군에서 민항 조종사로의 전환 교육에 관한 고찰

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Transitional training :
Military to Airline Pilots　(A Korean Perspective)

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요   약

한국의 항공산업은 짧은 역사에도 불구하고 괄목할 만한 성장을 이루었으나, 그 규모에 비해 행해진 사회과학적 연구는 부족한 실정이다. 본 연구는 한국 군 출신 조종사들이 민간 항공조종사로 전환시 그 적응을 돕기 위한 교육 프로그램에 있어서 주요 고려사항들에 중점을 두었다. 이러한 고려사항들을 찾아내고 선별하는 것을 돕기 위하여 국내 두 항공사의 현역 조종사들 중 군 경력자들을 대상으로 설문을 실시하였으며 그 설문 결과를 SPSS에 의해 분석을 하였다. 분석 결과 국내 항공사의 전환 교육 프로그램이 군 출신 조종사들이 민간 항공 조종사로 적응하는데 필요한 임무의 차이점이나 CRM, 영어 교육 및 기술적 환경변화 등을 효과적으로 준비시키는데 적절치 못한 것으로 나타났다. 이는 군 경력 조종사들의 민간 항공 전환시 그 적응을 돕기 위한 개별적인 교육 프로그램이 필요함을 예시해 주고 있다.

1. Literature Review

1-1. Background

In Korea, as in many other countries, the major source of new pilots for airlines is from the military. Airlines recognise that such pilots have been rigorously screened; medically, psychologically and intellectually. In addition, they have been subjected to structured training, operational experience and have worked as part of a team-oriented hierarchy. The pilots discharged from the military in Korea usually have a minimum of 10 years flying experience. Because of Korea's geopolitical circumstances, Korean military pilots are particularly highly trained in flight skills through multi-dimensional exercises for a variety of environments.

With the rapid growth of the two main airlines of Korea, the high demand for pilots has not been able to be satisfied. The traditional supply of military pilots has been insufficient to meet airline demands, so airlines have initiated their own ab-initio training programmes. However, the demand for Captains with extensive experience and a high numbers of flying hours, requires a faster solution than the long-term expected ab-initio training programmes. About 30% of Korean Airline captains are foreign and come from 36 different countries (Munhwa Broadcasting Company TV, 1997). These foreign captains are paid at higher salary levels than their Korean counter parts. To add these problems, the Korean economy has been affected by the Asian economic crash of 1998 (Ballantyne, 1998). The huge influence of the nationwide financial crisis has caused these two airlines of Korea to face the hardest financial period since they started their business. The preference for experienced Korean pilots from the military as pilots for the airlines of Korea is expected to continue and to increase as a means of reducing costs. Further

reliance on military trained captains increase the important of the transitional training they undertake prior to take up their command. It is essential that this course adequately prepares the military pilot for the modern airline environment. It is this problem, the adequacy of the transitional programme, that this study addresses.

Over the past decades there have been many changes in training for airline pilots. For example, it is now generally recognised that flying a modern airliner is a team task (Orlady, 1994). Three of the most important operational changes of all include:

1. The increased responsibility of the first officer.

2. The need for first officers to be more assertive.

3. The need for captains to encourage this kind of behaviour (Orlady, 1994).

Some positive moves towards such changes have become recently apparent in airlines of Korea. Most of the materials being used in LOFT/ CRM training programmes in Korea are supplied by US based organisations, however there is now some recognition that the difference between national cultures has to be considered carefully in LOFT/ CRM training (Helmreigh, & Merritt, 1997).

### 1-2. Two dimensions in national culture

In recent years, research at the University of Texas has revealed that culture plays a mayor role in CRM. One of the manifestations of this in Asia, particularly in Thailand, Taiwan and Korea, has been the inflexibility of former military pilots to communicate with first officers (Merritt, 1997).Korea also has some particular aspects of national and organisational culture that may influence the attitude and behaviours of flight crews. As reported by Johnston (1993), Hofstede differentiated national cultures across four dimensions; Power Distance, Uncertainty Avoidance, Individualism, and Masculinity. Merritt and Helmreigh (1996) considered two dimensions, Individualism and Power Distance, important influencing factors in cockpit crew-coordination. The dimension of Individualism-collectivism (IND), that is, the extent to which the individual's behaviour is defined and influenced by others, has probably received the most attention (Berry, Poortinga, Segall, & Dasen, 1992; Schwartz, 1990). Individualists like to behave in accordance with their own personal beliefs and values, and independence is considered as an important value; preferring personal achievement and recognition to group rewards (Merritt, & Helmteich, 1996). In comparison, collectives like to behave within a wider area of concern for other group-members, and they value the harmony of their group and social orders. All the in-group members share the outcomes and responsibilities of their behaviour (Bond, & Hwang, 1986).

Koreans are low on Individualism. Place and position in Korea are determined by group membership, which is often outside the influence of the individual. There is a stronger belief in

fate and they are motivated by a sense of not wanting to shame or disgrace the other group members with their weakness or failure.

Power Distance (PDI) reflects how people deal with inequality, in particular the expectations and acceptance of the unequal dispersion of power. A high PDI society places a high value on reverence and respect for elders and people in positions of power and seniority. Thus, within the Korean culture, the behaviour of people in Korea's strong power distance structure causes a steep authority gradient in the cockpit. This has been shown to influence the first officer's avoidance of conflict and deference to the experience and authority of the captain (Wheale, 1983).

Figure 1.   Power distance x Individualism-collectivism plot for 50 countries and 3 regions (see Table 1 for county codes). (Source : Hofstede, 1983.)
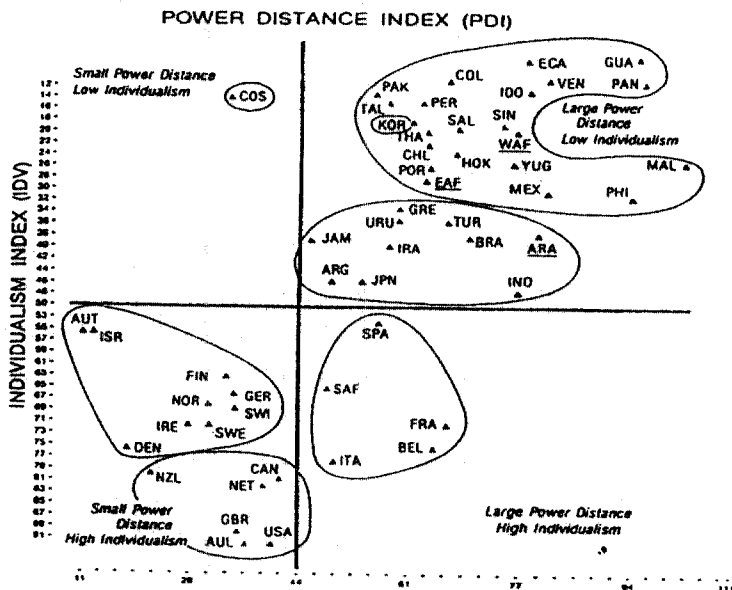
Ooi (1991) stated that assertiveness training, while a valid example of Western modes, would be met with polite nods by older Chinese pilots, with no transference to line operations. China, as with most Asian countries, is a high power-distance, 'collective' culture. Junior crew do not challenge the captains, indeed they expect the captain to give orders.

Merritt (1997) has undertaken a replication study of Hofstede's work in the aviation environment to answer the question, "To what extent do Hofstede's dimensions of national culture, derived from personnel in a large multi-national company in the late 1960's and early

1970's, apply to commercial airline pilots flying in the 1990's?". She gained attitudinal data from 9000 male commercial airline pilots in 18 countries and found two dimensions of Power Distance and Individualism-collectivism were replicated successfully (correlation of .74 and .94, respectively). Among Merritt's 9000 from 24 airlines in 18 countries, 123 Korean in-service airline pilots were included. Within the restricted range of scores in the research findings toward the IND dimension, the USA, Britain, and Ireland had the highest IND scores while Taiwan and Korea had the lowest scores. In PDI (power distance) dimension, the pilot country scores correlated .74 with Hofstede's country scores. Items which correlated with this index include: "In abnormal situations, I rely on my supervisors to tell me what to do" (r = .76); "Crews should not question the Captain unless the safety of the flight is threatened" (r = .76). The countries lowest in Power Distance were New Zealand, Australia, and South Africa. The countries highest in PDI was Brazil, followed by Korea and Philippines (Merritt, 1997).

In a high Power Distance cockpit, the captain is clearly the unquestioned leader. It is captain's job to communicate his/her plans to the crew both and during the flight, and to coordinate the crew's activities. In return for this, clearly communicated top-down direction, the crew is unquestioningly loyal and believe that they can overcome any personal or situational adversity to ensure that the captain and other crewmembers are not let down. There is an expectation that information will be shared, and not require assertive, potentially 'face-threatening' inquires. On the other hand, there is more self-reliance, and more personal responsibility for success and failure in low Power Distance cockpits (Merritt, 1993).

The Korean military is one of the most strongly disciplined organizations in the world. This is because Korea neighbours a country which poses a significant, ever-present threat; North Korea, and also because it is positioned in the middle of powerful countries like China and Russia, which have maintained good relationships with North Korea, and Japan, who had forcedly colonized Korea for 36 years. Consequently, ex-military pilots of Korea have probably experienced even larger power distance situations than shown in Figure 1. A further delicate problem is sometimes introduced when senior-ranking military officers leave to join airlines and found themselves as first officers next to younger - and militarily junior - captains. Forming a satisfactory working relationship can be difficult for both crew members in such circumstances, as countries such as Korea which have drawn heavily on their national air forces for pilots, have found.

However, Hofstede's approach must be considered from a different perspective. He did not try to prove that one culture was the standard from which all other cultures deviated. Johnston (1993) pointed out Hofstede's central argument, which warns against such universal standards of efficient work practices and group processed, given the cultural differences in work-related values. Rather than viewing the low individualism - high power distance dimensions characteristics of

Koreans as deviant form the norm, it is now important to recognise them as part of the cultural structure of the country, and find ways of achieving satisfactory CRM outcomes in that context.

1-3. From a Korean pilot's views

Cavanagh and Williams (1987) spell out clear differences between military and airline cockpit which they believe warrant attention when developing CRM courses. They specified six categories of differences: 1. Purpose of the organisation. 2. Qualification of the crew. 3. Rank distinctions. 4. Responsibilities of the crews. 5. Labor relations. 6. Miscellaneous factors.

However, these categories are from the perspectives of the US. They chose the Airlift Command, to exemplify the military context. While there are similarities with the military in Korea, there are also major differences. Airlift command is a cargo operation with two crew members compared to the single pilot fighter or attack aircraft, the major experienced pilots of Korea come from. In addition, American pilots have the opportunity to rotate their jobs and spend time on the cargo and fighter aircraft. In addition to these operational differences, English language is not the source of difficulty for US pilots, but it is for Korean pilots. 'Purpose of organisation' and 'Responsibilities of the crew' can be combined into a category called 'Role differences". Language is a significant issue for Korean pilots but labor relations is not so important because Korea has no history of trade unionism. Rank distinction and responsibilities of the crew are also manifested as differences in CRM skills. And finally, for Korean military pilots the change from and old-fashioned fighter aircraft's cockpit to modern airliner's glass cockpit is a significant change in the cockpit environment (technical). Consequently, if these differences are taken into account the six categories of difference identified by Cavanagh and Williams can be modified to four categories that relate specifically to the Korean situation: role differences, language, CRM, and cockpit environment.

Role differences

The role of the airline pilot and military pilot is different. The airline pilots fly on a basis of people-oriented perspective, while military pilots fly on the basis of a mission-oriented perspective. Military pilots manage flying situations for the successful fulfillment of the mission, on the other hand airline captain and first officers are mainly concerned for the passengers' safety and needs. As military pilots are in constant preparation for combat, they are more likely to select a riskier alternatives than airline pilots (Prince & Salas, 1993). For ex-military pilots to successfully transition to an airline culture, they need to understand the differences in role and duties between military pilot and airline pilots.

Language

Elliott (1997) working with international flight training students at Embry-Riddle university found that many of international students (including quite a few Asian students), when compared

to American students, took longer to complete their flight course and achieved lower grades at greater expenses. He concluded that the difference in performance was accounted for by language problems. These language problems become apparent when ex-military pilots, limited by their English, share a cockpit with foreign crews. Anxiety and stress are experienced when communicating with foreign flight crew and foreign ATC controllers in unfamiliar foreign airspace (O'Hare & Roscoe, 1990). There are few studies about communication problems related to language between pilot and controller. One study of the effect of introducing bilingual air traffic control in Canada showed that in a simulated high-density terminal area, approximately 5 percent of transmissions contained some forms of error. Pilots, rather than controllers, produced most of these. Misunderstandings are arise among pilots and controllers whose native languages are not English (O'Hare & Roscoe, 1990). Korean military pilots tend to be at a greater disadvantage when understanding and speaking English than their civilian counterparts, who have been sent overseas for ab-initio training.

CRM

The ex-military pilot is still considered an asset by many airlines even though some would argue that the military pilot can lack flexibility and crew resource management skills (Nash, 1995). Airlines worldwide operate with cockpit crew composed of individuals from a very wide mix of ethical, social, cultural and language backgrounds. Socio-cultural factors played a role in the 1977 Anchorage accident when a young oriental flight deck crew member failed to intervene or express concern when the senior American captain was obviously under the influence of alcohol before take-off (NTSB-AAR-78-7). For a similar reason, former military pilots may respond to situations, in a military fashion, when a different type of intervention is called for. For example, believing it is insubordinate or rude to intervene or express concern when military seniors make mistakes.

Table 1. Example of Intervention Model : PACE.

PACE; four step intervention process by concerned first officer ;
Step1. Probe for a better understanding. --- "*Captain, I need to understand why we are flying like this*"
Step2. Alert the captain to the anomalies. --- "*Captain, it appears to me that we are in a course of action that is drastically our safety margins and is contrary to both your briefing and to company SOPs* (standard operation procedures)."
Step3. Challenge the suitability of the present strategy. --- "*Captain, you are placing the passengers and aircraft in irreversible and immediate danger. You must immediately choose a course of action that will reduce our unacceptably high risk level.*"
Step4. Emergency warning if critical and immediate dangers. --- "*Captain, if you don't immediately increase our safety margins, I must immediately take over control of the airplane.*"
(Besco, 1995)

According to Lauber (1987), four events converged in the 1970's to stimulate the development of CRM. All four were directly related to the air carrier industry, and none of the important events outlined by Lauber (1987) pointed to the existence of a problem for the military. Due to military aviation's late recognition of the need for CRM, many military pilots have little understanding of CRM. Furthermore, the concept of CRM instructed to Korean military pilots is limited to military situations only and the instruction is given by general officers, not CRM specialists.

Many air carriers in the world have begun to pay increased attention to CRM in recent years due to the growing number of accidents in airline traffic. Many air carriers are developing new CRM programmes for their own national and organisational cultures (Grindrod, 1996). Another example is Northwest's CRM training which changed a lot when they adapted the FAA's Advanced Qualification Programmme (AQP) to expand its training capabilities. AQP allowed Northwest to develop customised training that focused on the pilot's real needs and took into consideration the individual's background and expertise. Northwest differentiates, for example, the A320 training for a military F-16 pilot from that of an ATR 42 pilot (Ott, 1996).

Table 2. Examples of appropriate CRM behaviours.

Flight crew	Cabin crew
■ Alert cabin crew to any flight time changes (if the flight time is shortened, cabin crew members need to start cabin landing preparation earlier). ■ Provide any gate change information as soon as possible. ■ Notify the cabin crew of any diversions. ■ Alert the cabin crew of any significant equipment problems that affect cabin crew operations.	■ Cabin crew should contact the flight crew for any event that the cabin crew believe is dangerous. ■ Any time, the cabin crew perceives unexpected changes in the airplane condition, plan, or route, then the cabin crew should contact the flight crew with a concise question or statement regarding this perception.

(King, Murray & Blocher, 1996)

Cockpit environment (Technical)

Ex-military pilots in Korea, trained in old fashioned aircraft may be confronted with another barrier, the understanding and utilisation of cockpit automation. Most of old-generation military aircraft of Korea do not have highly automated cockpits, creating a large technical gap between military skills and those needed for the airlines' new generation aircraft (Sexton, 1988). The FAA human Factors team (Abbot, et al., 1996) found that unexpected pilot behaviour (e.g., autothrottle engaged with autopilot off) evidenced in recent accidents and incidents appears to be the result

of many factors, including the increased capability, reliability, and authority of the automated systems, increased flightcrew use of and reliance on such systems, protective features of these systems, automation philosophy of the operator, and cultural differences. Issues related to the occasional breakdown in communication between the pilot and automated systems can occur as computers are becoming more complex and are given more authority in the cockpit. Major commercial aircraft manufactures Boeing/ McDonnell Douglas and Airbus, have different philosophies in cockpit automation (Hughes, & Dornheim, 1995).

1-4. Research problem

The purpose of this research is to identify ways of improving training programmes for Korean pilots who have transferred from military to commercial aviation. The ultimate goal of training for an airline pilot is quite different from that of a military pilot. In addition to the transitional flying skills, a comprehensive resource management training programme is needed for modern airline pilot traning (Orlady, 1994). There are significant differences between operating in a civil environment and a military one. Identifying the practical problems of in-service airline pilots who have experienced the transitional training form military to airline, helps to target more specific adjustments needed in the training programme. Particularly concerned with a Korean perspective, this research examines skill areas in which military pilots are thought either to be at lower levels of proficiency than their civilian counterparts or to have a significantly different type of training or experience. These areas are role and duties, language, CRM and cockpit environment (technical).

Four research hypothesis were developed.

1. Military pilots and airline pilots have different roles and duties and need training that prepares them for this change.

2. Ex-military pilots are less familiar with the teamwork and other CRM issues and need more training them is currently given in the transitional training programmes.

3. Ex-military pilots' English language skills are usually insufficient for international airline situation.

4. The airline aircraft has technical systems which are significantly different in philosophy and operation from the military aircraft. That the current level of transitional training on civil aircraft technical system is inadequate. These differences require additional training.

2. Methodology

2-1. The Sample

The population for this study was comprised of Korean airline pilots from Korean Airlines (KAL) and Asiana Airlines who had had military aviation experience. Reflecting on a data 1995,

there were about 1100 pilots in KAL and 420 pilots in Asiana. Detailed questionnaires were distributed by mail to 224 in-service airline pilots with military backgrounds in Korea. Of these, 104 responded. As Korean Air has almost three times as many pilots as Asiana Air (1995), the number of pilots initially sent questionnaires reflects this distribution. Consequently, questionnaires were sent to 170 KAL in-service pilots and 54 Asiana pilots.

The 104 in-service airline pilots respondents of this study were all male. Seventy three percent of the participants had been single-seated aircraft pilots with fighter of attacker experience in the military, while only 5% of the participants were identified as helicopters or propeller-type aircraft experienced pilots. The remainder had flown cargo aircraft.

Boeing-produced aircraft were flown by 80% of the participants and 9% of the participants were aged between 37 to 40 years and about 12% of the participants were over 50 years old. Participants showed wide range of experience in airline from 2 to 11 years as shown in figure 7, through most had 8 years or less.

The questionnaire was sent by mail from November 25 to December 7, 1997. Some participants whose questionnaires were returned to sender caused the time spread. It appeared they had changed their address. They could choose to participate, voluntarily in this research by posting the questionnaire in the return envelope. Pilots were informed that their responses would be confidential. Participants were asked not to write their name and address on the return envelope to preserve anonymity. Some pilots expressed concern that the results may influence their company's reputation. They were assured that this research would be used for study purposes only.

2-2. Description of the questionnaire

Throughout the literature review an argument was presented that a more comprehensive transitional training programme is needed for military pilots moving into the airline industry. This questionnaire was designed to identify whether participants believed there was a sufficient difference between military and airline operations to require customized training for the change and to identify the specifics of such a training programme. A total of five scales were developed in this questionnaire to measure: whether or not ex-military pilots perceived a difference between military aviation operations and airline operations; the adequacy of transitional training for change on roles and duties, training for English language skills, CRM transitional training and training for technical difference. All five measures were developed for this study. Although a five point Likert-type scale is commonly used in social science research, for the purpose of this study only 4 points were used to avoid neutral answers and force participants to agree or disagree. Participants were asked to rate how closely the items reflected their experience on the four-point scale shown below.

1. Strongly Disagree   2. Disagree   3. Agree   4. Strongly Agree

As instruments was developed in New Zealand, but was to be administered in Korea, there were difficulties identifying a suitable sample for the pilot study. The questionnaire was trialled on a small group of Korean student-pilots of Massey University School of Aviation. Two former Yugoslavian military pilots were also used in the pilot to bolster feedback on the military components of the questionnaire. An analysis of the results and discussions with the students resulted in a number of changes. Two items were dropped because of their vague and subjective meanings, and 6 questions were rephrased to overcome a bias towards an affirmative answer.

Section 1 was composed of questions identifying the nature of the differences between military and airline flying. The 12 items, which measured the difference between working as a pilot in a military environment and working as a pilot in a civilian airline across the dimensions of CRM, English language skills, technical skills and role / duties.

Table 3 Items measuring the nature of the differences between military and airline flying.

1	Airline flying requires more teamwork than military flying : Prince & Salas (1993), Orlady (1994).
2	CRM / LOFT training plays a major role in preventing human errors in airline flying : Butler (1993).
3	The roles and duties of airline pilots are quite different from those of military pilots: Prince & Salas (1993), Phelan (1994).
4	Airline flying is more people-oriented than military flying : Prince & Salas (1993).
5	Military flying is more mission-oriented than airline flying : Prince & Salas (1993).
6	The procedures of airline flying are more complex than military flying : Zalesny, Baker, Prince & Salas (1992).
7	Military flying is more exciting than airline flying : Zalesny, Baker, Prince & Salas (1992).
8	Airline flying is more procedurally and operationally controlled by SOPs. There is little individual pilot input : Prince & Salas (1993).
9	The Englsih language skills are more important in airline flying (Korean perspective): Proctor (1996).
10	The important of English language skills will be more emphasised in the future in the airline industry : Proctor (1996), Grindrod (1997).
11	Airline aircraft's control and automation system are very different to the military aircraft : Sexton (1988).
12	In order to become accustomed to airline aircraft's automation system, ex-military pilots need to adjust their usual habit of flying : Prince & Salas (1993).

Transitional training from military to airline is given to ex-military pilots to prepare them for a change in their roles and duties. Section 2 is composed of items measuring the respondents' perception of the adequacy of the transitional training to prepare military pilots for the change in role and duties they would experience when they become civilian airline pilots.

Table 4, Items measuring Adequacy of training for Change on roles and duties.

1	It was quite difficult to change from being a military pilot to an airline pilot : Phelan (1994, 1996).
2	Much time and effort required in adapting myself to international airline industry : Phelan (1994, 1996).
3	Sufficient transitional training from the military to the airline was provided : Prince & Salas (1993), Phelan (1994).
4	My current roles and duties were discussed properly during the transitional training : Prince & Salas (1993)

Section 3 was composed of questions identifying participants' perception of the adequacy of the transition training in preparing military pilots for the new situation where a good English language skills is a necessity. A good level proficiency of English language skills was identified in the literature as being important to the safe operation of the aircraft in an English speaking environment and for effective communication skills within the cockpit.

Table 5, Items measuring Adequacy of Training for English language skills.

1	There might be some difficulties caused by English, when I face unusual circumstances in foreign airspace or airport : O'Hare, & Roscoe (1990), Merritt & Ratwatte (1997).
2	I have no difficulties communicating with foreign captains in English : Merritt & Ratwatte (1997).
3	English language education in the military was insufficient for airline life : Nash (1995).
4	Ab-initio pilots are usually better at English than ex-military pilots : Nash (1995).
5	I have some difficulties when I communicate with foreign ATC control when they use non-standard terms : O'Hare & Roscoe (1990), Proctor (1996), Merritt & Ratwatte (1997).
6	I had no difficulties passing the basic degree of aviation English which was required for every new pilot in the airlines of Korea : Korean Air Press (1992).
7	I need more effective English education even now : Proctor (1996), Merritt & Ratwatte (1997).

Section 4 was composed of questions related to CRM issues. Among 8 items, which made up the CRM issues, three items (item 3, 4, 8) deal with an expanded meaning of CRM. The airline cockpit is a different environment to a military one. In an airline cockpit, teamwork and intra-communication skills are considered more critical (King, Murray & Blocher, 1996).Two issues of particular concern when using CRM in an Eastern cultural context are power distance and mixed culture concepts.

Table 6 Items measuring Adequacy of CRM transitional training.

1	Training for CRM was insufficient when I was in transitional training : Merritt & Helmreich (1996).
2	I feel that there is a large distance between most foreign captains and first officers : Hawkins (1987), Merritt (1993), Helmreich & Merritt (1997), Ooi (1991), Schwartz (1990).
3	It is not easy for cabin crew to make suggestions or ask the cockpit crew questions about the flight : King, Murray & Blocher (1996).
4	I am familiar with the roles and duties of cabin crew, dispatcher and ground maintenance personnel : Helmreich & Foushee (1993).
5	CRM issues are a serious concern when a Korean first officer has to fly with a foreign captains : Merritt & Ratwatte (1997).
6	Foreign captains in our airline are familiar with the Korean culture and Korean ways well : Merritt & Helmreich (1997).
7	For ex-military pilots, CRM issues should be more emphasised : Merritt (1997).
8	Our airline needs to give more considerations to CRM issues when scheduling and managing flight crews, to improve safety : Ooi (1991), Orlady (1994).

Pilots must be proficient in operating their aeroplanes at all levels of automation to be considered competent. Many automated cockpits of modern airline aircraft have very different automated systems from those of military ones (Sexton, 1988). Section 5 was composed of questions related to technical differences in the cockpit environment. The main difference between military and civilian aircraft in Korea is the degree of automation of aircraft systems. Sherman, Helmreich & Merritt (1997) found that high power distance pilots are willing to accept rather than distrust the 'expert' role of the automation.

Table 7, Items measuring Adequacy of training for technical differences.

1	Sometimes the airline automation system can be confusing to understand rather than convenient ; Wiener (1988).
2	I have been well instructed about the differences between the two major commercial aircraft manufacturers (Boeing/MD., Airbus) philosophies in cockpit automation : Hughes & Dornheim (1995).
3	I have never been specially informed or instructed about any accidents caused by interference of the pilot with in the cockpit automation system : Wiener (1988).
4	I do believe my flying skills rather than auto-pilot system : Sherman, Helmreich & Merritt (1997).

3. Outcomes

3-1. Scales.

The results from the analysis of the questionnaire are presented in this chapter. The statistical package SPSS for windows (Francis, 1996) was used to examine the data. Items in the questionnaire were constructed into five scales. Theses were: the Difference scale, which measured whether the respondents viewed the civilian airline environment as being different to the military and four scales which measured the respondents views of the adequacy of the transitional training programme in the areas of CRM, English language, technology and roles/duties. The reliabilities for the technology scale was not sufficiently high to be useful and this scale was deleted from further analysis. Some items in the other four scales were deleted in order to increase their reliabilities.

Table 8. Reliabilities, Range and Medians for each Scale

	Difference Scale	Training for Roles and duties	Training for English	Training for CRM
Reliability	0.56	0.64	0.74	0.60
Range	2.50-3.90	1.50-4.00	2.14-3.86	2.38-3.75
Median	3.2	3.0	3.14	3.00

The scales had above moderate reliabilities except one good alpha coefficient of .74 for scale: Training for English. A visual inspection of these results suggests that most ex-military pilots believe that 1) there is a difference between military and civilian aviation in relation to English needs, technology, CRM skills and roles and duties; and 2) that the transition training did not

adequately prepare military pilots for these changes. However, it is necessary to test the significance of these results to determine if they are a characteristic of sample or can be generalised to include other ex-military pilots working in the two airlines.

3-2. Chi-Square Test Results

A conservative approach was used to test the significance of the results. Although some researchers argue that attitudinal scores using a Likert-type scale can be considered to produce interval data and therefore be used in parametric tests (Sarantacos, 1998), it was determined to be more appropriate to use the less powerful non-parametric chi-square goodness of fit test. Whit only four response options, two indicating disagreement and two indicating agreement, the more cautious approach of treating the data as being of a lower level than interval was taken. Additionally, the sample size was quite small and comprised only one group, airline pilots with military experience.

The response on the four scales were recoded into two categories, those scores below the midpoint on the rating scale (2.5) and those above the midpoint. Scores above the midpoint indicate a view that there is a difference between military and civilian airline flying (Difference scale) or in the case of the adequacy scales a belief that the transition training was inadequate. In other words a balance below supports the null hypothesis. It was expected that the number of responses above and below the midpoint of the scale would be approximately equal if there was no perception of a difference in the two aviation work environments, or if there was no common view on the adequacy of the transition training, that is about the same number of respondents thought it adequate.

Table 9, Chi-Square Results for Adequacy of scales

scales		Observed N	Expected N	Residual	Chi-Square	df	Asymp. Sig.
Training in CRM	1.00	7	52.0	-45.0			
	1.00	97	52.0	45.0			
	Total	104			77.885	1	.000
English skills	1.00	6	52.0	-46.0			
	2.00	98	52.0	46.0			
	Total	104			81.385	1	.000
Training Roles/ Duties	1.00	16	52.0	-36.0			
	2.00	88	52.0	36.0			
	Total	104			49.846	1	.000

a. 0 cells 0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 52.0.

Since there were no scores below the midpoint of the scale for Difference in Environments, it was not possible to perform a chi-square goodness of fit test. The respondents where in total agreement that there was an identifiable difference between the two environments.

3-3. Correlations

Correlations were performed between demographic variables and the four scales to determine if demographic characteristics of the sample were associated with particular perceptions. Only two demographic variables showed any significant relationship, age and the type of aircraft that had been flown in the military.

Table 10, Correlations between demographic variables and two scales.

	AGE	Mulitary Aircraft type
CRM	-.239*	.197*
English Language skills	.202*	

* significant at the 0.05 level.

Age was negatively correlated with the Adequacy of CRM training scale. This suggests that older pilots were less likely to recognize CRM inadequacies in their work environment than younger pilots and generally view CRM as being less important. The correlations between type of aircraft flown in the military and CRM training indicate that fighter pilots are more receptive to viewing these needs as important and more likely to recognise deficiencies in these skills in the cockpit. Fighter pilots are considered to have experienced more self-decisional situations where needs less inter-relationships and resource management skills than multi-crew situations.

4. Discussion

In this chapter, the findings are discussed and recommendations for future research suggested. The purpose of the present study was to clarify if there was a need for differentiated transitional training programme for Korean ex-military pilots before they entered the airline industry, and to identify the areas that should be addressed in such a programme.

4-1. Findings

1. That ex-military pilots perceive a difference between the operational environments of military and airline, in terms of technology and roles and duties of pilots.

2. That the transitional training programme provided for the ex-military pilots did not adequately prepare these pilots for the change in role that they experienced when they moved into the airline environment.

3. That the standard of English amongst ex-military pilots was still not of sufficient standard for airline operations after the transition training.
4. That the CRM transitional training did not adequately prepare ex-military pilots for airline operations.

4-2. Limitations of the study

It is difficult to generalise the findings from such a small sample to other populations. However, the sensitive nature of the research (from a Korean perspective) made it difficult to get a larger sample size. So far, little research on military issues has been conducted in Korea except for research done by the military or sponsored by the Korean government.

The low response rate was caused by a number of factors. Mail surveys traditionally have a low response. In this case that would have been aggravated by the tight and irregular flight schedules of in-service airline pilots.

4-3. Recommendations

It is impossible to provide a definitive model of transitional training programme for ex-military pilots by reflecting this study. However, the research of this study does provide insight into some aspects of transitional training for Korean ex-military pilots. As this study was exploratory, the findings are tentative and require further verification. However, some tentative recommendations can be made along with some considerations for future development of transitional training programmes.

1. Transitional training programmes for ex-military pilots has to focus on the differences in the roles and duties of military and airline pilots. In-service airline pilots with a military background may be able to explain such differences to ex-military trainees in a more understandable way.
2. More detailed ATC English training and practical English conversation training has to be considered in transitional training for ex-military pilots. Using some of foreign captains in this training programme may give greater relevance and motivation to ex-military trainees.
3. CRM training must be more emphasised in transitional training for ex-military pilots. Respondents believed that the most important training issue for ex-military pilots is changing the military focus into an airline one. For a better understanding about CRM in its broadest form, giving pilots more opportunities to interact with people from other departments would help.
4. Transitional training for ex-military pilots has to give greater emphasise to the technical differences between airline aircraft automation systems and military systems.
5. There is a need for a differentiated transitional training programme for ex-military pilots to enable them to adapt better to the airline industry.

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