Lokaverkefni til MS-prófs í mannaðssússtjórnun

“Focus on what is correct, not who is correct”
Competence development and training of airline pilots

Hildur Jóna Ragnarsdóttir

Leiðbeinandi: Inga Jóna Jónsdóttir, dósent
Janúar 2018
“Focus on what is correct, not who is correct”

Competence Development and Training of Airline Pilots

Hildur Jóna Ragnarsdóttir

Lokaverkefni til MS-gráðu í viðskiptafræði
Leiðbeinandi: Inga Jóna Jónsdóttir, dósent

Viðskiptafræðideild
Félagsvíslasvið Háskóla Íslands
Janúar 2018
Focus on what is correct, not who is correct: 
Competence Development and Training of Airline Pilots 

Ritgerð þessi er 30 eininga lokaverkefni til MS-prófs við Viðskiptafráðideild, Félagvísindasvið Háskóla Íslands.

© 2018 Hildur Jóna Ragnarsdóttir
Ritgerðina má ekki afrita nema með leyfi höfundar.

Prentun: Háskólaprent
Reykjavík, 2018
Preface

This research project is a 30 credits master’s thesis within the 90 credits master’s programme of Human Resource Management in the School of Business at the University of Iceland. The thesis was written between June 2017 and December 2017. My instructor was Inga Jóna Jónsdóttir, senior lecturer at the Faculty of Business Administration within the University of Iceland.

The idea to write about the competence development and training of airline pilots developed after completing Inga Jóna Jónsdóttir’s course Human Resource Development in the spring of 2017. My other motivation was the large number of pilots in my family and my interest in understanding their non-technical training.

I would like to thank Inga Jóna Jónsdóttir for her help and guidance throughout the writing process. I also want to thank my family and friends for their support during my studies.

Reykjavík, 3. January 2018

Hildur Jóna Ragnarsdóttir
Abstract

This study focuses on the knowledge, skills and attitudes needed nowadays in order to be an airline pilot. It looks into the attitudes and experiences of pilots towards their non-technical training, crew resource management training (CRM) and how they apply it into the cockpit.

The main results of this study show that, according to the interviewed pilots, airline pilots will need a mix of interpersonal and technical competencies in order to be great pilots. The technical skills consist of knowing your aircraft and its instruments as well as the Standard Operating Procedures (SOPs), just to name a few. Many of the interpersonal skills which were mentioned are similar to the CRM training elements, e.g., communication skills, teamwork, empathy and understanding others, situational awareness, stress management, cultural awareness and so forth.

Other findings demonstrate that all the interviewees had a positive attitude towards CRM training. A few of them had some reservation in the beginning but realised that CRM training was useful and necessary for everyone. Captains recalled experiences of CRM in the past and how difficult it was for older captains to change their way of working and become more receptive to the co-pilots. All of the respondents understood that CRM was introduced to decrease human errors made in the cockpit by reducing the captain’s autocratic behaviour and encourage co-pilots to speak up, in order to create a more team-oriented environment in the cockpit. They stated that it is important for everyone to go through the same non-technical training in order for everyone to be on the same page.

In the end, all of the pilots stated that they apply CRM into the cockpit. Some say they use it unconsciously while others apply it by using all the resources available to them. Moreover, pilots use it in order to keep a good atmosphere inside the cockpit by applying good communication skills, showing empathy and understanding as well as considering others opinions and delegating work tasks in a firm, friendly and fair way.
# Table of Contents

Table of Figures ........................................................................................................................................ 8

Tables ...................................................................................................................................................... 8

1 Introduction ........................................................................................................................................... 9

2 Competencies in an organizational context .......................................................................................... 11

2.1 Competencies needed at work .......................................................................................................... 11

3 Competence development ..................................................................................................................... 14

3.1 How to improve competence development ...................................................................................... 15

3.2 Results of competence development ............................................................................................... 17

4 A pilot’s job .......................................................................................................................................... 20

5 What is CRM? ....................................................................................................................................... 22

5.1 CRM training ..................................................................................................................................... 22

5.1.1 CRM training elements .................................................................................................................. 25

6 The importance of teamwork .............................................................................................................. 27

6.1 How to maximize team performance ................................................................................................ 27

6.2 Team leaders and team members ..................................................................................................... 30

6.2.1 The effects of the captain’s personality and skills ....................................................................... 32

6.3 Regulatory and organizational influences on team performance .................................................. 34

6.4 Crew Member Diversity ................................................................................................................... 35

6.5 How to handle unexpected situations ............................................................................................... 36

7 Evaluation and results of CRM ........................................................................................................... 38

8 The supply of new training programmes ............................................................................................. 41

8.1 Multi-Crew Cooperation (MCC) Course ............................................................................................. 41

8.2 Evidence-Based Training (EBT) ......................................................................................................... 41

9 Methodology ........................................................................................................................................ 43

9.1 Qualitative research ............................................................................................................................ 43

9.2. Participants in the research .............................................................................................................. 43

9.3 Data collection ................................................................................................................................... 44
Table of Figures

Figure 1: Systematic Training Cycle……………………………………………………………………………….17
Figure 2: Kirkpatrick’s evaluation model……………………………………………………………………………….18

Tables

Table 1: Participants’ characteristics………………………………………………………………………………………44
Table 2: Thematic analysis……………………………………………………………………………………………………46
1 Introduction

Iceland’s first passenger flight on behalf of ‘Flugfélag Íslands’ was a domestic flight on the 4th June 1928, not even 100 years ago, and the first international flight by an Icelandic airline was on the 11th July 1945 which flew to Scotland (Flugsafn, n.d.).

Today, Iceland’s largest airlines, which are Icelandair Group, WOW air and Air Atlanta Icelandic, employ more than 1,000 employees with Icelandair Group engaging around 3,900 employees in 2016 (WOW air, n.d.; Atlanta, n.d.; Icelandair Group, n.d.). The airline industry is therefore ever growing and some even talk about a pilot shortage where Boeing and Airbus are predicting the need for 617,000 new pilots by the year 2035 (Pilot Career News, 2016). This shortage will need to be fulfilled with quick and efficient training.

The object of this research project will focus on the crew resource management (CRM) training of airline pilots. Kanki, Helmreich and Anca (2010) recount that around the late 1970s and early 1980s, the National Transportation Safety Board (NTSB) in America recommended airlines to introduce CRM training due to airline accidents made by human errors. In Iceland, Samgöngustofan and Flugmálafélag Íslands work together to assure flight safety and how pilots can contribute to that safety (Flugmálafélag Íslands & Samgöngustofa, 2017). In Europe, there is the European Aviation Safety Agency (EASA), which includes Iceland as well. Their mission is to keep EU citizens’ safety and environmental protection to a maximum and has made recent public decisions regarding CRM training in 2015 (EASA, n.d.).

CRM training helps reinforce certain non-technical competencies needed for the job, e.g., teamwork, communication, leadership and so forth, in order to decrease incidents and accidents, which are associated with CRM elements, from occurring (EASA, 2015a).

In order to reveal the level of importance of CRM training and continued competence development in the aviation industry, this research will look into pilots’ competencies needed to perform the job effectively and safely as well as looking into their attitudes towards and experiences of CRM training and whether they are able to put what they have learned into practice, by answering the following main research questions:
1. What knowledge, skills and attitudes do pilots need so that they are able to execute their job effectively and safely?
2. What are the pilots’ experiences and attitudes towards CRM training?
3. How do pilots use what they have learned in their CRM training in real life situations in the cockpit?

This research project will start with a literature review of competencies including knowledge, skills and attitudes, competence development and competence specificity as well as looking into CRM including its training elements and other additional training programmes. The next chapters will contain the methodology of the qualitative research used as well as the results of interviews taken with 6 pilots. The last chapters, the discussion and the conclusion, will try to answer the three research questions based on the literature review as well as the results from the interviews taken and conclude the research project.


2 Competencies in an organizational context

Mankin (2009, p. 471) defines competencies as, “a broad grouping of knowledge, skills, and attitudes (KSA) that enable a person to be successful at a number of similar tasks”. In an organizational context, this means that work-related tasks demand a combination of specific KSA to perform tasks properly and are most likely gained through previous experience (Mankin, 2009; Landy & Conte, 2013). Competencies are therefore seen as the individual or collective ability to achieve a goal, complete a task or handle a situation in a successful way. This ability consists of perceptual motor skills, cognitive skills, social skills as well as personality characteristics and personal motivation, values and attitudes (Ellström & Kock, 2008).

The company will have to set specific job requirements which describe what kind of competencies the company is looking for, for each and every job position. These job requirements are made out of competencies with different types and different combinations of knowledge, skills and abilities (KSA) needed to execute a particular job effectively and safely (Mankin, 2009). Knowledge is obtained through formal education, training or particular experiences whereby information and facts about a specific field are acquired. Knowledge can be about various job tasks, concepts or principles but also about facts and procedures. Skills can be interpersonal and technical skills as the ability to communicate with co-workers or the ability to think about resolutions to problems and being able to execute them. Attitudes are seen as various behaviours on the job (Mankin, 2009; Landy & Conte, 2013). These KSA can also be developed and trained within the organization by making training programmes available for employees which would be either mandatory or optional.

Another important subject are core competencies which are, “the combination of an organization’s technologies with the knowledge, skills, and abilities of its employees. It determines the viability and competitiveness of an organization” and which will be important in the evidence-based training (EBT) chapter later on (Mankin, 2009, p. 471).

2.1 Competencies needed at work

Nordhaug (1998) creates a specific framework which classifies different work-related competencies needed by employees to be productive and successful in their company. He adds the importance of individual competencies as well as non-task specific competencies to the
already existing notion of firm- and task-specific competencies. Companies will need individuals with specific competencies to perform the job, therefore the classification of competencies.

There are different types of competencies needed for different careers. In general, technical, interpersonal and conceptual skills are needed for any managerial work. Technical skills are the ability to use specific tools and equipment as well as knowing all about processes and various techniques used for the job. Interpersonal skills are associated with communication, cooperation and human behaviour in general whereas conceptual skills consist of problem solving, efficiency and ability to see potential problems and solve them appropriately (Nordhaug, 1998).

There are six competence types which are meta competence, general industry competence, intra-organizational competence, standard technical competence and idiosyncratic technical competence. According to Nordhaug (1998), every profession has specific work-related competencies to fulfil which can be firm-, task- or industry-specific and are either high or low.

Employees who possess high firm-specific competence are only able to work for that one specific firm whereas low firm-specific competence is defined by the fact that an employee’s competence is not limited to one specific firm. High industry-specific competence permits employees the ability to work for any firm in the specific industry, similar to low firm-specific competence. At last, low task-specificity is seen as being competent in not one singular task but many different tasks whereas high task-specificity concentrates on one specific task which is not connected to other further tasks. Low task-specific competence can be seen as tasks connected with interpersonal or conceptual skills whereas high task-specificity is more connected with technical skills. Every career possesses a different combination of competence needed.

First of all, there is meta competence which is neither firm-, task- nor industry-specific and is therefore low on all spectrums. Meta competence is a combination of underlying interpersonal and conceptual KSA which can be applied to various situations and tasks, e.g., communication skills, ability to understand and empathize with others, ability to keep calm in stressful situations as well as problem solving skills and openness for change. Meta competence can be introduced and reinforced through formal education but also through upbringing, socialization as well as previous work experiences. Meta competence can be used in any firm or industry as well as for any task (Nordhaug, 1998).

Second, there is the general industry competence which incorporates low task- and low firm-specific competence but possessing high industry-specific competence is crucial. General
industry competence makes it easier for the employee to change between firms in the same industry and it is mainly acquired through experiences in that specific industry as well as knowing all about the industry (Nordhaug, 1998).

Furthermore, there is the intraorganizational competence which is low on task- and industry-specificity but is high in firm-specific competence. Here there is need for intraorganizational knowledge where employees know all about the firm’s objectives, culture and regulations as well as being able to form networks and relationships with other employees. This competence is learned through experiences but also through the specific workplace itself and co-workers. The firm can reinforce this competence by offering training, mentoring and on-the-job programmes inside the firm (Nordhaug, 1998).

Then there is the standard technical competence which has low firm- and industry-specific competence but has high task-specificity. This competence is task-oriented and focuses on specific operations as for example in computer programming or other technical skills. Standard technical competence is often taught in formal education settings or employees are encouraged to participate in training programmes offered by the company itself (Nordhaug, 1998).

Moreover, the technical trade competence is seen as having high task- and industry-specific competence but low firm-specificity. In this case, employees most often go through an educational system where they learn the competencies needed for the job but will also learn a lot through experiences on the job itself. Technical trade competence is not firm-specific but industry-specific and therefore employees who possess the technical trade competence are able to work for any company in a specific industry (Nordhaug, 1998).

At last there is the idiosyncratic technical competence which is high in task- and firm-specificity but low in industry-specificity. The competence is focused on only one company and on specific technical tasks in that company, here the employee can be seen as stuck within a company as well as in a specific position in that company (Nordhaug, 1998).

Different careers will need different sets of competencies and will have a different combination of these specific competencies.
3 Competence development

As explained in the previous chapter, competencies are a combination of KSA which help employees perform their specific tasks efficiently (Mankin, 2009; Ellström & Kock, 1998). Landy and Conte (2013, p. 304) define development in an organizational context as, “formal education, job experiences, mentoring relationships, and assessments of personality and abilities that help employees prepare for the future”. This means that development is a learning programme which prepares employees for different aspects in the future as well as increases their individual KSA in the long term (Mankin, 2009). When combining the two, competencies and development, the result is a training programme which broadens and reinforces employees’ KSA.

Competence development can be seen as a form of formal training of employees but also as workplace learning. Formal training is curriculum based whereas workplace learning is practice based. By having a combination of the curriculum and practice based learning, employees are able to put what they have learned in theory into practice on the job itself. Through learning and training, people will be able to change and improve their abilities. This change in abilities can be social, emotional, physical or cognitive. Therefore, employees are able to develop their competencies as well as their qualifications but will also thrive socially and personally (Illeris, 2003).

Learning is either an interaction process, which is social and cultural and depends on the learner and his environment, or an acquisition and elaboration process, which is psychological, emotional or cognitive. Employees learn different aspects through different processes. Knowledge and skills are developed through cognitive learning, curriculum based learning. Emotional learning depends on the motivation, attitudes and emotions towards learning, hence, the reasons which motivate employees to learn. Communication, cooperation and empathy are developed through social and cultural learning, through interaction with co-workers and the surroundings (Illeris, 2003).

Yorks (2005, p. 9) states that human resource development, which helps organizations as well as employees to develop their competencies, is supposed to “prepare and continually develop people and learning systems to achieve the highest possible performance in order to meet strategic goals”. Therefore, it is important to introduce competence development, such as
learning programmes or workplace learning, when companies are hiring, when employees are being promoted as well as when employees are being transferred. In that way, employees possess all the KSA needed to complete their specific job requirements successfully. Another reason for firms to put emphasis on competence development is during organizational change or change in work-related tasks. With competence development, there is supposed to be a change. This can be a change in knowledge, skills, abilities, values, behaviours or any other human competence in order to increase job performance (Ellström & Kock, 2008).

3.1 How to improve competence development

A systematic training cycle is a training intervention based on four stages which can be changed, corrected and repeated as many times as necessary with the goal to improve competence development and training programmes (Mankin, 2009).

Several aspects need to be looked into for a company to offer successful training programmes as well as continued competence development. The company will need to execute a systematic training cycle in order to recognize their training needs for the near future. By creating a systematic training cycle, the firm will be able to find out where training is needed, what should be trained and who is in need for training as well as what the employees’ and company’s training goals are and finally evaluate the effectiveness of the training programme (Mankin, 2009; Landy & Conte, 2013; Kanki et al., 2010). It will develop the firm, the employees and training programmes in a way that overall performance increases as well as set goals are met (Yorks, 2005).

The systematic training cycle is shown in figure 1. based on the systematic training cycle by Mankin (2009), the Goldstein and Ford training model and training needs analysis discussed by Landy and Conte (2013) as well as the Wilson’s Human Resources Wheel shown by Yorks (2005).

The first phase of the systematic training cycle is to identify training and development needs in the company by making a training needs analysis which incorporates organizational, task and person analysis. Companies will have to execute a training needs analysis so as to know what kind of core competencies are needed to complete various work-related tasks (Landy & Conte, 2013). First of all, for a training needs analysis to work and be respected by employees, it is crucial to have the support from senior management to develop training and learning in the
company and to keep it up to date. The organizational analysis looks into where training is needed as well as the learning climate, the firm’s future objectives, goals, requirements and strategies. The task analysis examines the employees, especially their work-related tasks, job requirements and the KSA needed for the job. In this case, the training needs analysis will focus on what kind of training employees will need so that they are able to execute their job properly. This can be an evaluation and development of competencies in a company. The person analysis will look into employees’ motivation, experiences as well as employees’ performance in order to decide who needs training and what kind of training they need (Mankin, 2009, Landy & Conte, 2013; Yorks, 2005; Kanki et al., 2010). The organization will have to decide on what kind of training and development is needed, where is it needed and who needs it.

When the training and development needs have been identified, the design and planning phase can start. There is a lot that has to be considered when designing a training programme. The learning objectives will have to be clear in order to identify the desired performance objectives. The company will have to decide which type of training will meet their future objectives and goals as well as to fulfil their employees’ needs. It will also have to be designed for the right crowd and taught with the right approach in order to be successful. The firm will need to decide which solutions are appropriate and feasible to different problems. Time and budget constraints will need to be considered too. Job and organizational design as well as human resource planning is in progress (Mankin, 2009).

The third phase of the systematic training cycle is putting the theory into practice, so putting the new training plan into use. The smallest things can have a negative impact on the delivery of the training programme, e.g., quality of material or the instructor’s attitude. It is important to have good support from senior and upper management as well as from the instructors to implement change and encourage new training needs (Mankin, 2009).

The fourth and last phase is evaluating the whole systematic training cycle from stage one to stage three to determine what was successful and what needs additional improvement. The type of evaluation is fixed beforehand in the design stage and is based on stage one, hence if the training and development objectives and goals of the company were met. Evaluation can be measured by the job performance of employees after having been through the new training as well as by simple feedback from the employees after the training. Training and development
objectives are met if there has been improved performance which benefit either the organization or employees.

Figure 1. Systematic Training Cycle (Mankin, 2009, p. 142).

In case of the systematic training cycle not being successful, the company will repeat the cycle until the right methods of training and competence development are found and increased performance is established (Mankin, 2009; Yorks, 2005).

3.2 Results of competence development

The results of competence development can be individual, group or organizational change where there is development of either knowledge, skills, behaviour or values. An evaluation model is presented by Kirkpatrick (figure 2.) showing how training criteria is categorized and evaluated (Ellström & Kock, 2008; Landy & Conte, 2013).

Results can be measured by participants’ opinions, attitudes and satisfaction with a training programme and how effective it was for them by answering a simple questionnaire. It concerns the fact if the participants were satisfied with the training programme or not. This would be level one in Kirkpatrick’s model, the reaction criteria.
The second level, the learning criteria, actually looks into how much an employee learned and was able to retain from the training programme by testing and evaluating them outside of the workplace with a written or practical test.

The third level, behavioural criteria, evaluates how well employees are able to put into practice what they have learned during the training programme. These results are categorized as individual changes in behaviour or knowledge and skills but also as better overall job, task and team performance. These results are found when looking into on-the-job behaviours or performances.

The last and fourth level of training criteria is the results criteria which looks at organizational changes after a training programme is completed. Emphasis is put on whether there has been organizational change in costs, satisfaction, productivity or in reducing mistakes (Ellström & Kock, 2008; Landy & Conte, 2013; Kanki et al., 2010).

![Kirkpatrick’s evaluation model](Landy & Conte, 2013, p. 299)

A study made by Nordhaug (1998) came to the conclusion that participating in training motivated individuals to participate in further training and education as well as further job development, e.g., motivation for promotion. It also showed psycho-social development where individuals developed more self-confidence. Participation in training programmes also showed more individual responsibility as well as job satisfaction.
There are various reasons which might affect individual’s readiness to participate in training programmes. Studies have shown that adults with a high educational level will be more eager to participate in further training on the job than those who have a lower educational level (Ellström & Kock, 2008). Another reason for employees to be reluctant to participate in further training is the link between the training programme and their job requirements. In addition to the applicability of the training elements into their everyday tasks on the job. Adults are said to only learn what is significant to them and their job and therefore only take responsibility for what they want to learn and what is mandatory to learn (Illeris, 2003).

In the end, for a training programme to be effective, there needs to be strong support for education in the workplace from senior management as well as their belief in education to better and develop the organization further even though these training programmes might be mandatory (Ellström & Kock, 2008).
4 A pilot’s job

This research project looks into the career of an airline pilot and what kind of KSA are needed for the job as well as important CRM elements. However, before going into detail about CRM, it is important to know what the job of an airline pilot entails.

Airline pilots can operate passenger or cargo planes and there are always at least two pilots in the cockpit, the captain or pilot in command and the co-pilot or the supporting first officer. On longer flights, three or even four pilots will have to be on board so that they are all able to rest from operating the plane (Prospects, n.d.).

Airline pilots have various responsibilities regarding their flight plan, flight route, passengers or cargo as well as making crucial decisions based on the weather and having to work interdependently. They will have to make calculations on how high, how fast they will have to fly and how much fuel, kerosene they need (Prospects, n.d.).

Moreover, they need to check on the safety, navigation and operating systems before take-off in addition to be able to comprehend the data shown by the plane’s instruments. The pilots will have to be in constant contact with air traffic control before, during and after the flight. In case of a passenger flight, pilots will need to communicate with and inform the cabin crew as well as the passengers throughout a flight. During the flight, pilots have to check up on possible changing weather conditions, their position and performance in the air as well as the air traffic itself and even possible emergencies. After the plane has landed, pilots need to make a report if anything unusual occurred as well as to fill in flight hours of the plane and log in their own flight time (Prospects, n.d.).

An airline pilot has specific tasks and therefore has to have specific skills and competencies as well as to undergo strict training before becoming an airline pilot. When on the job, pilots are obligated to participate in ongoing simulator training every six months in order to keep their licence updated (Prospects, n.d.).

Also, the roles of the captain and the co-pilot are divided into pilot flying and pilot monitoring during the actual flight. These roles are interchanged between the captain and the co-pilot. The pilot flying is doing the actual flying and is operating the aircraft while the pilot monitoring is observing the pilot flying’s performance and progress of the flight (Prospects, n.d.; Kanki et al., 2010).
Due to the fact that airline pilots have all these previously named responsibilities, it is important for them to get the necessary training so that they are able to complete all these tasks effectively and safely which is where CRM training is introduced.
5 What is CRM?

CRM stood first for cockpit resource management but was changed into crew resource management because this kind of training is not only applied to the pilots anymore but to other aviation employees, e.g., cabin crew, flight dispatchers, or even to other industries as in health care where it is called crisis resource management (Kanki et al., 2010).

Kanki et al. (2010, p. 5) define CRM as “the application of human factors in the aviation system”; where interpersonal elements are introduced into the technical world of aviation. Kanki et al. (2010, p. 5) note that others have defined CRM as “using all available resources - information, equipment, and people - to achieve safe and efficient flight operations”; and where its goal is to strengthen the crew’s communication and management skills by emphasizing training of non-technical knowledge, skills and attitudes in their performance (EASA, 2015a). Also, West (2012) describes CRM as a way to develop team strategies and train crew into using their resources in an effective way in addition to offering constructive feedback after training.

It is a known fact that CRM was introduced to reduce human errors made in the cockpit by putting more emphasis on the interpersonal factors when operating an aircraft and is therefore very psychological in nature but also focusing on the concept of leadership and teamwork. CRM should facilitate interpersonal communication between all crew members, reduce the authoritarian behaviour of captains, make it easier for co-pilots to speak up and for crews to use all their resources available to them (Kanki et al., 2010).

5.1 CRM training

A lot of pilots, who are still working today, did not receive any initial CRM training and those who were flying when CRM training was introduced had to adjust to a new non-technical training programme which became mandatory (Kanki et al., 2010).

Kanki et al. (2010, p. 4) remark that there were pilots who disliked CRM training and thought of it being a “charm school, psychobabble or an attempted brainwashing by management”; due to the fact that many came from the single-pilot tradition in aviation which did not entail teamwork. With the addition of a co-pilot, it became difficult for captains, who were used to flying solo, to adjust to a new member in the cockpit who was supposed to share the workload with the captain as well as to offer support and reduce human errors. Kanki et al. (2010) also
mention that in the past, there was an unspoken rule that the co-pilot was not supposed to question the captain’s authority and choices or even errors made.

As stated before, CRM training started in the late 1970s by the NTSB in America. The first CRM training programme was introduced in 1981 by United Airlines after its crash in 1978 where the pilot in command failed to accept the co-pilot’s contribution to the situation while the co-pilot was not assertive enough to contradict the captain’s actions. CRM is supposed to change individual styles and behaviours in a way that it eliminates weaknesses so that co-pilots do not shy away to speak up and captains reduce their authoritarian behaviour, all in order to improve teamwork (Kanki et al., 2010; West, 2012).

CRM training incorporates the interplay of person and machine, training in interpersonal communication, leadership, decision making, teamwork, flight safety and situational awareness. Research shows that lack of communication or teamwork can lead to fatal accidents in aviation and therefore having pilots go through CRM training may reduce accidents, human mistakes and makes pilots more efficient and competent (Kanki et al., 2010).

CRM training is defined as the “instructional strategies designed to improve teamwork in the cockpit by applying well-tested training tools (e.g., performance measures, exercises, feedback mechanisms) and appropriate training methods (e.g., simulators, lectures, videos) targeted at specific content (i.e., teamwork knowledge, skills, and attitudes)”, thus by introducing pilots to specific training materials regarding certain aspects in their job with the right learning instrument, teamwork should increase (Salas, Wilson, Burke & Wightman, 2006, p. 392).

CRM training can be seen as a training programme which develops the crew’s competencies and capacity to change through learning. In the airline industry, CRM training puts emphasis on competency-based knowledge. Competency-based training is oriented on performance and marked by specified performance standards while including the measurement and development of performance (EASA, 2015b).

In order for pilots to achieve good CRM competencies, CRM instructors have to focus on developing pilots’ ability of using their available resources effectively as well as to acquire KSA needed to succeed on the job (Salas et al., 2006). These instructors need to go through CRM training themselves and other additional training and be able to assess the training programme and the pilots’ performance in a proper manner (EASA, 2015b).
The EASA (2015a) explains that CRM training can be classroom-based where individuals learn in groups outside of the normal work environment. Earlier on, CRM mainly consisted of classroom-based training. It can also be computer-based but is then mostly used as a self-study method. These two training methods are seen as training in a non-operational environment.

However, training is also done in a flight simulator so that pilots can practice hypothetical situations in a similar work environment as in real life, or on actual flight with a line instructor sitting behind the pilots in the cockpit, this would be seen as training in an operational environment or putting theory into practice. CRM training methods are classroom- and computer-based as well as operational, in simulators or line-oriented flight training, actual flights which are all followed by a check or a test (EASA, 2015b).

These checks and tests are similar to Kirkpatrick’s learning and behavioural criteria. The pilots are tested and evaluated in a simulator, outside of their work environment or even in their work environment on actual flights, on what they have learned and how their behaviour has changed due to the learning programme (EASA, 2015b).

The training is then analysed by doing pre-course reading and studies as well as to introduce different training procedures, the instructor has to be evaluated by his competence and performance as well as those who are in training have to be assessed. In the end, there needs to be an assessment on the effectiveness of the CRM training as a whole. This kind of assessment can be characterized as the results criteria by Kirkpatrick which would show if there has been organizational change as in CRM training being able to reduce accidents caused by human errors (EASA, 2015b).

The initial introduction of CRM into the aviation industry can be seen as being the result of a systematic training cycle and competence development. There was a need for a new training programme for interpersonal skills which would decrease the number of accidents caused by human error.

Reasons for an airline to invest in future competence development as CRM and other training programmes can be a technological-functional perspective where there is a need for new competence requirements because of changes in the company itself (Ellström & Kock, 2008). This might be the airline buying new airplanes to which the crew will need new technical training on or the airline changing organizational regulations.
5.1.1 CRM training elements

CRM is divided into different training elements. The European Aviation Safety Agency (EASA) highlights seven main CRM training elements.

The first element is the autopilot. Pilots are taught how to read, manage and operate the autopilot in a proper manner. It is very important for pilots to have good knowledge about the philosophy and reasoning behind the use of automation as well as knowledge about specific type-related differences depending on the aircraft.

The second element incorporates monitoring and intervening. Pilots are trained in observing the progress of the flight as well as when and how it is appropriate to intervene. This incorporates the tasks of the pilot monitoring rather than those of the pilot flying.

The third element is to develop resilience which is divided into two parts, mental flexibility and performance adaptation. Mental flexibility is the ability to identify critical changes before, during or after a flight. Pilots should be able to base opinions on different situations and find appropriate solutions to problems as well as to be open for new judgments and opinions from others. When talking about performance adaptation, CRM training puts emphasis on reducing hesitant, frozen or overreacting behaviour and train pilots in how to take actions in present situations and avoid or correct this sort of behaviour. Resilience development teaches pilots to realise what has happened, monitor the situation, predict or find the problem and in the end respond to the problem with the right solution and be capable of executing it.

The next training element in CRM is the surprise or startle effect during unexpected, unusual or stressful situations and how to handle these situations. Pilots are trained to manage the crew on board in case of unusual events. They are also taught to maintain and acquire structured behavioural reactions from the crew and be able to take back situational control and awareness after its loss.

Furthermore, CRM training introduces the element of cultural differences in case of multinational or cross-cultural crew members by emphasizing communicational differences or differences in how individuals read certain situations. Different cultures will have different work values. Some cultures put emphasis on individualism and others on collectivism, other cultures are more feminine others more masculine as well as the difference of having short-term or long-term goals. Individuals from different cultures working together have to be aware of each other's
differences and respect them in order to be able to work together effectively (EASA, 2015b; Landy & Conte, 2013).

The sixth element is operator’s safety culture and company culture where pilots learn about difficult operations and procedures.

The last element in CRM training are case studies where pilots can analyse incidents and look into what elements of CRM were missing but pilots are also encouraged to look into case studies with the successful use of CRM (EASA, 2015b).

Other CRM training elements include introduction to general CRM principles and objectives, the human factor, performance and limitation in aviation, threat and error management. Training elements regarding individuals which cover stress management, fatigue, assertiveness, situation and personality awareness, vigilance as well as attitudes, behaviours, human error and human reliability, ability of self-assessment and self-critique and at last information acquisition and processing. Pilots have to be able to work together as a team and need to manage and share their workload so there is a certain requirement for shared situational awareness, shared information acquisition and processing as well as effective communication and coordination with everyone involved. Pilots will be trained in leadership, delegation, decision-making and how and when to take action. They also need to know the company’s culture regarding operations, safety and regulations (EASA, 2015b)
6 The importance of teamwork

Most airlines have thousands of employees and hundreds of pilots working for them, the crew will therefore work with different crew members most of the time and their ability to work in a team effectively is immensely important and is therefore incorporated into CRM training (Landy & Conte, 2013).

A team is a group of people which have a common goal and are mutually dependent on each other to reach that goal as well as share responsibility regarding the results of their work. Teams are composed of various people with different knowledge, skills and abilities as well as experiences and personalities. Individuals with high cognitive abilities as well as showing personality characteristics as extraversion, agreeableness, conscientiousness and emotional stability are said to be more likely to perform well in a team and show greater overall team performance. Team members with shared mental models, for example, know how their team will work, have the same understanding of their required tasks, have better coordination and know how their team members will behave in certain situations which will lead to effective performance. However, no matter how different team members are from each other, mutual respect and support is crucial for teams to be effective (Torrington et.al., 2014; Landy & Conte, 2013; West, 2012).

Team performance can increase because of various personality characteristics as well as KSA (Landy & Conte, 2013). It is important that the knowledge, skills and attitudes of individual crew members complement each other and do not impose conflict because the crew’s effectiveness is based on their technical skills, their individual personalities as well as attitudes (Mankin, 2009; Chidester, Helmreich, Gregorich & Geis, 1991; West, 2012). According to Salas, Fowlkes, Stout, Milanovich & Prince (1999), CRM training increases teamwork behaviour in the cockpit. Pilots will need to be trained in teamwork behaviour, hence how to work with each other and how to perform their tasks properly so that successful and effective teamwork exists in the cockpit.

6.1 How to maximize team performance

Team performance, the result of teamwork, depends on three major aspects; the input factors, the group process and the output factors or simply known as the input-process-output model. It
explains how teams work and how they are able to increase their performance (Kanki et al., 2010; Landy & Conte, 2013; West, 2012).

The input factors consist of individual, group, organizational, regulatory or even environmental influences, hence what might affect the team’s work. Individual input factors consist of each individual’s intelligence, motivation, attitudes as well as the pilot’s physical and emotional state. Group factors consist of the team’s structure, norms and climate. The weather and the aircraft’s condition are environmental elements. Organizational factors and regulatory factors are all about the airline’s culture and job requirements as well as resources and training programmes provided by the organization. All these factors can influence the group process and performance and in the end the output or outcome of the team performance (Kanki et al., 2010; Landy & Conte, 2013, West, 2012).

The second aspect are the group process factors which is the relationship between the individuals in the group. The group process in aviation is divided into two functions, the first one being interpersonal and rational skills including communication, coordination, team formation, management and decision tasks. The second function is the way pilots work with the aircraft and perform tasks which entail situational awareness, workload management, aircraft control and procedural tasks. These two functions will need to be used interdependently during operation to achieve an overall successful performance (Kanki et al., 2010).

The third aspect is the outcome or output factors which are split into primary and secondary outcomes or results. The primary results emphasize on the safety and efficiency of the flight and the secondary results highlight individual satisfaction, motivation and attitude (Kanki et al., 2010; Landy & Conte, 2013).

The input factors will characterize the group performance and in the end the outcomes. In return, positive or negative outcomes of one flight will influence the input factors of the next flight and therefore also the new group performance as well as the new outcomes. West (2012) calls this reflexivity. Reflexivity is the combination of the words reflect and flexibility. This is where teams evaluate and review their performance in order to adapt or improve it in the future (West, 2012). After experiencing the results of one flight, the crew will be able to reflect on that experience and either improve or repeat the actions and thereby trying to maximize their performance. This will go on in a loop, hence learning from past outcomes and basing one’s future input on them (Kanki et al., 2010; Landy & Conte, 2013; West, 2012).
Individual team member’s job satisfaction is said to be associated with the ability to participate, task-related objectives, task variety and the significance of the tasks. When tasks provide these characteristics, teams are said to be more productive, effective and satisfied as well as showing greater team performance, team innovation as well as cooperation (Landy & Conte, 2013; West, 2012).

Good team performance depends on teamwork. Exchange of information as well as active and effective listening should be a pilot’s priority particularly when it comes to taking decisions during unexpected situations. Every team member will need to know what is going on as well as inform others of new actions being taken, so that there is no loss of coordination and everyone is still working towards achieving the same organizational goals. Teams will also have unspoken rules, norms, which will have to be followed whether that might be their dress code, behaviour, punctuality or politeness which can be characterised as input factors. When the norms of a team are followed there is the possibility of higher performance. As stated above, teams will need to use appropriate and effective communication especially for teams who execute interdependent tasks (Landy & Conte, 2013; West, 2012).

Kanki et al. (2010) state that for a team to be effective, there is need for proficiency, proficiency in performing the specific tasks required on the job as well as to be adaptable to changes throughout the flight.

Another important aspect in teamwork is their mutual decision making especially for pilots. Teams will need to avoid groupthink, where team members agree with one decision instead of proposing possibly better actions because they rather want to agree than disagree. Team members will need to look for different perspectives as well as consider and encourage different ideas or concerns from each individual in the team, so that the best course of action is chosen in the end. The co-pilot does not necessarily have to agree with the captain just because he has the authority. Most importantly, teams are motivated by their tasks stated in their job description, which have significant meaning, are important, need specific skills as well as autonomy and provide positive performance feedback (Landy & Conte, 2013; West, 2012).
6.2 Team leaders and team members

Incidents and accidents have occurred due to a captain’s autocratic leadership style, showing no cooperation or respect to his subordinates. However, incidents due to a captain’s lenient leadership style and his inability to exercise control and authority in the cockpit also exist (Kanki et al., 2010).

In the past, the captain was responsible for the whole operation and would therefore apply an autocratic leadership style during the flight but this has changed in the 21st century. The co-pilot has additional responsibility and the crew works more as a team while the captain applies a more receptive and delegating leadership style than an autocratic leadership style. Even though the captain is the leader and makes all final decisions due to the responsibilities that he holds, he is allowed and should listen to the other crewmembers’ opinions, ideas for resolution, questions as well as concerns and be receptive and adaptable to them because they are part of the team (Kanki et al., 2010).

A team leader is someone who enables team members to perform effectively but still exercising authority. A team leader creates a positive environment in which he clarifies each and every team member’s role and provides them with important and interesting tasks to reach set goals and objectives. He should know when to intervene as well as when and how guidance and positive feedback should be given (West, 2012).

In the cockpit there is a team leader and team members. The captain is seen as the leader of the crew who has a clear set of responsibilities and authority. The co-pilot would be considered a team member who is included in all decision-making and can perform similar if not the same tasks as the captain. The co-pilot is on the verge of being a leader himself but is not there yet because he needs more experience in the cockpit (Bjugstad, Thach, Thompson & Morris, 2006).

There are different leadership styles that fit different team members. Based on Hersey and Blanchard’s theory of pairing followership styles with leadership styles according to the followers’ maturity level, some team members are mature enough to need less guidance while there are others who have a lower maturity level and will therefore need a more encouraging leadership style with more guidance (Bjugstad et al., 2006).

The co-pilot, in this case, is a team member who has a high maturity level and can be categorized as possessing a high level of maturity and works in an autonomous and independent way. The delegating leadership style fits well with the characteristics of a co-pilot. CRM training
puts emphasis on delegating and teaches team leaders to provide team members with responsibilities. By using the right leadership styles appropriate for each team member, the overall performance is more likely to be higher (Bjugstad et al., 2006; EASA, 2015b).

As the team leader, the captain can also exercise a transformational leadership style which motivates the team members to reach set goals and perform well (West, 2012). West (2012) suggest that transformational leadership influences the team members in a way that they identify with and are inspired by the leader. The leader represents a role-model for the team members. This encourages leaders to behave in a respectable manner. A transformational leader also listens to his team members’ opinions and encourages them to participate in work-related tasks. Moreover, a team leader possesses a lot of experience and can therefore coach his team members (West, 2012). A captain is a transformational leader because he has the authority but allows and encourages the co-pilot to voice his opinions. He also possesses more experience than the co-pilot and is able to teach and coach him on different aspects of flying which the co-pilot has not experienced yet. The captain has to be a role-model for the co-pilot because eventually every co-pilot becomes a captain and has to perform the exact same role.

In this context, Barrett (2010) states that a successful leader is someone who shows integrity, consistency and competence on the job as well as being open and understanding to his team members’ opinions and ideas. These are characteristics which a captain has to show to his co-pilot. Another attribute which characterizes a key aspect in the team leader and team member relationship is their communication. Team leaders will need to provide their team members with the appropriate information and trust them to understand it and use it during their tasks. They have to assure that there is no miscommunication or misinterpretation of the information and that the team members are able to ask questions if there is any doubt in the information. A good team leader-team member relationship is based on a two-way communication and mutual trust (Barrett, 2010; Holbeche, 2006).

As Landy and Conte (2013) reveal, there are three key actions in which a captain shows leadership skills. Firstly, he emphasizes on aspects that are in need of coordination between the whole crew, in the cockpit and the cabin, so that everyone is well informed. Secondly, he sets clear rules regarding the crew’s behaviour. At last, he is able to manage his role and authority as a captain with respect and integrity and not abuse it (Landy & Conte, 2013). A good team leader
will assign tasks as well as roles to each team members, delegate work tasks and share workload but also encourage cooperation and resolve conflicts if needed (Mintzberg, 2011).

For a team leader to be successful at his job, he will need the support, trust and respect of his team members so that his reasoning, beliefs and authority are understood and accepted. A team leader who is respected by his team members is perceived as being knowledgeable, authoritative, confident, honest and trustworthy. A team leader who is not perceived well by his team members will never be able to win them over (Barrett, 2010).

By using the right leadership style, having a two-way communication system and show mutual trust and respect, team leaders as well as team members will show success.

6.2.1 The effects of the captain’s personality and skills

Personality is hard to define because it can depend on the context you are in as well as it being able to change, vary and even develop over time. Personality tests in an organizational context have been based on five traits: emotional stability, agreeableness, conscientiousness, openness to new experiences and extroversion. Some personality traits are said to be more fitting for one job than another but this should not be generalised because even though someone might not possess a certain personality trait, they can still be fit to perform the job (Torrington et al., 2014).

Kanki et al. (2010) make note of a study made to find out if there is a difference in crew performance depending on the captain’s personality and how he behaves in specific situations. The study looked into captains possessing interpersonal skills or not and being goal oriented or not. The study consisted of three groups of crews with different “types” of captains. The first crews had captains who were seen as possessing both high interpersonal skills as well as being goal oriented. The second group of crews had captains with high goal orientation but low interpersonal skills and the third one consisted of captains with both low interpersonal skills and goal orientation. The data showed that there was a clear difference in flight performance depending on the captain’s personality. Crews with captains who both possessed high interpersonal skills and were goal oriented scored the highest and did well on their performance throughout their flights whereas crews with captains who showed both low goal orientation and interpersonal skills scored poorer than the other two crews on their overall performance. These results conclude that even though pilots score well in training and are qualified pilots, their overall crew performance may depend on their personality, hence being goal oriented and
possessing interpersonal skills can improve overall performance in the cockpit (Kanki et al., 2010).

Kanki et al. (2010) also discuss the “boomerang” effect of CRM where participants show resistance to the CRM training and their attitudes change for the worse. Reasons for this resistance can be due to the trainee’s personality. Someone who is not goal oriented and lacks interpersonal skills is more likely to show resistance to this sort of training (Kanki et al., 2010).

A study made by Chidester et al. (1991) found out during simulator training that crews with a captain who was expressive, motivated and showed technical goal orientation performed better in stressful situations and performed overall more effectively than crews with less motivated captains.

Other studies have shown that when all members of a team have high cognitive ability, such as problem-solving and situational awareness, show extraversion, emotional stability, conscientiousness and agreeableness, their team performance is high as well. Chidester et al. (1991) also demonstrate that crews perform better when there is no hostility or arrogance in the cockpit but for the crew to coordinate well, they have to be willing to take on new and demanding work tasks. Certain personality characteristics can increase a team’s performance but one has to have in mind that every individual pilot, like everyone else, is different from each other and therefore one cannot generalize pilot’s personality characteristics, only suggest which characteristics might be more useful to achieve effectiveness on the job (Landy & Conte, 2013; Chidester et al., 1991).

While overall trainees have positive attitudes towards CRM training as well as showing the ability to use what they have learned in real-life situations or simulations, some studies have shown that it is harder to transfer various aspects of CRM into practice but this might depend on the individuals themselves and their personality characteristics (Salas et al., 2006).

A good leader, hence captain, is goal-oriented and gives feedback regarding his team members’ performance. Every employee needs to know the level of importance of their work and their tasks as well as what kind of outcome their contribution might have. By giving their team members the appropriate feedback, specific goals and instructions, team leaders are able to keep them motivated as well as showing them that their work is important and reaches successful results. Team leaders and team members, here captains and co-pilots, will have to have a similar
set of values and principles in order to accomplish mutual goals for their organization (Bjugstad, Thach, Thompson & Morris, 2006).

### 6.3 Regulatory and organizational influences on team performance

A crew’s performance can depend on the airline’s organizational culture and regulations. Landy and Conte (2013) discuss the fact that the crew’s performance can profit from organizational factors. The organization might emphasize specific goals for various aspects of safety, performance and efficiency as well as offer training programmes to increase the crew’s KSA. The airline will need to offer pilots the latest technical and information systems so that crews are able to use that information to find solutions to possible problems.

Another study wanted to find out what effect fatigue may have on the crew’s performance. Fatigue in the airline industry is seen as an individual factor influenced by organizational and regulatory factors, e.g., long flights and less crew rest. Contradictory to expecting tired crews to perform less well than fully rested crews, the crew that had been flying together for a few days performed better as a team than the crew that flew their first together. This shows that throughout the first days of working together, the crew becomes a team through their mutual experiences despite their fatigue (Kanki et al., 2010).

Another regulatory factor that might influence crew performance is ambiguity of regulations or rules of the organization. A pilot who ignores the “sterile cockpit” rule, which does not permit non-operational conversation under 10,000 feet between the crew due to the fact that the period between take-off and under 10,000 feet is considered the critical period of a flight, can have consequences on the crew’s performance and interaction (Kanki et al., 2010). Communication entails keeping everyone updated on the progress of the flight as well as keeping situational awareness high and manage and delegate the workload between the crew. Incidents happen due to miscommunication, so it is important to use emotional intelligence to know when, how and where communication is appropriate. Communication is though also important to build interpersonal relationships with the crew members and gain each other’s trust. The key is to find the right balance (Kanki et al., 2010).

An additional important regulatory factor is the Standard Operating Procedures (SOPs) which show how tasks are to be executed and by whom (Kanki et al., 2010). Many incidents and accidents have happened where pilots did not follow the SOPs and took risks by deviating from
standard procedures, whether this being a co-pilot or a captain. It is important that when a
captain or a co-pilot are unsure of a situation, they can look into the SOPs and find out how to fly
the plane by the book. The airline is supposed to put emphasis on pilots using and flying
according to the SOPs so as to avoid unnecessary incidents when in doubt about tasks,
responsibilities, guidelines or procedures. Airlines provide clear distinction between different
roles, goals and level of authority by providing pilots with the SOPs (Kanki et al., 2010, West,
2012).

A final regulatory factor is change. The introduction of CRM training was a change and
development in the way pilots were trained in their interpersonal competencies. It is known that
organizational development will require individual changed behaviour in order for it to be
successful (Torrington et al., 2014). However, it is often accompanied by different responses
from employees. There might be negative responses because employees are comfortable with
their values and beliefs and see no need for change (Landy & Conte, 2013). It is though
important especially for leaders, as captains, to see the need for themselves to change as well as
to encourage others, the co-pilots, to change with them (Torrington et al., 2014).

In an industry, as the aviation industry, where technology is always advancing and new
training programmes are being introduced, it is important for employees to be adaptable and
flexible to change (Landy & Conte, 2013). Employees will need to be able to handle emergency
and crisis situations as well as work stress and solve problems. They also have to learn about the
new work tasks, technologies and procedures and handle uncertain and unpredictable work
situations. They will need to demonstrate the ability to adapt to new cultures, people and
environments which they learn through CRM training (Landy & Conte, 2013).

### 6.4 Crew Member Diversity

While there can be personality differences between crew members, there are also possible
demographic or psychological differences between crew members. Demographic diversity
consists of difference in age, gender and ethnicity while psychological diversity entails
differences in skills, abilities, personality, attitudes, values or beliefs as well as occupational and
educational background (Landy & Conte, 2013).
An airline crew will always be composed of a team with either demographic or psychological differences due to the fact that the captain of a flight crew will have more experience and will therefore have had more training and will most likely be older in age than the co-pilot. A study showed that a team composed of members with psychological diversity did better than a homogeneous team due to the fact that heterogeneous teams increased the amount of diversity of skills, knowledge and abilities but homogeneous teams are said to communicate more often with each other than heterogeneous teams (Landy & Conte, 2013; Salas et al., 2006).

An aspect which also needs to be considered is the fact that being an airline pilots is a male-dominated field and would therefore be considered as a masculine job. In 2010, only 4.3% of people in America making a living as an airline pilot are female. However, there is an increase of female airline pilots even though it might be small in comparison with the amount of men working as airline pilots (Goyer, 2016).

As stated before, CRM training emphasizes on the human factor in flying and for pilots who already possess great meta competence and emotional intelligence, CRM training is a simple addition to their technical training. Nevertheless, crews are composed of different individuals who bring different attributes to the cockpit and some individuals score lower on interpersonal skills but do well in their technical skills which concludes the fact that CRM training is necessary for all crew members to be functional, perform well and for individuals to improve their meta competence skills (Kanki et al., 2010).

### 6.5 How to handle unexpected situations

Threat and error management as well as startle effect management are one of the main training elements in CRM. Threats can be different weather conditions, different layouts of airports or even co-workers. Errors are mistakes made by the captain, co-pilot or others which might affect the flight. A startle effect is a sudden and unexpected event which triggers an unconscious and defensive response. CRM training puts emphasis on these elements, so that pilots do not lose control over the aircraft or are able to take back control when unexpected incidents happen during the flight (EASA, 2015d).

The startle effect often occurs when there is loss of control. During CRM training, different scenarios in the simulator are trained which incorporate a startle effect, treats or errors and the
goal is then to reduce the risk of losing control and recover from these situations as a team (EASA, 2015d).

During a flight, there is always a pilot monitoring and a pilot flying. The pilot flying is in control of the plane and executes all the operating tasks while the pilot monitoring is observing the pilot flying as well as the overall progress of the flight (Kanki et al., 2010). It is more often the pilot monitoring that will have to be prepared for possible threats or even be able to avoid these threats and errors before they occur. The pilot monitoring will also have to know when it is appropriate to intervene without being too pedantic towards the pilot flying. When errors or threats occur, the pilot monitoring has to react in time and communicate with the pilot flying to find solutions, especially when the pilot monitoring is the co-pilot. In case of threats or errors occurring, there is either the possibility to resist them which most often the autopilot takes care of in situations of low altitude or avoiding collisions. There is also the possibility to resolve threats which is the human aspect of threat management where the pilots try to find possible strategies to resolve the problem either by communication with each other or through prior experience. With the combination of resistance and resolution, pilots will be able to take control over the threats and errors or even avoid them (Kanki et al., 2010).

Kanki et al. (2010) summarize that good CRM is “recognizing and identifying threats, preventing errors if possible, catching those that will inevitably take place and to the extent possible, through resistance and resolution, mitigating the consequences of those that have occurred” (p. 62); hence pilots will have to be alert to threats and errors, be able to avoid them or find solutions to those that have already occurred.

Monitoring and threat and error management should be taught throughout any training session so to reinforce individual responsibility as the pilot monitoring as well as the responsibility of each member to increase team performance as well as teamwork in order to avoid any incidents from occurring (Kanki et al., 2010).
7 Evaluation and results of CRM

Pilots are evaluated on their CRM skills when in an operational environment, e.g., in a flight simulator or an actual aircraft. Evaluation consists of examining and questioning the pilots on their performance, adding additional training in CRM for those who need it as well as improving the CRM training itself at the end of the evaluation (EASA, 2015b).

The crew’s non-technical skills (NOTECHS) are evaluated by a NOTECHS framework of four elements which are cooperation, leadership and managerial skills, situational awareness and decision-making (EASA, 2015b).

Pilots are evaluated on their ability to cooperate, which incorporates the elements of team building with open communication and participation, considering and supporting others as well as conflict solving. The crew should be able to give and receive correct information as well as feedback. For cooperation to exist, teams will need to create a supportive and positive environment (EASA, 2015b; West, 2012). When measuring the impact of CRM training, studies found out that there was a positive change in attitude and behaviour more specifically towards communication, coordination and responsibility. CRM was received as being useful and effective as well as being able to enhance learning attitudes, hence pilots being more motivated to participate in training programmes (Salas et al., 2006).

Their leadership and managerial skills are evaluated. Pilots will need to lead and manage with authority and assertiveness in order for tasks to be completed but also in a way that the crew and other co-workers feel included and involved. They need to plan their goals and intentions ahead and be able to coordinate with others. There is also a need to maintain standards and specific behaviour during the flight. At last the pilots will manage and delegate the workload between each other (EASA, 2015b; Landy & Conte, 2013). West (2012) adds that CRM needs to focus on team leadership in order to train pilots’ ability to coach and manage team members as well as give appropriate direction. Studies revealed that it was harder for pilots to transfer, e.g., leadership styles and mission execution than communication and information exchange (Salas et al., 2006).

The crew is also evaluated on their situational awareness, which covers shared situational awareness of the aircraft systems and the external environment, weather, as well as anticipation
if there might be any threats or errors. It is based on mutual understanding of a situation in a specific environment (EASA, 2015b; West, 2012).

For the decision-making skills, pilots are evaluated on how they define and diagnose problems with the information available to them, review possible options with other crew members, assess the risk and choose an option based on sound judgement and at last review the outcome of their decision (EASA, 2015b; West, 2012).

CRM training should always be followed by crews being able to put into practice what they have learned, followed by feedback and further reinforcement of CRM issues in flight simulators if needed (Kanki et al., 2010).

These training elements are reinforced every year. There is also a need for combined CRM training for crews that fly with a cabin crew. Flight crew and cabin crew have CRM training together in order to work on their communication, coordination, each team member’s function as well as how to adapt to different situations and demands (EASA, 2015b, West, 2012).

CRM training and CRM effectiveness is evaluated by Kirkpatrick’s evaluation model. It is evaluated on pilots’ reaction towards CRM, possible changed learning outcomes during simulator training as well as changed behaviour on the job in addition to possible organizational results of reduced accidents within airlines (Kanki et al., 2010).

Studies asking about the crew’s opinion on CRM have shown very positive results. Asking over 20,000 pilots in America and elsewhere, a vast majority of them feel that CRM training is useful, important and effective (Kanki et al., 2010).

Salas et al. (2006) point out that participants of CRM training gave positive feedback after the training programme was completed, stating that the programme was useful, pleasant and contradicted their disbelief. Some trainees favoured CRM training but were not able to put CRM elements into practice in simulators (Salas et al., 2006). CRM’s effectiveness is most often measured through the trainees’ reaction, hence if they liked the training programme or not, or the trainees’ behaviour during simulator tests. Behaviour also needs to be measured while on the job itself not only right after the training programme has been completed in order to see how effective CRM training is while on the job (Kanki et al., 2010). However, studies about CRM’s effectiveness need to increase and researchers need to find a universal evaluation method in order to be able to generalize CRM’s effectiveness (West, 2012).
For CRM training to be efficient and effective, it is important to have support from senior management as well as to have well trained and motivated instructors and check airmen who put emphasis on developing and updating the CRM curriculum and practices. This support should also be visible when there is need for change, e.g., enhance the safety and learning culture of the airline. Senior management has to facilitate change and offer training immediately when or even before it has occurred, in order for employees to be prepared and for the change to last. Airlines who do not have this support system, show that their employees have less interest in CRM training. In order for human behaviour and attitude to change for the better, the importance of a recurrent reinforcement of CRM training is crucial for the crew itself as well as for the instructors and check airmen (Kanki et al., 2010; Salas et al., 2006).

The evaluation of CRM training is very important so that instructors can evaluate if set outcomes have been reached and are effective to the extent that individual, organizational or training characteristics have changed for the better. In addition, training evaluation shows CRM instructors if the right methods were used and the right aspects of CRM were taught. Different CRM elements will need different methods to reinforce them (Kanki et al., 2010).
8 The supply of new training programmes

New training programmes have been introduced into the aviation industry in order to maximize the crew’s performance as well as to increase safety and efficiency on board.

8.1 Multi-Crew Cooperation (MCC) Course

A multi-crew cooperation (MCC) course is a fairly new training programme which will train pilots’ competencies needed to fly multi-crew, more than one pilot, and multi-engine aircrafts, more than one engine. Multi-crew aircrafts are planes, such as most passenger and cargo planes, which demand two or more pilots on board. Many airlines demand pilots to take a MCC course before they are trained on any specific type of aircraft (CAEOAA, n.d.; Lufthansa flight training, n.d.).

Various elements are trained throughout this course, e.g., teamwork and leadership, communication, threat and error management which includes situational awareness, problem solving and decision making, managing the workload, cultural awareness, normal, abnormal and emergency operations, handling environment and weather, monitoring, briefing and flight management as well as using checklists and automation. Many of these elements resemble and focus on CRM elements and relations to CRM are also often introduced during MCC courses.

The course is classroom-based as well as practical in nature. Pilots will be trained under various situations in simulators (CAEOAA, n.d.; Lufthansa flight training, n.d.).

8.2 Evidence-Based Training (EBT)

In 2007, a new training programme called evidence-based training (EBT) developed by airline captain Michael Varney was just published and is being used by airlines such as Icelandair, Air Atlanta Icelandic, Qatar Airways and many more and is being implemented into various other airlines. In 2010, Emirates accepted EBT training and was the first airline to include EBT to their training. In 2015, the EASA published the first EBT Guidance Material (EBT-Foundation, n.d.a). EBT is therefore a fairly new training programme.

Evidence-based training (EBT) was introduced to update flight training to the 21st century. It is supposed to increase training effectiveness to a competency-based level by evaluating pilots’
performance based on evidence retrieved throughout the training programme instead of basing training on individual incidents or accidents (EBT-Foundation, n.d.b). The EASA (2015c) recognized the introduction of EBT as a safety intervention in order to re-evaluate already existing training and determine the most important aspects of training for the 21st century.

EBT highlights core competencies, resilience and evidence. It uses data that is taken from accidents as well as pilots’ individual performance in training as evidence showing what needs to be trained and who needs training. It looks at the behaviour of excellent pilots and how they reach good performance based on behaviour or performance indicators. These indicators are seen as characteristics which good pilots possess in order to perform effectively and safely. EBT also puts emphasis on the startle effect showing how resilient a pilot and his crew can and have to be when facing threats and errors (EBT-Foundation, n.d.b). EBT emphasizes relevant training issues such as situational awareness by introducing unexpected scenarios in the training environment (EASA, 2015c).

The development and possession of core competencies is important in EBT as well. Core competencies and its appropriate behavioural indicators, how these core competencies are related to our behaviour, are the combination of technical and non-technical KSA. These KSA entail the application of procedures, communication, aircraft flight path management and automation, aircraft flight path management and manual control, leadership and teamwork, problem solving and decision making, situation awareness and at last workload management. These core competencies are what were known as technical and non-technical KSA and are now the actual competencies needed to operate safely, effectively and efficiently in the 21st century aviation industry. They are trained throughout a three-year recurrent training and evaluation programme in flight simulators (EASA, 2015c).

An individual who does not meet the “minimum competency standard” is obliged to participate in additional training. When additional training has shown no success the pilot will have to be removed from duty until he meets the minimum competency standard with further training (EASA, 2015c).

EBT puts a lot of emphasis on individual performance in the specific airline and tries to improve individual competencies and performance so that in the end the crew performance increases.
9 Methodology

This chapter will focus on the methodology used to execute this research as well as which participants were chosen, how they were chosen and why. It will also look into the data collection, the interview process itself and the data analysis.

9.1 Qualitative research

The methodology in this research project is based on qualitative research. Qualitative research looks into the process and the meaning of specific situations. It wants to get a deeper understanding of individual’s motivations, experiences and interpretations. Individual in-depth interviews are one method used to collect data. This type of interview focuses on only one individual at a time and his particular experiences. During individual in-depth interviews, the questions can be semistructured. Semistructured interviews entail specific open-ended questions being asked which will give the interviewer a chance at comparing answers between different interviewees but depending on the participant’s answers, additional questions can be asked which were not planned ahead (Cooper & Schindler, 2014).

In this research, individual in-depth and semistructured interviews were chosen because they will be able to provide the researcher with pilots’ opinions on competencies needed for the job as well as their individual attitudes towards and experiences of CRM training, in addition to how they use CRM in the cockpit. Another benefit is that it will give the researcher the opportunity to compare answers of different pilots, whether there might be differences in experience, age, or job position.

9.2. Participants in the research

The target population were airline pilots, co-pilots and captains, which either fly passenger or cargo flights. The target population was chosen in order to get their perspective of CRM training.

The sampling began with convenience sampling due to the fact that the researcher has several pilots in the family and therefore chose a family member as the first interviewee available. After that, the snowball sampling was used, the first respondent recommended other pilots who would be willing to participate and after talking to these participants, they would recommend other
pilots who would be suitable for the interview, having in mind the idea of speaking to captains who have been on the job for many years as well as co-pilots who might have just started their careers as pilots (Cooper & Schindler, 2014).

In the sample, there are 6 male pilots, 3 captains and 3 co-pilots, who work for 5 different airlines, Icelandic, European, bigger and smaller airlines, cargo and passenger flights. The interviewees’ age expanded from 23 years old to 66 years old at the time of the interviews and the oldest being the only one who was retired. At the time of the interviews one pilot had been an airline pilot for 4 months while the oldest had been an airline pilot for 38 years. These were all Icelandic men and one person who was contacted by email did not respond until the project work was already completed. In order to keep the identity of the pilots private, they were marked with the numbers (1), (2), (3), (4), (5) and (6) throughout the data analysis and their workplace will not be mentioned. Table 1 summarizes these characteristics for each pilot:

Table 1. Participants’ characteristics.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Job position</th>
<th>Age at the time of the interview</th>
<th>How long they have been airline pilots</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Captain</td>
<td>56</td>
<td>33 years</td>
</tr>
<tr>
<td>(2)</td>
<td>Captain</td>
<td>52</td>
<td>22-23 years</td>
</tr>
<tr>
<td>(3)</td>
<td>Co-pilot</td>
<td>23</td>
<td>1 year</td>
</tr>
<tr>
<td>(4)</td>
<td>Captain</td>
<td>66 (retired)</td>
<td>38 years</td>
</tr>
<tr>
<td>(5)</td>
<td>Co-pilot</td>
<td>24</td>
<td>4 months</td>
</tr>
<tr>
<td>(6)</td>
<td>Co-pilot</td>
<td>32</td>
<td>10 years</td>
</tr>
</tbody>
</table>

9.3 Data collection

The data was collected between the 6th September 2017 and 30th October 2017 and the interviews lasted between thirty and sixty minutes.

The first interviewee was contacted in person whereas the others were contacted by phone or by email. In all cases, the researcher started by introducing herself and what connection she had to the research as well as who had recommended them to her. The aim of the research and the
research subject for the master’s degree in Human Resource Management at the University of Iceland was introduced to the interviewees. Every respondent was interviewed once in their home environment or the home of the interviewer and were all interviews recorded with their permission.

The interview framework was based on three themes which would answer the research questions. The first theme asked about the job, its tasks as well as competencies needed. The second theme looked into the training programme in addition to experiences and attitudes towards the programme. The last theme examined the use of the CRM training programme and opinions of how to improve the programme as well as positive aspects of CRM.

The interview framework as well as every interview was conducted in Icelandic because all interviewees were Icelandic. The interviews were then written down in Icelandic but were translated into English. Each interview was then reproduced in written form by the researcher in order to find possible answer to the research questions in addition to be able to compare answers between different pilots.

9.4 Data analysis

The data collected from the interviews was examined in order to find possible answers to the three research questions as well as to shed a light on other interesting findings and ideas worth researching in the future.

In order to analyse the interviews, a thematic analysis was done. Each interview was reread and scanned in order to find codes which summarized and interpreted the data. Codes are characterized as one word, a label or a short sentence which define and interpret the key ideas of the data (Lyons & Coyle, 2016).

After coding the interviews, the researcher looked for suitable themes for the specific codes. Themes are identified as more general definitions of meaning which are often constructed by gathering similar codes and simplify them into one theme (Lyons & Coyle, 2016). Themes can then also possess subthemes which are more specific than the themes and which highlight a specific aspect in each theme (Lyons & Coyle, 2016).

In this thematic analysis, seen in table 2, three main themes were identified which are the pilot’s job, attitudes and experiences of CRM and the use of CRM in addition to multiple subthemes.
Table 2. Thematic Analysis.

<table>
<thead>
<tr>
<th>The pilot’s job</th>
<th>Attitudes and experiences of CRM</th>
<th>The use of CRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles and responsibilities</td>
<td>Results and gains from CRM</td>
<td>Examples of how pilots use CRM</td>
</tr>
<tr>
<td>Emphasis on interpersonal</td>
<td>Do pilots face challenges during CRM training?</td>
<td>Mutual understanding</td>
</tr>
<tr>
<td>and technical competencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How the job has changed</td>
<td>Attitudes and experiences of new training programmes</td>
<td>What could be improved?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10 Findings

This chapter will discuss the three main themes. It will look for answers to the three research questions by examining the interviewees’ answers regarding the pilot’s roles and tasks as well as competencies needed on the job. Moreover, it will analyse the interviews for answers about their experiences and attitudes towards CRM training as well as how they use CRM training.

10.1 The pilot’s job

In order to answer the first research question: *What knowledge, skills and attitudes do pilots need so that they are able to execute their job effectively and safely;* participants were asked to describe their job and each other’s roles, what kind of knowledge, skills and attitudes a good airline pilot has to possess in their opinion. Changes which have occurred since they first started working as airline pilots will also be discussed.

10.1.1 Roles and Responsibilities

Both the interviewed captains and co-pilots agreed that the captain has more responsibilities and authority as well as being the one who takes any final decision with input from the co-pilot. Nevertheless, they also agreed that their roles are not so different from each other which means that they will need similar, if not the same knowledge, skills and attitudes to complete their job.

Captain (1) discussed how the roles have changed from the past to the present, that “the difference [between co-pilot and captain] has decreased throughout the years but the captain takes the final decision regarding the safety of the flight. The co-pilot gets to take part in the decision making process.”. He continued stating that “in the past, the captain was more autocratic and the co-pilot was there to assist him”.

Captain (2) revealed that:

In my opinion, the difference [between co-pilot and captain] is very small. If you cannot sit in the right seat [co-pilot] then you cannot sit in the left seat [captain]. However, the captain has the authority and responsibility which can never be taken away from him.
Captain (4) shared a similar view to the other two captains and explained that, “even though, the co-pilot is trained pretty much the same as the captain, it is the captain who has the final say regarding any decision-making but also taking other crew members opinions into consideration which is part of CRM”.

The interviewed co-pilots had a very similar viewpoint to those of the captains on the roles in the cockpit but went into much more detail of what each other’s roles consist of. Co-pilot (3) explained that, “the division of labour on ground is very specific, the co-pilot and the captain have each their own tasks” and continued:

… as soon as the plane is ready for take-off, we are no longer captain and co-pilot but are … called pilot flying and pilot monitoring. We divide these roles between us, one of us flies to the destination and the other one flies back, in that way the co-pilot flies just as much as the captain. … During the flight we are always communicating, if the pilot flying wants to do something that is not standard he will need to inform the pilot monitoring and if the pilot monitoring wants to continue with a standard procedure then the standard operation is followed through. I would say that this is very healthy thinking process and makes flying safer nowadays. … This is followed by a “no blame policy” where when you do not feel good about a procedure, it is taken into consideration and you are not just ignored or belittled.

In a similar tone as the captains, co-pilot (3) also added that, “the captain is always responsible and takes the final decision after a discussion. The co-pilot includes tips, suggestions and contributes to the situation and then the captains decides on the conclusion”. A sentence which co-pilot (3) learned during his training and would often come back to throughout the interview was, “focus on what is correct, not who is correct” regarding what is the actual right procedure to follow.

Co-pilot (5) discussed the fact that, “a captain and a co-pilot actually have the same qualifications whereas the captain has more experience”. He added that:

… their tasks are very similar but the captain guides the flight because of his experience and you [co-pilot] listen to him, tell him your opinion and suggestions. This is connected to CRM, taking into consideration what others feel and think, not only in the cockpit but also with the cabin crew, air traffic control, dispatchers and so forth. There is a strong connection between everything and it is all very fluid. I have worked as a flight attendant and realized how variable the job is and how fast you have to adapt to what is happening. ... At my company, our roles are very well defined and organised, knowing who does what and when.
10.1.2 Emphasis on interpersonal and technical skills

When asked about what kind of knowledge and skills, technical or interpersonal, a pilot needs to possess, every interviewee, more or less, stated that it was a mix of both technical and interpersonal skills. There is no doubt that there are many KSA needed in order to be a successful pilot. Some put more emphasis on interpersonal skills than technical skills whereas others highlighted technical skills.

Co-pilot (3) stated that, “some believe the best pilots to be psychologists who can fly”. He also added that:

Good interpersonal communication is most important because you are working with people whether that being cabin crew, passengers, air traffic controllers or in the cockpit itself. Good interpersonal communication can lower the stress level in the cockpit. A good characteristic to have is the ability to read and adapt to other people.

He included the fact that, “a good attitude can get you far”:

When your attitude is right, it will be easier for you to learn and to improve yourself, you will have discipline and respect for others and their work. No matter what background or knowledge base you have, if your attitude is not right, you will not learn what you are supposed to learn. However, where there is a will there is a way and everyone who passes the medical check and are healthy should be able to learn all of this.

Regarding the interpersonal skills, the first officer (5) highlighted the concepts of empathy and cultural differences: “you will have to show understanding to different things but you will also need to show cultural understanding … People might react differently than you would because of their cultural background”.

Captain (4) underscored the importance of interpersonal skills in the aviation industry nowadays “because the instruments take care of the technical part of flying”:

The human factor is more important because you might have to fly with people who you do not like flying with. … Each individual will have to do their job so that everything works out. No one is the same and even though the captain takes every final decision, he will have to get along with others. You are stuck in the cockpit for many hours and if you cannot get along with your co-workers then the whole thing does not work out.
Captain (1) added that:

Pilots should be able to get others on board with them and not against them so that they all work towards their common goal, to keep the flight safe and without any incidents. A lot of the learning material is taught through computer-based training so there is nobody who helps you cover the material. It is therefore important to be a quick learner and possess self-discipline.

Co-pilot (5) said, “you cannot forget job experience and communication in the cockpit but also with the cabin crew or air traffic control” and carried on:

As a young co-pilot … you build experience through time. You should not underestimate experience because you might be flying with someone who knows the situation better than you do because he has already experienced it or been in a similar situation.

Similar to the co-pilots, captains also consider experience a vital aspect of knowledge and skills, as captain (1) noted, “experience is important too and with time you will get good experiences of all sorts of situations. Here in Iceland pilots get good experiences and training regarding winds, snow and de-icing”.

Captain (1) also emphasized on who you are as a person:

From the beginning the main aspect should be for the pilot to be a normal human being whose brains function properly. It is preferable that pilots think quickly, are well coordinated so that there is no confusion and that they can keep up with the pace. You will always have to be faster than the plane itself.

Co-pilot (5) talked about the mix of technical and human skills needed for the job. He affirmed that, “it is important to know the plane which you will operate, not all the details but the company’s legal requirements as well as the SOPs, who does what and when”. He continued:

The thought behind the SOPs is that whether you are Icelandic or any other nationality and you are supposed to fly with someone from Spain or Greece, there will not be a problem because both of you know who does what and how.

Captain (2) focused more on the technical side of flying but also stated:
It is a little bit of both. You will need to be mechanically minded, be able to understand system logic as well as air law and meteorology but languages can be a barrier too in different countries and there has been miscommunication because of language barriers.

He continued, “the thing is that there is so much material that you have to know where to look for it. Google has changed the job in a big way. … Today you just have an IPad”.

10.1.3 How the job has changed

The job has changed throughout the years with the introduction of CRM training, evidence-based training as well as through the recent years of technical changes and development. It is important to note the changes which have occurred in their job especially for pilots who were flying before the changes were introduced and are still working today and get their views on how their job has changed and what effects these changes might have had. It also sheds some light on how attitudes towards colleagues might have or might not have changed.

When asked about changes throughout their many years as pilots, the interviewed captains agreed that there have been various changes regarding the work pace, technology, regulations, training, communication as well as the culture around flying.

Captain (1) noted that:

The technology on board has developed … as well as all the instruments. In the past you had a flight engineer on board but now he is replaced by an instrument. Also, there was always a single crew on board with two pilots where you would get crew rest after a 7-hour flight and wait 2 to 4 days to take over the next plane but now we fly from 17 to 19 hours with one or two additional pilots. The workday has changed and has become longer by adding additional pilots on board.

Captain (2), who is also a line and simulator instructor, agreed that “there is more speed and employees are being put into use in a better way” but also explained how complex it is for the normal pilot to read through the regulations from the European Union about the length of crew rest, “the crew departments have become specialists in these regulations and make pilots fly as much as they possibly can and therefore crew rest decreases. … In the end, you are responsible for your own duty and you should pay attention to not go over your duty”.

Captain (4) also discussed the length of crew rest and described how the job itself as well as the crew culture had changed a lot:
... you could say that it is not fun anymore. We worked just as much in the past as we do now but it is different. We went from A to B and got 2 days to rest but today you fly from A to B and you get 13 or 14 hours to rest and then you fly on. This started before I retired, my last flight was a flight around the globe … in 4 and a half days. You are flying just as much but the pace is much faster … it is all very packed. We had the chance to go out to eat, relax and enjoy. There was an unwritten rule that the crew would at least go out for one meal together. Today, the co-pilots cannot be bothered, they are not interested.

Even though, the co-pilots who were interviewed may not have been on the job for many years, they did make note of changes in the airline industry and in the cockpit when talking to experienced pilots about changes which have occurred, as co-pilot (5) explained it:

You notice that pilots talk about the “cockpit gradient” where you had a hierarchy in the cockpit and the position of the captain and the co-pilot were very far apart and then the cabin crew was even further down the line. In the past, this was the norm but is no longer today or not as much as it was back then. ... Captains have become more open and receptive for opinions and co-pilots are not afraid to speak up about their thoughts. It is all about communicating with each other which is connected to CRM. Since CRM was introduced around the 1980s, a lot has changed, you look at your colleague as someone who helps you out rather than someone who gives or receives orders.

Another co-pilot (6) stated that he comes from the new generation of pilots but thinks that the main change for the older pilots is the introduction of the SOPs, which is fairly new:

What I have heard is that, in the past, you [co-pilot] would have to adapt yourself to each and every captain. This one does it like that and the other one does it differently. Now there is a sort of play going on where everything is the same.

### 10.2 Attitudes and experiences of CRM

While the interviewed pilots work for different airlines, which either fly cargo or passengers as well as to different locations in the world, they all have CRM training in common. They all have recurrent CRM training once a year and as co-pilot (6) stated, “every other year, we have CRM training with the cabin crew”. Co-pilot (5) added that they have, “recurrent training with cabin crew and men from operations”. Captain (1) mentioned that airlines offer additional CRM material through computer-based training which might not be mandatory but is useful to look
into for further education. Now questions were asked in order to identify pilots’ experiences and attitudes towards CRM training.

**10.2.1 Results and gains from CRM**

All six pilots had positive things to say about CRM training. They concluded that overall they had positive attitudes towards the training programme and good experiences of it. They also realised how CRM made them acknowledged other people’s viewpoints and opinions as well as job tasks and understand and respect colleagues around them.

All of the three co-pilots, which were interviewed, summarized CRM training as introducing pilots to incidents and accidents which occurred due to human errors in the past or fairly recently. During the CRM recurrent training, the co-pilots (5) and (6) said that they went through examples with CRM instructors as well as having open discussions about what could have been done to avoid these incidents. There are also group games and role play in order to facilitate teamwork.

Co-pilot (6) recounted his experience of his latest CRM course: “it was with a group of cabin crew members and everyone was mixed into groups. We then went into an aircraft cabin simulator and everyone got their roles and we sort of performed a play”. Co-pilot (6) continued to state that his attitude towards CRM training was very good and that “you can use CRM for everything, in offices or banks. It revolves around cooperation”. However, he noted that it is more of a problem in Asian culture than in Iceland, “in Asia, there is more of a hierarchy …. you would not contradict the captain”.

Co-pilot (5) defined the examples mentioned during CRM training as “eye-opening” but also remembered, “you are only human yourself and can make all kinds of mistakes. The thing is just to be vigilant”. Co-pilot (5) was then questioned about his attitude towards CRM training, “you take it as it comes. Sometimes you just think “yeah, yeah” but then you realise that there is something more behind it”.

Another aspect which was defined as “eye-opening” by co-pilot (5) was during his first simulator training with a partner who he barely knew:

My experience was good but I was paired up with someone who did not talk much and we were totally different characters. I always kept a positive mental attitude throughout the mission … of course you make mistakes but we are here to learn. He thought it went
terrible but it worked out in the end. When it did not go too well on his end, it affected his performance and had an effect on me but I would never let it have an effect on the flight. CRM for me was, working with different people and seeing how people react differently. I was sometimes surprised by the way my partner reacted. It was though eye-opening because not everyone reacts the same way. You learn to be flexible, open-minded and not afraid to express what you think. You need to be firm, fair and friendly.

When asked about his attitude towards CRM training, co-pilot (3) reported that “it is the only reasonable thing, the fact that people communicate with each other and do not take decisions alone” and continued:

Every single thing we do is in cooperation with the other person so that everyone is aware of what is happening. We are maximizing each other’s situational awareness. You are trying to get the other person to think as well as to express their thought process. The goal is to keep each other on our toes.

Captain (4) answered that his experience and attitude towards CRM was very good and that, “after I had learned it, I started to use it in my daily life”. He also thinks that it is good that CRM is mandatory because, “people are forced, whether they like it or not, to take other people into account and be considered towards them. CRM is all about possessing the knowledge to make it work”. He described CRM as being able “to use all the knowledge available to you in the cockpit, whether that may be the interpersonal factor, the people around you, or your technical knowledge”. He continued to argue that “CRM is about the interpersonal aspect of people being able to work together and get the best out of each other no matter who you might be working with”. Captain (4) added the importance of interpersonal relationships and communication where “simple gestures such as saying good morning or thank you can make the job much more personal and fun as well as increases job satisfaction and therefore job performance too”.

Co-pilot (5) and co-pilot (3) discussed the usefulness of CRM training in different contexts. During recurrent training with cabin crew, co-pilot (5) recalled that how he understands different viewpoints due to the fact that he had worked as a flight attendant prior to becoming a pilot:

It has helped me to develop interpersonal competencies as understanding of what is happening behind us in the cabin and knowing how passengers can behave. I think some pilots do not realise this right away because they do not have to deal with passengers in that way.
Co-pilot (3) discussed how CRM can bring everyone different generations together:

I am from the generation which is brought up with the fact that CRM is a part of it [flying]. I do not know it differently. I think it is good to have these courses and talk to the older captains and take examples with them. Mainly, you want everyone to follow these CRM principles so that everyone is on the same page.

10.2.2 Do pilots face challenges during CRM training?

When asked about their attitudes and experiences of CRM, some of the pilots, both captains and co-pilots, remarked on other pilots’ attitudes towards the training programme and the possible difference between the older and newer generation of pilots.

In order to understand the background of CRM training and different behaviours of various pilots, captain (2) explained the history of CRM and reviewed where CRM initially came from:

… it started in America and the first commercial flights started right after World War Two and most pilots came straight from the military which has a totally different culture than the airline industry. You just followed your orders and had no opinions yourself. A term used by the Americans is “on a need-to-know basis” which means that you only get the essential facts until further notice. The information was not for everyone. However, people realise that military pilots were not passenger-friendly and a training programme was designed for pilots to be able to work with other people surrounding them. It is all about getting people to work for you without yelling at them. This also developed into a side-track. Due to the fact that there were these big leaders in the military entering commercial aviation, co-pilots were told that all captains were wrong and that they needed supervision. This turned out to be a breach of trust where there is supposed to be cooperation and teamwork instead.

Captain (2) continued that one aspect of CRM was often forgotten:

… everyone makes wrong decisions, which is known, but some statistics show that during a scenario where you make a wrong decision you have the tendency to stick to it. … However, CRM is all about evaluating, re-evaluating, gather information and data, analyse it and then make a decision. Afterwards, you will need to be clever and realise that with new input, your initial decision might have been wrong.

When discussing captain (1)’s attitude towards CRM, he said that it was, “pretty good and it (CRM) was something which needed to be improved”. He related to his experiences as a co-pilot
in the past and argued how negative attitudes can affect performance. He continued by discussing the fact that:

… there were certain types of captains, in the past, who did not listen to anything you had to say because you were younger and less experienced. This has changed today, everybody is listened to and every opinion is taken into consideration which leads to improved communication. On the other hand, the crew’s patience is tested when people are tired. Some do not have the patience to say something on a friendly note when you have repeated yourself twice or three times and they still do not get it. Some have the tendency to sharpen their tone which is, of course, not right and will affect the other person’s performance and maybe the captain’s performance too. CRM is built to improve safety on board and a big part of the job is to deal with safety in order for the flight to get to its destinations without any incidents.

Captain (1) was asked if he feels as if everyone is interesting in participating in CRM training, he answered that, “some older pilots might not have had much interest in it. They thought of it being sort of unnecessary, I believe. I remember one pilot just walking out of the course and saying it was total nonsense and getting away with it”. Captain (1) then remarked that:

… the pilots who were trained in the past, literally ruled on board which meant that for the co-pilot it was useless to state his opinion if he was flying with a captain who knew everything better. Since then, pilots have received better training. However, you can still end up flying with someone who is high on the seniority list and did not receive this kind of training until later on but is not as receptive to it because he has already formed his own opinion on what is right.

Captain (1) summarised his experience of CRM:

You will need to be positive towards your colleagues so that they show positive attitude towards you as well as an improved work ethic. You do not want to affect your colleague’s performance because of some negativity that you project. On the other hand, some people could be more tough but that depends on the person.

In that context, co-pilot (6) reported that he is very much in favour of CRM training but had the perception as if it was not as well received with the older pilots.

In addition to the annual recurrent CRM training, airline pilots are required to take tests in the simulator twice a year in order to keep their licence updated. Captain (4) and co-pilot (5) acknowledged the fact that pilots can fail their simulator tests because of their inability to apply
CRM elements and may be taken off duty in order to improve their CRM skills with additional training.

Co-pilot (5) said that, “many are failing during their simulator tests because of CRM and their insufficient knowledge of the English language”.

Captain (1) explained, “there are pilots who will need additional training in order to put emphasis on some specific aspects of CRM and sometimes even with a personal CRM instructor”.

10.2.3 Attitudes and experiences of new training programmes

While interviewing the pilots, most of them mentioned additional training programmes such as evidence-based training and multi crew cooperation (MCC) courses.

Captain (2) who, as mentioned before, is a line and simulator instructor himself and works with these programmes, was very enthusiastic about EBT and explained why it is difficult to change old regulations:

The aviation industry … changes slowly because new ideas will need to go through strict regulations in order to be implemented. We still need to fulfil regulations which were written in the 1950s-60s on aircrafts which are no longer in use today. The regulations are often set in stone and cannot be changed. The reason why regulations are so strict, is the fact that authorities fear to be blamed for accidents. Accidents which might be traced back to changes in the regulations which would have allow them to happen. … According to the regulations, when there has been an accident, it is examined and a cause is found and added to the list of regulations. In the end, everyone will then have to be tested on it. With EBT, we are trying to change this way of testing. We [pilots] go into the flight simulator twice a year, every six months and every time there are scenarios which we have to complete. These are either elements which the airline wants to test or mandatory elements set by the authorities.

He continued that by implementing EBT, there is a small change in the way pilots are trained:

A lot is changing and developing in these sciences and there is more and more of EBT. EBT is more about collecting data. The airline has to go through a specific process and in the end, they will have to read the data results from the simulator tests. It is still in the beginning stages and has to be developed further. … There will be big changes in the next four years. Mandatory scenarios will stay put but the airline will be able to collect data and rate pilots on a scale from 1 to 5 [1=worst and 5=best].
He stated that “there will be more emphasis on the startle factor, how you react, how much of your performance decreases [from scale 1-5] and if you are able to recover from it and be on top of things again” and proceeded:

The flight simulator is about finding the pilot who lags behind in order to discover if he is able to bounce back from a startle effect or if he is under the acceptable line [under 3]. In the event of him being rated a 2, the airline will have to document him and if he receives a 2 again in the next two simulators, one and a half years later, then the airline will need to do something, take him off the job and train him. In the past, this was more of a pass or fail situation. Now, there is more of collecting data, finding those who are under the line, finding out how often it happens, this is where the airline decides on parameters on how often they are going to let this happen, then take them off the job and train them.

The researcher asked captain (2), if EBT was a more personalised training programme based on individual pilots’ performances, he agreed that it was going in that direction.

Other pilots agreed that their airlines were starting to use EBT. Co-pilot (6) was asked about his attitude towards EBT:

At first when I heard about EBT, I thought “how is this supposed to work”. However, after you have tried it, it is much more fun. I think it is great. Of course you are in a test but you do not feel as if you are being tested, it is more as if you are in training. There is a specific programme behind it, not everyone goes through the same tests but everyone goes through something similar. The instructor is then able to see each and every one’s weaknesses and then train them further.

Here co-pilot (6) was also asked, if EBT was more of a personalised training programme which he agreed with as well:

During a simulator test, the instructor would be able to see if I was not performing well enough and would advise to fix it by training me until it is perfected. It is about finding the weaknesses and then customise each simulator test to the individual’s weaknesses in order to train them. You are not stress out about failing because you get the chance to work your way up since the training is customised to your needs.

The other course which some participants mentioned, was Multi-Crew Cooperation (MCC) course.
Captain (1) recalled having heard about MCC but had not taken the course himself. Both co-pilot (3) and co-pilot (5) mentioned taking a MCC course in Britain. Co-pilot (3) declared that in order to be allowed to fly for his airline, he had to take a MCC course.

Co-pilot (5) explained that:

When you are done with your single pilot training, it is advised that you take a MCC course. MCC is based on learning how to work as a team. There are a few days of theory, very similar to CRM elements, and then there are several hours in a simulator.

10.3 The use of CRM

The last theme and questions asked during the interviews is how do pilots apply their CRM training into real life situations when in the cockpit and how is it useful to them. The interviewed pilots gave numerous examples of how the apply CRM.

10.3.1 Examples of how pilots use CRM

Every one of the six pilots who was interviewed agreed that their CRM training was useful to them in one way or another and were eager to give examples on how they used CRM on the job.

Captain (1) and co-pilot (6) both noticed that they use CRM unconsciously. As captain (1) stated that “sometimes you are not aware that you are using something from the CRM training until you have arrived at your destination without any incidents occurring”.

Co-pilot (6) said in that context:

I think you use it unconsciously. I do not come to work and think “now I am going to apply this CRM element”. However, you might fly with someone that you have never flown with before and you have heard rumours about his behaviour. What I try to do, in that case, is to not judge the person beforehand and be completely neutral towards him…. Then you try to find the best way possible to work with people. … communication has to be comfortable. Nevertheless, the captain is always responsible and has the authority, which you cannot take away from him.

Captain (1) gave an example of how he uses CRM during line checks, when there is a line instructor following the process of the flight and is testing you: “you get a better grade when you prove that you make use of everyone and everything around you in order to make decisions”.

59
Captain (4) described a similar case of using the resources around him. He was flying from location (A) to location (B) and then to location (C) when there was a failure with the hydraulic pump. He stated that he knew that there were mechanics in (C) but none in (B) which led to the question of what to do next:

I phoned back to base and explained the situation and they agreed that flying to (B) meant that the plane would be stuck but flying to (C) would mean that the plane could be repaired. Here is where I used CRM by receiving external knowledge which I would not have gotten in the cockpit. CRM is all about knowing where do I get the information that I need. None of us know that much that we do not need others. We have to be able to admit that to ourselves and to others. You have to be unafraid to look for knowledge from older and more experienced people because they might have been in that situation before. And today, you can also just use google.

Captain (2) answered in the similar way as captain (1) and (4):

A big part of this is to gather information and the main aspect is to delegate. A lot is happening before a flight and the most important thing, for me as a captain, is to sit tight in my office, so that everyone knows where I am. … There are all sorts of problems which arise and you cannot deal with all of them yourself, so you have to delegate the workload. I think it revolves around that and CRM is about getting people to work for you … and that everybody understands the common interest of the flight.

Co-pilot (3) and co-pilot (5) expressed CRM training being useful regarding their behaviour and communication. Co-pilot (3) repeated that it was important to:

“Focus on what is correct, not who is correct” when you are in disagreement. When you were younger, you were more likely to get in a bad mood because you were displeased with something which does not benefit you at all. Your thought process is blocked and you get angry. This is something that I have learned for myself personally, to push that feeling away and look into the SOPs and see what is correct.

He continued that “it is one thing to criticize and another to be rude. There is a fine line between those two things” and mentioned an example:

When the pilot flying is not keeping the course of direction, when do I as the pilot monitoring say something? When he is 1 degree off, which is too soon, or when he is 15 degrees off, which would be too late. It is difficult to know when it is appropriate to criticize someone’s performance and how it is said.
On the same note, co-pilot (5) explained:

It is important how you present yourself and express what you feel in a friendly inquiring tone. … People will more likely want to work with you if you are friendly and approachable which you can use to your advantage. It is important to possess a positive mental attitude which might be difficult working many days in a row.

10.3.2 Mutual understanding

Every pilot mentioned positive aspects about their CRM training as well as how CRM training provides mutual understanding between the whole crew.

Captain (1) and co-pilot (6) referred to the fact that everybody is on the same page. Captain (1) stated that “everyone receives similar CRM training and are therefore on the same page, know what is expected from them and know each and everyone’s protocol”.

Co-pilot (6) explained the positive aspect of CRM training being the fact that:

Everyone is in it together and are on the same page. I think that about 30 years ago, the captain could have been flying solo. He ruled everything on board and everyone was maybe a bit scared of him. Today, CRM has changed this. I think we are pretty much on the same level, there is only a small difference [between co-pilot and captain].

Co-pilot (3) said CRM training was positive because, “we are keeping each other on our toes and you cannot get away with being lazy and stop learning”.

Co-pilot (5) added, “people have become more receptive towards their colleagues and passengers”. He mentioned the use of CRM in a different context than the aviation industry:

CRM training is being held in hospitals for doctors and nurses in order to improve their teamwork. It revolves around cooperation and understanding the other person’s job, what the other person does, what are their responsibilities and so forth. You can take CRM with you into your personal life, standing in line or being in traffic, it is all about showing understanding for the people around you.

Both captain (2) and captain (4) agreed that CRM training helps with understanding cultural differences. Captain (4) cited his favourite sentence in that context:
Take a piece of paper and give it to four people. Everyone gets the same piece of paper with the same content and then ask them how they would interpret the content. You will get four different answers. This is cultural difference, how you are raised and all that, is incorporated into the interpersonal aspect. Not everybody is able to work with other people.

Captain (4) also said that, “the interpersonal aspect is always interesting” and continued:

You are taught how to use everything around you. You are not just alone in the cockpit. You are taught where to look for information and to not be afraid to ask for it. The biggest part in all of this, is being able to work with different people.

Captain (2) stated that CRM training was a good way, “to learn how to read people around you and acknowledge cultural differences”. He continued that there is one thing that should not be forgotten:

Only the crew, the pilots and the cabin crew, have to take these CRM courses. However, we deal with so many more people around us, handling agents, mechanics and other employees in the company who have no idea about CRM training. So the question is, if not more people inside of the company could benefit from these courses.

10.3.3 What could be improved?

The last answer from captain (2) led to the final question, if there was anything in these CRM training courses which could be improved.

Some said that there was not really anything which needed to be improved but others found small adjustments which could be made as well as how difficult it can be for individuals to adapt to these new training programmes.

From his last answer about introducing CRM to other employees, captain (2) continued:

More people in the company should participate in these CRM courses such as middle management and senior managers. However, it is easier said than done. These companies and departments can be very large in size and some departments might not even be in touch or cannot communicate with each other which CRM training might change but I am not sure.

He carried on about his hope for EBT:
… if it works out then it will result in a review within the authorities but we have not come that far yet and might make mistakes on the way. However, the authorities are keeping an eye on us because they want to get rid of their responsibility that every incident is made into a mandatory training element. This would lead to the test becoming longer and longer which might not even result in better pilots.

Others agreed that it would be beneficial to have CRM training with other employees who are in contact with the pilots. Co-pilot (3) said:

CRM training could be held more often. It would be great to have one course between us pilots and then another one with other pilots from other airlines to get some sort of comparison. It would also be good to have others on these courses who we communicate with because sometimes when we ask them for something and they might think that we are criticising their work but we are just putting pressure to get out on time. However, this would mean increased training costs.

Co-pilot (6) stated, “it is necessary to have CRM training once a year to talk about these elements”. He was then asked if it would be beneficial to include others in CRM training, he answered, “yes, keeping everyone in the loop. This could also be introduced in the whole company with flight control and people who are servicing the aircraft”.

Co-pilot (5) added the concept of different role playing:

Not everybody might be up for it and it could be difficult to execute … but putting employees into other people’s positions and let them execute each other’s roles in order to show others how much work it is or how much pressure others might be under. I do not think that many pilots actually know how much work or stress employees in the cabin, in operations or in the dispatch are under. This would help with understanding each other. However, everything costs money and this might not actually happen.

Captain (4) acknowledged that CRM had developed a lot throughout the years but “one thing that could be improved is for people to have easier access to it. This is connected with the instructor; he has to have a good attitude towards CRM as well as be eager to teach”.

It is also important that pilots reach for assistance if they are in need for it as captain (4) acknowledged that “you should not be afraid to ask for help and admit to yourself and others that no one is perfect and demand further training and knowledge”.

On that note, co-pilot (3) explained that:
… in order to apply CRM successfully you might have to adapt or change your personality a bit so that you behave as CRM standards acquire you to behave. However, this is something that is not easily done especially when people have been on the job for a long time.

In that context, captain (1) explained that:

Some pilots will have it [CRM elements] embedded in themselves either from their upbringing or from their educational past. Others will need more training and reinforcement in order to get on the same level. This training is built to get everyone on the same page.
11 Discussion

A pilot’s knowledge, skills and attitudes as well as his experiences and use of CRM training have been the focus of this research project. His job consists of getting between destinations safely and effectively by following procedures as well as working efficiently together in a team towards a common goal. He therefore has specific roles and responsibilities as well as procedures to follow in addition to undergo strict training. Non-technical training such as CRM was introduced in order to minimize human errors made in the cockpit by developing pilots’ interpersonal skills on the job (Kanki et al., 2010).

The first research question looks into what kind of KSA pilots feel that they need to possess. The results from the interviews show that both captains and co-pilots acknowledged that their roles are very similar and will therefore need similar KSA. The captain has though the authority and the co-pilot is allowed to share his thoughts during the decision-making process. The interviewed captains are using a more delegating and receptive leadership style where workload is shared with the co-pilot and his opinion is taken into consideration. The interviewed co-pilots respect the amount of experience which the captains hold as well as their authority over the flight itself. However, they also appreciate the ability to share their opinions as well as the workload with the captains. This is in correspondence with Kanki et al. (2010) who state that even though the captain has the authority, he is no longer applying an autocratic leadership style but more of a delegating leadership style where the co-pilot shares the workload with the captain and is allowed to be part of the decision-making process. The co-pilot who works in an autonomous and independent way is still a team member who is guided by the team leader, here the captain, who is seen as a role-model. The delegating and transformational leadership style fits well in the cockpit and CRM training puts emphasis on delegating and teaches team leaders to provide team members with responsibilities (Bjugstad et.al., 2006; EASA, 2015b; West, 2012).

During the interviews, captains and co-pilots agreed that pilots need to possess a mix of interpersonal and technical competencies in order to be successful and efficient pilots. A co-pilot quoted that, “some believe the best pilots to be psychologists who can fly”. This quote can be seen as somewhat true because of the successful emergency landing on the Hudson River in 2009. The captain of this flight, Chesley Sullenberger, had studied a master’s in psychology in
addition to participating in CRM research and training which might have had an influence on the success of the emergency landing in addition to other factors (Landy & Conte, 2013).

Other characteristics of a great pilot noted by the interviewees were good interpersonal communication, a good attitude, empathy, cultural awareness, self-discipline as well as being a fast learner, mechanically-minded, knowing your aircraft and the SOPs, possessing and learning from experience. These competencies mentioned by the pilots are in accordance with Nordhaug’s (1998) classification of work-related competencies and can be characterised by the combination of specific competencies such as meta competence and technical trade competence. CRM training puts emphasis on pilots acquiring meta competence. Pilots can apply meta competence to various situations and tasks which correspond to CRM training elements, e.g., when in stressful situations, when solving a problem, when re-evaluating decisions but also to improve communication skills, the ability to understand and empathize with others. During the interviews some pilots mentioned that some people already possess the meta competence entailed in various CRM elements through their upbringing or through their education while others do not and will need reinforcement in order to work according to CRM principles. This is exactly how meta competence is learned, either through formal education, upbringing or socialization and previous work experiences (Nordhaug, 1998). Throughout the CRM training pilots gain meta competence which is important for them due to the fact that they need to have a wide range of KSA in cooperation, communication, teamwork, foreign cultures, situational awareness and many more. Moreover, pilots, who do not already possess meta competence, can gain meta competence through CRM training.

Airline pilots’ technical skills can be characterised as technical trade competence because their competencies have high task- and industry-specificity but low firm-specificity. The combination of low firm-specificity and high industry-specificity indicates that a pilot’s competencies are not limited to one airline. A pilot can therefore work for any airline in the industry as long as he gets the appropriate training. Pilot’s competencies are task-specific and concentrate on one thing, operating an aircraft safely which means that a pilot has to go through an educational programme in order to learn the tasks associated with operating an aircraft as well as learn through experiences on the job itself (Nordhaug, 1998).

The interviewees put emphasis on delegating and sharing the workload. Pilots will need to manage and delegate the workload in the cockpit where technical, interpersonal and conceptual
skills are needed. A pilot’s technical skills are characterised by the ability to use the instruments of the aircraft and know all about their processes and techniques, this can be for example the use of automation. Interpersonal skills in the cockpit are very important and CRM puts most of its emphasis on this element. Interpersonal skills are all about communication, cooperation and human behaviour, e.g., empathy and understanding and is it important in the hiring process to find pilots who communicate and coordinate well in a team. Conceptual skills are also an important part of CRM training, it consists of problem solving, efficiency and ability to see potential problems and solve them appropriately. These skills are all mentioned by the interviewed pilots (Landy & Conte, 2013; Nordhaug, 1998).

A respondent mentioned the fact that CRM is all about evaluating, re-evaluating a situation, gather information and data, analyse it and make a decision. According to him, it is important for pilots to realise that with new input, new information, their initial decision might have been wrong and that they are then able to change their decision and improve their performance. This response resembles the input-process-output model mentioned by Kanki et al. (2010), Landy and Conte (2013) and West (2012). It is all about the elements which might affect your work, the input, and then how you work through them, the process, and in the end which are the results of these processes, hence the output or outcomes. After the results of one experience, pilots then reflect and evaluate their own performance and if there needs to be a change in the flight process or not for the next flight performance or even during the same flight. With this reflection and evaluation, pilots show flexibility and adaptability (West, 2012; Kanki et al., 2010; Landy & Conte, 2013).

Many of the knowledge and skills listed by the interviewees are incorporate into CRM training, e.g., teamwork, communication, interpersonal skills, empathy and understanding towards others, cultural differences as well as company’s culture and regulations. Many of the interviewees mentioned that it is important to be able to work together towards a common goal despite cultural or any other differences. As a pilot, you will fly with different kinds of people who are either similar to you or the very opposite of you but there will always be some differences whether they are demographic or psychological. There are pros and cons to both heterogeneous and homogeneous crews. Homogeneous crews might communicate better whereas heterogeneous crews might show better performance. However, the key aspect is to be able to work together towards a common goal without any incidents despite possible cultural differences.
In that context, Kanki et al. (2010) as well as Chidester et al. (1991) found out that pilots who possess interpersonal skills, are motivated and goal oriented are more likely to perform better at their job than others who do not possess these characteristics.

The second research question asks about the pilots’ experiences and attitudes towards CRM training. A part of the results show that the captains have experienced a big change in the way they are trained with the introduction of CRM as well as with new training programmes being supplied during recent years. The older generation of pilots is fully aware of the changes in the industry. It might have been harder for those pilots as well as co-pilots, who worked with autocratic captains, to change their attitudes from the old-fashioned roles in the cockpit to a new more team-oriented cockpit. Whereas for pilots, who have had CRM training from the beginning and throughout their careers, it may be easier to use CRM elements because it has always been a part of their job, as the co-pilots which were interviewed stated. However, some co-pilots and captains showed some reservation or scepticism towards new training programmes and CRM training at first but realised that it was useful when introduced to its training principles and when put into use. These results correspond to Kanki et al.’s (2010) discussion about how pilots from the single-pilot tradition had a hard time to adjust to a new non-technical training programme because they were not used to working in a team. Other studies revealed that it is harder for pilots to transfer leadership styles than communication (Salas et al., 2006). This shows that it may be more difficult for captains to change their leadership styles than their way of communicating.

Co-pilots as well as captains noted that some captains might not be as motivated to participate in CRM training or be as receptive to it as other younger pilots. As one captain stated that older pilots would just leave in the middle of the course because they did not want to be there. In that context, Kanki et al. (2010) discuss the “boomerang” effect of CRM where participants who are not goal oriented and lack interpersonal skills are more likely to show resistance to the training (Kanki et al., 2010). A pilot’s receptiveness to a new training programme might depend on his personality.

Some participants mentioned the fact that older pilots might not be as receptive to new training programmes because they did not receive it initially, because it did not exist yet, and
have already set their mind on how they want to work. However, the interviewed co-pilots received initial CRM training and were therefore possibly more receptive to it due to the fact that they are taught CRM elements from the start. This might correspond to Illeris (2003) notion of how adults only learn what is significant for them and their job requirements. On the other hand, Nordhaug (1998) found out that people were eager to engage in further training after participating in initial training. After initial training, individuals become self-confident and motivated for promotion which is especially important for co-pilots who want to become captains. A positive attitude towards training is essential as an airline pilot due to the fact that airline pilots have recurrent training throughout their whole career numerous times per year.

Competence development can also be seen in general recruitment and training as well as when promoting co-pilots to captains which corresponds to one of the participant’s statement that, “if you cannot sit in the right seat then you cannot sit in left seat” (Ellström & Kock, 2008). This means that if you are not doing well as a co-pilot you will not be promoted to the position of a captain. Further competence development in the airline industry is the introduction of new and more fitting training programmes such as EBT and MCC mentioned by the interviewees. There is a change in initial and recurrent training in order to increase individual KSA for the future (Mankin, 2009). The interviewed pilots’ attitudes towards these new training programmes as well as CRM are very positive and is something that needed to be changed and updated even though there might have been scepticism in the beginning as with any kind of change. With the introduction of change, the first reaction is most often resistance because of the fear of losing one’s values and beliefs (Torrington et.al., 2014; Landy & Conte, 2013). The company will need encourage and support change in order for employees to reach their job requirements as well as for KSA, values and behaviours to develop and hence increase job performance. Resistance to change might have been the initial reaction of the older generation of pilots. However, as stated before there was only some initial reservation towards new training programmes which turned into positive acceptance towards these training programmes.

The last research question examines how pilots’ make use of their CRM training while on the job. The participants mentioned how CRM has taught them to be more empathetic towards their co-workers as well as to take their opinions into account. They agreed that their communication skills had improved as well as situational awareness. CRM taught them that even though
everyone can make mistakes, it is important to know how you work through them. It is about taking responsibility and being able to resolve these mistakes with the help from others around you in a calm and effective manner and make use of all the resources around you. All of the interviewees stated that CRM revolves around mutual understanding so that everybody knows what is going on and what should be done in order for the flight to get to its destination safely as well as mutual understanding of possible cultural or personal differences. As Kanki et al. (2010) mention, CRM is all about using everything around you, whether that may be your co-workers, information or the technology in order to operate the flight safely and efficiently. Threat and error management has become one of the main training elements in CRM, so that pilots know how to react and recover from unexpected events without losing control of themselves, their crew or the aircraft (EASA, 2015d). Landy and Conte (2013) as well as Salas et al. (2006) mention how CRM training focuses on cultural awareness and how pilots are able to except each other’s differences.

In the end, the interviewees were asked about possible improvements regarding CRM training. Many of the pilots thought that CRM training did not need any major improvements and that it is a good training programme which is necessary to partake in. Some mentioned that including other aviation employees would be an improvement to the training programme, not only pilots and cabin crew. In addition, pilots mentioned that introducing CRM training to employees working in the offices would be beneficial too. This is in accordance with the fact that CRM is also being introduced to other aviation employees as well as into other industries as the medical industry for instance (Kanki et al., 2010).

In order to reinforce the acceptance for these training programmes, an interviewee stated that the instructor needs to be eager to teach and have a positive attitude towards the training programme himself. The EASA makes sure that there are competent CRM instructors who are able to evaluate the pilots’ competencies in a correct manner (EASA, 2015a). In that context, for training programmes to be successful and excepted by the employees, there needs to be support for education from upper and senior management as well as from the CRM instructors themselves (Mankin, 2009; Ellström and Kock, 2008).

The interviewees’ overall attitude and experience of CRM is positive and they consider it useful as well as necessary in order for everyone to work according to the same principles. CRM
is about reducing human errors made in the cockpit by improving non-technical KSA, such as the crew’s communication and management skills, reduce captains’ autocratic behaviour, facilitate co-pilots to share their opinions, teamwork, use all resources available to you and being able to recover from unexpected events which are only a few elements of CRM (Kanki et al., 2010).
12 Conclusion

This research project looked at the level of importance of non-technical training in the aviation industry, CRM training, by interviewing airline pilots on what kind of competencies are needed nowadays to perform their job as well as what their attitudes and experiences are of this kind of training, including how they use it on the job.

The competencies needed for the job have changed throughout the years, the interviewed pilots put more emphasis on interpersonal skills even though technical skills are essential as well. The reason for this may be the change of the job itself as well as with the technological development throughout the years which result in the greater importance of possessing good interpersonal skills as a pilot. CRM has become a mandatory non-technical training programme for every pilot in order to increase their interpersonal skills as well as their ability to make use of their resources around them in an effective way. CRM creates a comfortable and safe work environment and increase job performance and possibly job satisfaction.

The results show that, all the interviewed pilots have a positive attitude towards CRM training and are able to put it into use in the cockpit. Even though, there might have been some reservation or scepticism towards CRM and other training programmes in the beginning. The results of this research project introduce the KSA needed for the job as well as clarify possible differences between captains and co-pilots’ attitudes towards CRM. At last, the results show how pilots use their CRM training when on the job and possible future improvements regarding the training programme.

The results of this research project can though not be generalised due to the fact that only 6 pilots were interviewed and all of them were Icelandic men. Even though, their answers were similar to each other, there might be differences when interviewing female pilots or even pilots from other parts of the world with different cultural backgrounds.

For future research it would be beneficial to look at the possible introduction of CRM into airline offices and management. In addition, it would be interesting to look at EBT and the evaluation of pilot training becoming more individualised rather than being based on individual incidents or accidents.
References


Appendix - Interview Framework

Bakgrunnur
- Hver er lífsaldur þinn?
- Hjá hvað flugfélagi vinnur þú?
- Hver er staðann þín hjá flugfélaginu?
- Hver er starfsaldurinn þinn hjá þeim?

Starfið
- Hversu lengi hefur þú unnið sem atvinnuflugmaður?
- Lýstu fyrir mér starf atvinnuflugmannsins! Hver er munurinn á milli aðstoðarflugmannsins og flugstjóra? Hlutverk þeirra og verkefni?
- Hvað breyttist í starfi þínu þegar þú fórst frá því að vera aðstoðarflugmaður í að vera flugstjóri? Verkefni? Ábyrgð? Þjálfun?
- Getur þú gefið mér dæmi hvernig starfið flugmannsins/aðstoðarflugmannsins/flugstjóra hefur breyst frá því að þú að þú byrjaðir í atvinnufluginu?
- Hvers konar þekkingu þurfa flugmenn að hafa? Tækilega og mannlega þekkingu?
- Hvers konar færni þurfa flugmenn að hafa?

Þjálfun
- Hver fingur að færni og þekkingarþróun í þínu fyrirtæki? Námskæið, sjálfsnám?
  Frjáls eða skildu námskæið?
- Lýstu fyrir mér reynsla þínu að færni og þekkingarþróun í þínu fyrirtæki?
- Hvers konar álit hefur þú á CRM þjálfunina í fyrirtækinu þínu?

Álit og reynsla á þjálfuninna
- Lýstu því fyrir mér hvernig CRM þjálfunin nýttist þér í vinnunni sjálfrí?
- Hverjir eru jákvæðu þættirnir í CRM þjálfuninni hjá fyrirtækinu þínu?
- Hvað má betur fara í CRM þjálfunin?