The Experience and Performance of Female Airline Pilots in Taiwan - A Tripartite Assessment

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Abstract

The pilot profession remains one of the most notable gender-imbalanced occupations in the aviation industry, with women making up a far lower percentage than men. Nevertheless, the experiences and challenges faced by female pilots in the workplace is worth exploring. Previous studies have mostly approached these issues from the perspective of male and/or female pilots, ignoring the opinions of managers responsible for flight operations. This study fills this research gap by adding flight operations managers' assessments of female pilots to explore the topic from a broader and comprehensive tripartite perspective. In addition, gender issues in the cockpit and the impact of female pilot participation are also discussed. The research is conducted through in-depth interviews covering flight operations managers, male pilots, and female pilots in three different Taiwanese airlines. The findings of this study reveal that the performance of female pilots is generally affirmed by flight operations managers and male pilots, and the participation of female pilots produces some chemical effects on the culture of the cockpit, which also contributes to crew resource management and flight safety. Contrary to previous research findings, the female pilots interviewed in this study do not feel that they are being challenged or abused in relation to their gender. Finally, several recommendations are given to the airlines to implement CRM training programs and recruit female pilots.

Keywords: female pilots, gender discrimination, gender stereotype, CRM, female pilot recruitment

1. Introduction

Air transportation is a highly competitive global industry, which not only provides convenient transportation services, but also creates many employment opportunities, including pilots. However, even though the history of women flying airplanes is similar to that of men (Vermeulen & Mitchell, 2007), the pilot occupation continues to be dominated by males (McCarthy et al., 2015). According to a study by University of Nebraska, women pilot certificate holders accounted for a mere 8.5% of all US pilots in 2020 (Lutte, 2021). Although the number of female pilots has increased, the growth rate is very slow. The growth rate of female pilots in other countries is even much lower than that of the United States. Thus, the pilot occupation in the aviation industry can be regarded as one in which gender disparity is most prominent (Kristovics et al., 2006; Ferla & Graham, 2019).

The situation in Taiwan is no exception in this regard. The number of female pilot accounts for 5.3% of all pilots in 2020 (Gender Equity Committee, 2021). The early civil aviation pilots in Taiwan were all recruited from the Air Force, so they were all men. In addition to this historical factor, prejudice, gender stereotypes, and even gender discrimination also contribute to the low percentage of female pilots. This phenomenon can also be seen in other traditionally male occupations, such as doctors, soldiers, police officers, and sailors. Women in these occupations, being the minority, are regarded and treated as "tokens" in the workplace and face more pressure and obstacles in terms of their workplace experience and performance (Kanter, 1977). However, it will increasingly become a trend for women to join the ranks of pilots owing to the shortage of male pilots and greater awareness about gender equality. The experiences, performance and challenges faced by female pilots in

the workplace is worth exploring.

In addition to the gender disparity in the number of pilots, there are also gender differences in personality, psychology, and physiology (Ganesh & Catherine, 2005; You et al., 2013). For example, women's careful, gentle, and calm personality traits are very suitable for flying jobs. Some studies have even noted that women's personality traits make them more suitable than men for civil aviation duties (Vermeulen et al., 2009). Moreover, some studies have suggested that the gender of pilots will also affect teamwork and flying culture among crew members (Turney & Bishop, 2004). With more and more women joining the ranks of pilots, what impact will it have on the male-dominated aviation culture and cockpit is an issue worthy of attention. For example, how do male pilots feel about their female co-workers and their professional ability, and what are the effects of a gender-diverse team on the relationships in the cockpit, such as ways of communication, leadership, and trust. More importantly, what is the impact on the effectiveness of Crew Resource Management (CRM) and flight safety when the duties are jointly performed by male and female pilots? These are the topics that airlines must pay close attention to.

Previous research mostly explored these issues from the perspective of male and/or female pilots (Davey & Davidson, 2000; McCarthy et al., 2015; Yanıkoğlu et al., 2020), this study adds the views and opinions of flight operations managers in charge of pilot management to gain a more comprehensive understanding of the impact of female pilots on the cockpit after they join the flight ranks. Specifically, the purpose of this study was to explore the experience and performance of female pilots in Taiwanese airlines through in-depth interviews with flight operations managers, male pilots, and female pilots of three different Taiwanese airlines. Gender issues in the cockpit and the impact of female pilot participation are also discussed. The results of the research will not only enhance the academic understanding of this topic, but also provide references for airlines to implement CRM training programs and recruit female pilots.

2. Literature Review

2.1 Gender Roles

Gender is the most fundamental and obvious difference between people and significantly affects how people perceive others (Skita & Maslach, 1990). Gender roles are the different expectations that individuals, groups and societies have of others based on their gender (Ridgeway, 2011). Although gender is determined by genetic genes, psychological gender roles are caused by factors such as ethics, morals, customs, and traditions in social cultures. Under such a social structure, who is suitable for a certain profession is often determined by gender. For example, in the aviation industry, flight crews are generally considered a male occupation, while cabin crews a female occupation (Mitchell et al., 2006).

Davey and Davidson (2000) noted that gender roles refer to a kind of cultural expectation. Individuals learn about the differences between men and women through media, family, popular culture, life, and school education in the process of socialization, and learn to establish these gendered behavioral patterns as their own. Therefore, gender roles are a product of socialization, shaping different personality traits and development based on an individual's interactions with the environment (Ickes, 1993).

van de Vijver (2007) argued that due to gender differences, men and women are given different defined roles from the time of birth. In traditional Chinese culture, it is believed that men are dominant and women are subordinate. Different behavioral patterns have been defined for both men and women. Due to such cultural influences, men's behavioral patterns are associated with independence and bravery, while women are associated with gentleness and grace (Koenig & Eagly, 2014). Most societies maintain this type of value orientation; this not only leads to the phenomenon in which women are viewed as subordinate to men in the workplace, but also affects the career development of female managers (Leslie et al., 2015).

2.2 Gender Stereotypes

A stereotype is a fixed, over-generalized view of a particular group or groups of people within society (Eisenchlas, 2013). It occurs because we do not have enough time to understand individuals, so we apply the typical characteristics of all members of a group to each member of the group. The use of stereotypes is one way how we simplify the world, however, stereotypes also make it easier to ignore the differences between individuals, and the resulting representations are often selective, distorted, and oversimplified (Ladegaard, 1998; Eisenchlas, 2013).

Gender stereotypes are preconceived beliefs about the attributes, personality traits, abilities, or the roles that are or ought to be possessed by, or performed by a specific gender, which will affect people's impressions, attitudes, and behaviors toward a specific gender (Eagly, 2009). Gender stereotypes are not necessarily correct and are

often the result of overgeneralizations that do not represent the characteristics of the whole (Kanter, 1977). The public has always held stereotypes about men and women. For example, for most people, "man" and "masculine" are comparable, meaning that men should be strong, persevering, and brave, while most people will associate "woman" and "feminine" with dignity, virtuousness, and gentleness. This is the "gender role stereotyping", that is, the psychological tendency to stereotype the behaviors of men and women (Koenig & Eagly, 2014). Gender stereotypes often hinder the development of a certain gender in society because they might restrict the abilities of women and men to develop their personal abilities, pursue their careers, or choose their own lives, and often results in gender discrimination and inequality in the workplace (Davey & Davidson , 2000).

"Occupational gender stereotyping" is an extension of gender role stereotyping, which divides occupations by gender, and whereby it is believed that a certain occupation is only suitable for a specific gender, so it is hard to accept another gender for these occupations (Kristovics et al., 2006; Ridgeway, 2011). The pilot profession is an example of occupational gender stereotypes.

2.3 Gender Issues in the Pilot Profession

Pilots are traditionally regarded as a male-dominated profession. According to a most recent statistic by the International Society of Women Airline Pilots, only about 5.8 per cent of the world's airline pilots are women (International Society of Women Airline Pilots, 2022). Some airlines in Asia don't even consider recruiting female pilots at all, while others prohibit both male and female cabin crew from sharing double-bed sleeping berths on long-haul flights (The Straits Times, 2016). In 2018, only eight of the 554 pilots Ryanair employs in the UK are women, just 1.4% of all pilots (Taylor, 2018). The aviation sector remains one of the sectors with the worst gender balance.

Gender stereotypes are one of the important reasons for the under-representation of female pilots in the aviation industry. Affected by the military culture of the past, people generally have a stereotype that flying is an industry with a masculine nature and that pilots should be held by men (Davey & Davidson , 2000). This has caused the aviation industry to be always skeptical about whether women are competent for the job of pilots, even though some studies have pointed out that women's flying ability is not inferior to that of men (Mitchell et al., 2006; Vermeulen & Mitchell, 2007). Vermeulen and Mitchell (2007) pointed out that airlines should correct their gender stereotypes to satisfy the requirements of gender diversity in the workplace. To achieve this goal, airlines must strengthen the training of human factor and CRM to encourage positive attitudes toward female pilots.

In a recent study by Yanıkoğlu et al. (2020) on Turkish female pilots found that they have suffered from gender prejudice and discrimination in the workplace, especially from captains with military background. These discrimination and prejudice put a lot of psychological pressure on them and will affect their behavior and performance. The interviewed female pilots also mentioned that some male pilots have difficulty communicating with female pilots because they have been working with men in their previous working careers. In addition, sometimes when their male colleagues get angry, female pilots must endure slang and abusive language during the flight.

In another study, McCarthy et al. (2015) adopted in-depth interviews with male and female pilots in the UK to explore the obstacles that women encounter when they aspire to enter the pilot profession. The results showed that high training costs and a male-dominated flying culture are the obstacles preventing women from choosing a flying career. The four female pilots interviewed all stated that although gender stereotypes and prejudice in the cockpit still exist, this phenomenon has gradually diminished. The findings also indicate that one important obstacle may be that many women and girls are unaware of the career opportunities open to them in the sector, especially when they are in school. It is crucial to introduce these young students to role models and mentoring to spark their enthusiasm into the industry.

2.4 CRM

The origins of CRM training in the United Sates can be traced back to a workshop, *Resource Management on the Flightdeck*, sponsored by the National Aeronautics and Space Administration (NASA) in 1979. At the workshop, human error was identified as the major cause of air accidents (Helmreich et al., 1999). A long-term research by NASA has revealed that the problems encountered by the flight crews in a multi-crew cockpit are usually not related to technical problems in flying; rather, they are usually related to poor group decision-making, ineffective communication, inadequate leadership, and deficient operational or resource management (Wagener & Ison, 2014). A study by Shappell et al. (2006) also revealed that between 60% and 80% of all aviation accidents and crashes involve human error.

CRM is defined as the efficient use of all available resources, including hardware, software, and personnel to

achieve safe and efficient flight operations (Lauber, 1984). Traditional pilot training focuses on the technical aspects of flying and individual performance, but rarely addresses crew management issues that are equally important to flight safety. Instead, CRM programs focus on flight crews' "non-technical skills" that are instrumental in enhancing operational performance, such as leadership, situational awareness, decision-making, teamwork, communication, and personal limitations (Flin et al., 2002). The purpose of CRM is not to change the personalities of the people involved, but to change their attitudes about how tasks are performed and managed in the cockpit to ensure safe and efficient operations. All others who have a working relationship with the cockpit crew can also be considered part of an effective CRM process (Shappell et al., 2006).

Airlines in various countries have different priorities when promoting CRM, and their effects may also be different due to factors such as their own national culture, organizational culture and other factors (Helmreich et al., 2001). Therefore, there is no standard methodology for developing a CRM curriculum, and airlines can tailor CRM courses to their needs (O'Connor & Flin, 2003).

3. Method

This research used the qualitative method of in-depth interviews. The purpose of the in-depth interview is to discover rather than verify, and ultimately to analyze, explain and present the research findings. Through in-depth interviews, respondents can express their views and opinions on issues in their own words, allowing the researchers to gain a deeper understanding of the true thoughts of the interviewees (Patton, 2014). The researchers designed different interview questions for the flight operations managers, male pilots, and female pilots, respectively. The interview outlines are listed in Table 1. Flight operations managers were included in the study because they were responsible for assessing the performance of all pilots and could provide another perspective on the impact of female pilot participation on cockpit culture, CRM and flight safety.

Table 1. Interview outline

interviewee	Questions
Flight operations manager	Motivation for hiring female pilots
	The company's policy and purpose for recruiting female pilots
	Work evaluation and management of female pilots
	The influence of female pilots on cockpit culture
	The impact of female pilot participation on CRM and flight safety
Male pilot	Views on co-duty with female pilots
	Views on the performance of female pilots
	Overall evaluation of female pilots
	The impact of female pilot participation on CRM
	The impact of female pilot participation on flight safety
Female pilot	Motivation to become a pilot
	Challenges and difficulties of working as a pilot
	Self-assessment of work performance
	Any experience of gender discrimination?
	How to balance work and family?

The interviews were mainly conducted in airline offices, classrooms, and cafes. There were a total of 16 respondents in this study, including three flight operations managers, seven male pilots, and six female pilots. The list of interviewees is listed in Table 2. Each interview took about 30 to 40 minutes. When asking questions, the researchers encouraged interviewees to put forward their own opinions and questions, and adjusted the sequence of questions if necessary to increase the flexibility of interviews. When in doubt, the researchers would follow up to further understand what the interviewees meant. To organize the verbatim manuscript, the researchers asked the participating airlines in advance to agree to full audio recordings of the interviews, and again asked the interviewees to agree to audio recordings before each interview.

The face-to-face interviews were conducted during March to June 2016. After analyzing the findings, the authors consulted several female pilots who were not the subjects of the original study during 2017 to verify the findings. All respondents expressed similar views and ideas.

Table 2. List of interviewees

Interviewee	Sex	Job title	Time working as a pilot
MG1	Male	Flight operations manager	10 years
MG2	Male	Flight operations manager	15 years
MG3	Male	Director of flight operations	20 years
M1	Male	First officer	5 years
M2	Male	Captain	15 years
M3	Male	Flight instructor	25 years
M4	Male	Captain	11 years
M5	Male	Captain	12 years
M6	Male	First officer	10 years
M7	Male	Captain	15 years
F1	Female	Captain	12 years
F2	Female	Captain	13 years
F3	Female	Flight instructor	15 years
F4	Female	First officer	8 years
F5	Female	First officer	8 years
F6	Female	First officer	10 years

4. Research Findings

4.1 Flight Operations Managers

4.1.1 Motivation for Hiring Female Pilots

Early Taiwanese airline pilots were mainly from retired Air Force pilots, but as the source of Air Force pilots dwindled, airlines began to train their own pilots. As stated by interviewee MG1: "Probably twenty years ago, the company started recruiting self-trained pilots. At that time, many internal employees, such as flight attendants, ground crews, maintenance personnel, came to apply for the position." The company selected excellent talents, mainly from internal staff (such as repair crews, cabin crew, ground handling), and sent them abroad for flight training and gradually trained them to become a pilot. During the training process, it was discovered that some parts of women's innate characteristics are more suitable for pilots, and their performance is not inferior to male pilots. Encouraged by this, the company began recruiting female pilots. To expand the talent pool, the company later began recruiting external talent

4.1.2 Company Policies for Recruiting Female Pilots

In light of the *Act of Gender Equality in Employment*, which protects the equal right of men and women to work, airlines do not have specific gender requirements when recruiting pilots. Also, there is no restriction on the ratio of male to female pilots. The process of pilot recruitment by airlines is entirely merit-based, and applicants will be admitted as long as they meet the company's requirements. As expressed by interviewee MG2: "Our admissions guide does not specify any ratio of males or females. It is completely based on how you perform, your quality and the standards required by our company. As long as you can pass, we will recruit you." Another interviewee MG3 stated: "During the internal selection process, of course, we will discuss the quota of women. Basically, we will not specifically limit the proportion of women. No, we will not…. Training female pilots is of course a consideration, but not an absolute condition, we choose the best."

4.1.3 Management of Female Pilots

Compared to male pilots, interviewee MG2 said female pilots had no problem following company discipline. In terms of promotion, all managers interviewed stated that female pilots are evaluated completely based on professional performance and discipline. The assessment standards for promotion are equal for men and women, and gender differential treatment is avoided as much as possible. However, women's menstrual cycle presents difficulties as women request more days of leave during this period. When they become pregnant or have a child, they will take on more family responsibilities and shift the focus of their lives. As a result, they are likely to be transferred to the administrative department and forced to take a break from flying, which often affects their career development. As stated by MG1: "The regulations stipulate that as long as they are pregnant, they cannot be engaged in flying missions. Therefore, the most important thing in managing female pilots is the issue of fertility. Because they must be grounded for one year and re-acquire their flight qualification before they can return to the flight lines. This is a management problem."

4.1.4 Views on the Performance of Female Pilots

Interviewee MG1 said that brute force is no longer needed in commercial aircraft; instead, we need pilots who can monitor complex systems, make decisions, coordinate and cooperate. Therefore, the performance of female pilots is not affected by differences in physiology. On the contrary, all managers interviewed agreed that, due to

the rigorous recruitment process, the job performance of the female pilots was quite impressive, and there is no obvious difference from that of the male pilots. The early learning curve is flatter for female pilots, especially those who are not from a science and engineering background, but they can often get better after hard work. Interviewees MG2 and MG3 even went as far as to suggest that female pilots performed better than male pilots and were more suitable for flying because they were more resistant to stress and more careful.

As interviewee MG3 commented: "Because our selection process is always merit-based…, so when they come in, their performance is not particularly different from other male pilots." Another interviewee MG2 commented: "The performance of male and female pilots is not much different. Female pilots perform the same as male pilots. We may have to step away from the assumption that the so-called pilot jobs are more suitable for men." Also, because there are fewer female pilots, they tend to be more motivated and engaged than male pilots when it comes to work attitudes. Interviewee MG1 added, "Some companies have even promoted female pilots to pilot instructors or flight skill assessors."

4.1.5 Female Pilot Participation on Cockpit Culture, CRM, and Flight Safety

All flight operations managers interviewed agreed that the characteristics of women tend to soften the atmosphere in the cockpit, which has a positive impact on cockpit culture and CRM. They also believed that women were good at encouraging teamwork and their communication skills were better. As interviewee MG1 stated: "Of course, female pilots will temper the working atmosphere in our male field. This is certain. Communication and coordination will also be less sharp." Besides, interviewees MG2 and MG3 stated that many female pilots will take the initiative to participate in non-flying missions and their willingness to contribute to the company will be higher. During the flight, all interviewees mentioned that the way of speaking and topics in the cockpit will take gender into consideration, and you must be careful when making jokes.

In terms of stress management, situational awareness, and decision-making, all interviewees reported that male and female pilots were equally capable, with no obvious differences. One interviewee commented: "As far as I know, I have not heard of any female pilots having any problems with stress management. During the training, we will conduct a qualitative assessment of the pilots' situational awareness. There should be no difference in situational awareness between male and female pilots." All interviewees agreed that the participation of female pilots had a positive impact on CRM and helped improve flight safety.

4.2 Male Pilots

4.2.1 Views on Working with Female Pilots

All interviewees recognized that it is already a trend for women to serve as civil aviation pilots, and there will be more opportunities to fly with female colleagues in the future. They also mentioned that they needed to pay closer attention to potential physical contact during some operations to avoid making female pilots feel that they were being sexually harassed. As one interviewee M1 stated: "On long-haul routes, we need to be careful not to dress too casually during their rotating shifts of rest because male and female pilots share a common rest area." Furthermore, all the male pilots agreed that when they were on duty together with female pilots, the cockpit atmosphere was better, and there were more topics of conversation. Interviewee M2 remarked that "When my partner is a woman, the cabin atmosphere will be more relaxed, which is different from the feeling of being on duty with a male pilot." Therefore, they need to avoid being distracted and take care to avoid conversations that might disturb female pilots.

4.2.2 Views on the Professional Competence and Work Attitude of Female Pilots

All the male pilots interviewed gave high praise to the professional competence of female pilots. They all agreed that as long as female pilots passed the company's assessment, their professional ability was basically no different from that of male pilots. One interviewee, M3, even stated that female pilots are very demanding of themselves, and their average performance is better than that of men. Most of the male pilots also believed that due to the small number of female pilots, their performance was more easily noticed. As for work attitudes, female pilots had a more active attitude because they did not want others to have a negative view of them.

4.2.3 Influence of Female Pilots Joining on CRM

All interviewees agreed that the participation of female pilots had a positive impact on CRM. As stated by interviewee M5: "Women are more attentive and may have different ideas and perspectives about the same thing. If there is a female colleague on the team, I will ask her if she thinks of something we have overlooked." In this regard, men and women on duty together can bring a complementary effect and reduce the chance of making mistakes. Women are also better at communicating and like to discuss things based on the facts. As stated by interviewee M7: "Women's communication is softer and realistic, which can not only ease the atmosphere in the

cockpit, but also work better when communicating with male pilots."

The male pilots interviewed also unanimously agreed that there are different chemical effects when a woman is present in the cockpit. The obvious change is that they tend to have a softer attitude towards the female pilots who are on duty together and have more respect for women. Five of the male pilots described how they behaved more politely and the atmosphere in the cockpit was more relaxed and less tense when they flew with their female colleagues. Another example has been given by interviewee M6: "Especially in the tone of speech, it will not be as harsh as it is to a male colleague. Therefore, the addition of female pilots has a calming effect on the atmosphere in the cockpit and promotes teamwork."

4.2.4 Impact of the Participation of Female Pilots on Flight Safety

All the interviewed male pilots believed that flying attaches more importance to personal professional abilities, and that flight safety is more directly connected to the company's training, systems, and culture. In addition, five interviewees highlighted the importance of compliance with standard operating procedures (SOPs) for flight safety. As clearly explained by interviewee M4: "The main reason is that the training process of pilots follows a series of training and assessment. Whether it is a male pilot or a female pilot, flight safety shouldn't be much of a problem as long as SOPs are followed." Accordingly, the gender of the pilot does not affect flight safety. Moreover, some interviewees mentioned that women's views and opinions often contained elements they didn't notice, which helped them look at the problems from a broader perspective and make flying safer. As interviewee M6 said: "It is of great help, allowing me to see a wider perspective. Sometimes I'm so focused on one thing that I don't notice other changes that might affect flight safety, they'll alert me and put me back on track."

4.3 Female Pilots

4.3.1 Challenges and Difficulties of Working as a Pilot

The three female pilots interviewed identified poor weather conditions as a common challenge at work. As interviewee F1 put it: "The weather is different on every flight and can cause you some stress; of course, this can be used to improve your skills in dealing with typhoons or severe weather." Another type of challenge they faced was the stress of flying to unfamiliar airports, according to interviewees F2 and F4. The time pressure associated with avoiding flight delays was another work challenge. As remarked by F3: "Passengers don't like to be delayed, flight punctuality is very important for airlines. So sometimes we will be in a hurry to leave, which can also cause stress." Another difficulty mentioned by all interviewees was that, as a pilot, you have to overcome the challenges of working through the night and adjusting your physiological clock when serving on long-haul flights. This is one of the requirement of this job, and you have to get used to it.

In addition, women often bear more family pressure than men, and responsibilities such as pregnancy, childbirth, and childcare are unavoidable challenges for female pilots. Female pilots are also limited in flying time due to factors such as maternity leave or the need to spend time caring for children. For women trying to balance flying careers and family, they face not only perceptions from colleagues and society, but also other barriers such as inadequate family support. As stated by interviewee 5: "The biggest challenge of being a female pilot is family. If you are still single, that's okay, but once you get married and have kids, it can be even more stressful. I want my family to be able to understand and support me."

4.3.2 Experience Gender Discrimination against Female Pilots?

All the interviewees stated that they had rarely experienced gender discrimination in the male-dominated pilot profession. If this happens, it should be related to the individual's personality and self-cultivation. As interviewee F3 stated: "I have never experienced it, but I know other people have encountered this kind of situation. It is probably due to personal personality." Instead, the female pilots interviewed said they had received more care from others. As interviewee F6 recalled: "I joined the company as a co-pilot. When I flew with some pilots, they were a little suspicious of my ability, but it was a matter of personal cultivation. As far as the company is concerned, there is no gender discrimination. Instead, they care a lot about how well you fit in? "

4.3.3 Advantages of Women Working as Pilots

Most female pilots interviewed in this study agreed that women are more attentive, cautious, thoughtful, and holistic and organized in their thinking. In addition, women's communication style differs from men in that it is less tough and less likely to spark in conflict. This makes it easier to communicate effectively and promotes teamwork. As expressed by interviewee F1: "I feel that women are more attentive and easier to work with teams; CRM will be better, and there will be less conflicts." Another example was given by interviewee F2: "Male instructors are more likely to have disputes with maintenance staff. We are used to discussing issues through communication, and we are less likely to have disputes with others." These qualities of attentiveness, focus and

good at communication work to the advantages of female pilots. Additionally, all interviewees mentioned that male pilots may behave differently because there are women in the cockpit. They will also be gentler in their conversations with female pilots and have more appreciation and respect for them.

4.3.4 Impact of Female Pilot Joining on CRM and Flight Safety

The six female pilots felt they were less likely to have disputes with others over communication and coordination, which was good for the cockpit atmosphere. Women are also very decisive when it comes to decision-making; they often see problems from a different perspective and consider different factors than male pilots. As interviewee F5 stated: "It should be a plus, because I think male pilots can learn from our considerations, and the focus of male and female pilots may be different." Thus, male and female pilots can complement and learn from each other. Interviewee F6 has also supported the view as follows: "Boys have the advantages of boys, girls have the advantages of girls, and the combination of the two will have a bonus effect." Regarding situational awareness, female pilots do not think that they are really different from male pilots. Similar to male pilots, female pilots interviewed agreed that female participation would not have a particular impact on flight safety. They said that since pilots have undergone a series of rigorous training and assessments, they only need to follow SOPs while on duty to ensure flight safety.

4.3.5 How to Balance Work and Family?

Because women shoulder family responsibilities, they must strike a balance between work and family life. All the female pilots interviewed believed that the support of their families is the greatest force for them to continue their flying careers without worries. As interviewee F3 said: "My parents are very supportive of my work, and their current health is also good, so I am more at ease." Similarly, interviewee F2 mentioned that "my husband is also a pilot and knows flying very well. If possible, we will arrange some monthly leave in advance for family activities. With the cooperation of both parties, there is not much problem in taking care of the family and children."

All six female interviewees agreed that mission comes first and they will try their best to match the schedule, but if there is something important or urgent, they will coordinate shifts with colleagues in advance or ask for time off. For those who are still single, they are relatively less stressed than married female pilots. As two female interviewees F4 and F5, still single, commented that "singles and those with families may feel differently. For single people, there are relatively few worries. For pilots with families, work can have a certain impact on family life."

5. Discussion

5.1 Performance of Female Pilots

The results of this study showed that both flight operations managers and male pilots interviewed rated female pilots as comparable in professionalism and performance to male pilots; some interviewees even thought that female pilots performed better. In this regard, previous studies have yielded mixed results. For example, in the study by McCarthy et al. (2015), trainers argued that women could be better pilots. Bazargan and Guzhva (2011) analyzed the NTSB database and found no difference in safety performance between male and female general aviation pilots when measured by the probability of pilot error. Conversely, Germain et al. (2012) received many negative comments about female pilots in their study. In terms of work attitude, due to the small number of female pilots, they are more easily noticed, and they tend to have a more positive work attitude, so as to avoid negative comments.

5.2 Gender Prejudice or Discrimination

Female pilots interviewed in this study expressed that they did not feel that they had suffered gender discrimination. According to one interviewee, gender stereotypes or discriminatory remarks did occur occasionally, but it was related to personal cultivation and was not a common phenomenon. Instead, they have received much concern from their superiors and others. These findings differ significantly from those studies conducted in European countries or the United States, which consistently show that female pilots continue to experience discrimination, sexism, and harassment (Davey & Davidson, 2000; McCarthy et al., 2015; Yanıkoğlu et al., 2020). Our results clearly show that such phenomenon is not common in Taiwan. Gender stereotypes and segregation that believe the profession is more suitable for men than women do not appear to be serious in Taiwan's aviation industry.

One reason is that since the enactment of the Gender Equality Law in 2014, Taiwan has been pushing hard for women's rights. The role and status of women in Taiwan's job market have been improved (Foster, & Chou, 2005; Brysk, 2020). The same is true in the aviation sector, where significant progress has been made through the implementation of gender equality policies and regulations. Culture may play a role in the acceptance of

Taiwanese female pilots and the career challenges they face (van de Vijver, 2007; Neal-Smith & Cockburn, 2009). This cultural difference will serve as an important direction for future research. Another possible explanation is the influence of education. Research has shown that education is a major factor affecting people's preference for gender equality (van de Vijver, 2007). In 2019, the proportion of men and women over the age of 25 with secondary education in Taiwan was 90.6% and 82.4%, respectively (Gender Equity Committee, 2021). People with higher education in Taiwan are more accepting of gender equality, which is also reflected in the career choices of men and women.

5.3 Impact on CRM and Flight Safety

Flight operations managers, male pilots, and female pilots all felt that female pilot participation in the cockpit had a positive impact on CRM and indirectly improved flight safety as women were more focused, better organized, good at communication, coordination, and multitasking. This association is a very important finding. Airlines should value the potential benefits to CRM and flight safety of women working in the cockpit and increase the recruitment of female pilots. Male pilots also believed that women think more broadly when faced with unexpected situations, which helps solve problems. They also thought that when a female pilot is in the cockpit, it usually changes the male pilot's speech and behavior, thereby making the cockpit atmosphere calmer and more peaceful. These findings are similar to those of McCarthy et al. (2015) that women bring different qualities to the flightdeck and alters the atmosphere inside the cockpit.

5.4 Work-life Balance

According to the interview results, the biggest challenge as a female pilot is family. Because women tend to have more family responsibilities than men, they are under greater pressure to be stronger and more independent. In addition, pregnancy and childbirth will challenge their flying careers. Once you have a child, unstable work schedules and high demand for flight time may deprive female pilots of family life. Therefore, all the female pilots interviewed stated that balancing work and family life was a big challenge, and the support of their families helped them a lot in their work. The finding is in with previous studies showing that women's housework responsibilities are the biggest challenges to their career advancement (Neal-Smith & Cockburn, 2009; Martin & Barnard, 2013; Yanıkoğlu et al., 2020).

Based on the above research results, this study puts forward the following recommendations for airlines to recruit female pilots:

The findings of this study are particularly important in the field of CRM. Although the female pilots interviewed in this study indicated that gender prejudice or discrimination in the workplace is not severe, in view of the growing number of female pilots, airlines are advised to incorporate topics such as gender issues and gender diversity management into their CRM trainings to promote gender equality. It is hoped that flight crews, regardless of gender, will appreciate each other's strengths and work together to improve the effectiveness of CRM.

The flight crew will never have a normal work schedule, which inevitably affects family life, and female pilots will be even more affected. Consistent with previous studies (Yanıkoğlu et al., 2020), this study also found that the biggest challenge for female pilots is how to balance work and family. It is recommended that airlines pay attention to the concerns of female pilots and formulate family-friendly policies to help female pilots maintain a work-family balance (Mohamed & Zaki, 2017), such as designing flexible scheduling systems that allow female pilots to arrange their own flights or allow female pilots to apply for same-day round-trip schedules to take into account the needs of family life.

Finally, the results of this study show that female pilots have their own advantages. Faced with a growing shortage of male pilots, women represent another source of talent pool. Airlines should make full use of the characteristics and abilities of women and benefit from them. This study recommends that airlines expand the promotion and recruitment of female pilots, not only to alleviate the pilot shortage, but also to give women a better foothold in aviation and provide them with development opportunities. Some feasible approaches include airlines can more actively promote the careers of female pilots on campuses at all levels, establish industry-academic cooperation projects with relevant institutions or set up scholarships to pay for the training of female pilots.

6. Conclusion

This study explores the workplace experiences and performance of Taiwanese commercial female pilots from the perspectives of male pilots, female pilots, and flight operations managers to delve deeper into this topic. The results of this study could provide important implications, especially in the aviation industry where gender stereotypes and prejudices are still prevalent.

The results of the study showed that all the interviewed flight operations managers gave affirmation to the female pilots' efforts and performance at work and believed that with their characteristics and abilities, they could play a complementary role with male pilots in the cockpit, which was more conducive to effectively realize CRM and improve flight safety. The finding is similar to that of Germain et al. (2012) who noted that women possess certain unique skills that make them good pilots.

The male pilots interviewed unanimously agreed that female pilots can bring different chemical effects that help change the atmosphere of the cockpit. They also believed that women were good at communicating and coordinating, which helps with teamwork. Additionally, women are more thoughtful and often notice what their colleagues miss when performing tasks together, which can provide an extra layer of protection (Germain et al., 2012). Contrary to the opinion of the flight operations managers, the male pilots interviewed believe that flight safety is not related to gender. As long as the pilots can pass the company's training and assessment and perform tasks in accordance with SOPs, flight safety can be ensured.

The female pilots interviewed in this study did not think that they had suffered from gender discrimination or prejudice. While this does not mean that there are no gender-related remarks at all, they believed that these remarks were mostly jokes and not directed at any individual, so they did not feel they were subject to gender discrimination or prejudice. It is safe to conclude that female airline pilots in Taiwan do not feel they are being challenged and abused in relation to their gender; instead, they are respected and cared for in the workplace. This finding contrasts with previous research showing that female pilots always face gender discrimination or bias from their male colleagues (Davey & Davidson, 2000; McCarthy et al., 2015; Yanıkoğlu et al., 2020). The aviation industry should think about how to remove barriers to entry and promote gender diversity to attract more women to join and stay for development.

Like other studies, this study has some limitations. First, the research results come from a small number of interviewees, but these interviewees have different seniority and hold different positions, which can provide rich and reliable information on the research topic. Furthermore, the sample of this research is limited to airline employees in Taiwan, and caution must be exercised in generalizing the results to other regions. It is suggested that future research can be conducted in other regions with different samples to allow for cross-sectional or cross-cultural comparisons. Lastly, even though gender discrimination and prejudice in Taiwan's aviation industry are less severe than thought, the number of airline female pilots is still very low; how to attract women to join the ranks of pilots and be willing to stay and develop their flying careers is a topic worthy of inquiry. It is suggested that future research can delve deeper into this topic.

Acknowledgement

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