SMS principles and how to apply them to everyday airport operations. This is always due to lack of funding or appetite displayed by Senior Management</td>
</tr>
<tr>
<td>3</td>
<td>it is easier for organization with successfully implemented QMS implement SMS as there are several common elements. But I don’t thing that QMS is prerequisite for SMS as any SMS system consists of all elements necessary to run SMS without QMS.</td>
</tr>
<tr>
<td>7</td>
<td>With mandatory requirements for QA systems and Occurrence Reporting SMS Implementation was a add on to the already established system</td>
</tr>
<tr>
<td>15</td>
<td>A lot of work has been done but I still suggest for improvement on TQM Principles</td>
</tr>
<tr>
<td>19</td>
<td>QA is the basis for the/an AMO portion of the organization and risk management is the basis for The/An Operational portion of an organizations SMS</td>
</tr>
<tr>
<td>27</td>
<td>SMS must be developed internally and should not be 'bought in' from a consultant. ownership of the system is very important</td>
</tr>
<tr>
<td>29</td>
<td>In our case it was mainly a matter of adding two processes to existing quality system. A) Proactive Hazard identification and risk mitigation. B) Reactive investigation of incidents to identify and act on areas of improvement (Lessons learned)</td>
</tr>
<tr>
<td>35</td>
<td>Design &amp; Manufacturing organizations rely on their Continued Operational Safety programs as well as QA for SMS.</td>
</tr>
<tr>
<td>36</td>
<td>QA is an important part of SMS but is not what it is predicated on. You can have a consistent operation that is consistently unsafe. QA enables continuous improvement of the SMS. It ensures processes are being carried out as planned, but does not ensure the processes are correct. Management does not need to know QA principles but does need to know how to report into the system and why.</td>
</tr>
<tr>
<td>37</td>
<td>They can become too complicated - keep things simple!</td>
</tr>
<tr>
<td>38</td>
<td>SMS was already implemented but our organization had to improve it and improved it we did.</td>
</tr>
<tr>
<td>47</td>
<td>Implementing SMS was not so difficult for my airport because my airport organization itself had performed construction and have been operating my airport. Construction Safety philosophy is so identical with SMS. My airport organization is an airport builder and an operator. During the construction, we used to consider everything as operation perspective.</td>
</tr>
<tr>
<td>52</td>
<td>QA is foundational to successful SMS implementation</td>
</tr>
<tr>
<td>8</td>
<td>SMS for airworthiness has not been implemented in EASA IR</td>
</tr>
<tr>
<td>10</td>
<td>SMS has not been fully implemented</td>
</tr>
<tr>
<td>20</td>
<td>Although my organisation is not required to implement SMS, I have answered the questions based on our implementation of a regulatory management system and what I consider to be essential for SMS.</td>
</tr>
<tr>
<td>23</td>
<td>the case of SMS in EASA is a bit special, hence some items are ticked 'N/A'</td>
</tr>
<tr>
<td>26</td>
<td>The questionnaire is not really adapted to my organisation</td>
</tr>
<tr>
<td>33</td>
<td>While ICAO is employing a more risk-based approach and using data more an more to drive its activities, it has not yet implemented a formal SMS.</td>
</tr>
<tr>
<td>11</td>
<td>Full management support is essential, this I have enjoyed</td>
</tr>
<tr>
<td>12</td>
<td>SMS was not taken as a serious issue at strategic level of management</td>
</tr>
<tr>
<td>21</td>
<td>SMS shall be always supported by senior management and civil aviation authorities shall be supportive in whole process of running SMS.</td>
</tr>
<tr>
<td>24</td>
<td>the adoption of SMS needs to start at the top of the organisation to be effective</td>
</tr>
<tr>
<td>17</td>
<td>It takes at least 5 years to implement SMS efficiently</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>22</td>
<td>a dedicated team must be put together and time made to implement SMS effectively</td>
</tr>
<tr>
<td>25</td>
<td>Significant achievement that took dedicated resources and over 24 months to implement with assistance from fellow airport operators</td>
</tr>
<tr>
<td>46</td>
<td>every person felt he had a role in the process of SMS</td>
</tr>
<tr>
<td>51</td>
<td>It's a major change which takes years to be fully implemented</td>
</tr>
<tr>
<td>14</td>
<td>It works well, and is a strong basis for decisions</td>
</tr>
<tr>
<td>39</td>
<td>I have worked for two large organisations that have both fully implemented SMS. This is a useful tool to ensure the safety of activities and for maintaining the reputation of the organisation.</td>
</tr>
<tr>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>no</td>
</tr>
<tr>
<td>13</td>
<td>1/ Question 16 should be &quot;is&quot; not &quot;in&quot;; 2/ The questions are &quot;leading questions&quot;, and almost ask for the answer; 3/ perhaps questions that are not so limited in their selection of answers, trying to get opinions and points of view would be better?</td>
</tr>
<tr>
<td>16</td>
<td>I would only like to commend such survey, it is useful for you to obtain information, but also for us as respondents, to serve as a guideline on what our shortcomings are. Regards, [Signature]</td>
</tr>
<tr>
<td>31</td>
<td>i am looking for consultation expert to implement sms</td>
</tr>
<tr>
<td>40</td>
<td>Eg starfaði ekki hjá fyrirtækinu þegar SMS var innleitt. (english translation: I didn't work for the organization when SMS was implemented)</td>
</tr>
<tr>
<td>41</td>
<td>the answers where more addressed to the Airport SMS implementation</td>
</tr>
<tr>
<td>43</td>
<td>NO</td>
</tr>
<tr>
<td>45</td>
<td>Yes we sell and implement safety management software, provide safety auditing services and safety consulting</td>
</tr>
<tr>
<td>49</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>International Airport pursues a philosophy of a comprehensive safety department that includes both safety processes as well as SMS in a single organisational entity headed by a senior manager.</td>
</tr>
<tr>
<td>28</td>
<td>Implementing SMS requires full engagement with all staff. If SMS is simply a set of documents, policies, and procedures it will not be successful in managing safety effectively.</td>
</tr>
<tr>
<td>30</td>
<td>to maintain a SMS should be done by the safety manager and not the operational manager.</td>
</tr>
<tr>
<td>34</td>
<td>SMS Implementation was stuck in the safety office for some time, managers were happy to report items or discrepancies but not to take responsibility or action to correct. Individual managers find it too hard to maintain a risk register for their sections.</td>
</tr>
<tr>
<td>48</td>
<td>Lot of experience in our organization, however management of change still poses challenges</td>
</tr>
<tr>
<td>53</td>
<td>Change management process would have been a good guidance to have before implementing.</td>
</tr>
</tbody>
</table>

- END -