

## **Airmanship As The Ultimate Asset Of A Pilot To Acquire Flight Safety In Indonesia In Relation To Public Policy**

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**Abstract:**-This journal tries to review how pilots themselves characterize a good pilot and airmanship on their daily duty as well as day to day life, and how safety is created by the practice of such knowledge. The purpose of this journal is to give a standardized understanding about the knowledge and the practice therefore of airmanship to achieve flight safety, subsequently that the pilot themselves or insiders' understanding of the concept of airmanship indicates that the formulation of the concept is very complex. Most of the pilots are defining airmanship based of the knowledge about flying an aircraft. Applying the concept of airmanship for the pilots is the relationship between practical knowledge and an individual understanding. In relation to the practice of knowledge about airmanship, pilots in operating an aircraft are also embedded to such requirements and regulation both internally and externally its operational organization. External requirements and regulations are national and international aviation standards such as the National Government Aviation Regulations, ICAO, IATA and other related governing body or institutions. These regulations mean public policy that rules the practice of aviation thereof including the pilot themselves. Concerning to the complex formulation and practice of knowledge of airmanship and also the implication of public policy to be complied by pilots in regards to acquire flight safety, the purpose of this journal is to compile a comprehensive understanding about airmanship and its relation to public policy, by formulating a Blanket of Airmanship. Blanket of Airmanship is expected to provide a uniform insight and understanding about airmanship as well as deeper and attached concept to the pilots, which shall results flight safety.

**Keywords:** *pilot, airmanship, flight safety*

### **I. BACKGROUND**

Efficacious air transport services can be expressed if it has been providing the services in a professional manner that is secure, accurate, quick and responsive to what is desired by the customer or passenger. Professional services will increase customer satisfaction in general as well as specifically has an impact to flight safety. Professional services cannot be detached from an efficient and detailed public policy, and in regards to air transportation, an international convention has been held in Chicago on 1944 which has formulate an international standard for complete aviation services standard, and currently known as the International Civil Aviation Organization (ICAO) Annexes. ICAO is a UN specialized agency, established by Convention Members in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention). The policies on ICAO Annexes consists of international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector. Indonesia as a member of the ICAO also has an obligation to provide the best service on the aviation sector with the required international standard. In this condition, the Indonesian Government has issued Government Act no.1 year 2009 regarding Aviation, which became the requirement and regulation for aviation service and standard in Indonesia. Concerning to any services, failures is a condition that follow services with ineffective public policy or low supervision. In relation to that condition, failures in air transportation are commonly result to flight accidents. Based on a study regarding factors that caused flight accidents, human error especially pilots occupies the highest factors in flight accident (as shown in Table 1).

**Table 1. The cause of a Flight Accidents in the World (in percentage)**

N	Factors	1950s	1960s	1970s	1980s	1990s	2000s	All
1	Pilot Error	43	33	25	29	29	34	32
2	Pilot Error (weather	9	18	14	16	21	18	16
3	Pilot Error (mechanical	7	4	5	2	5	5	5
4	Total Pilot Error	58	63	44	57	55	57	53
5	Other Human Factor	2	8	9	5	8	6	6

6	Weather	15	12	14	14	8	6	12
7	Mechanical Failure	19	19	20	21	18	22	20
8	Sabotage	5	4	11	12	10	9	8
9	Other Cause	0	2	2	1	1	0	1

Source: <http://www.planecrashinfo.com/cause.html>

In respect to the abovementioned table, it shows that pilots are the most vital factor to acquire flight safety. Therefore, the author is reviewing to resolve the issue by finding out factors which influence pilots in undertaking faults, especially for commercial pilots in Indonesia. Indonesia as an archipelagic country is relying on air transportation as an effective and efficient transport for domestic transportation however the safety condition for air transportation in Indonesia shall continuously being upgraded by all parties involved. Based on the Nasional Safety Transportation Committee (Komite Nasional Keselamatan Penerbangan / KNKT), factors that causes flight accidents in Indonesia are as shown in Table 1.

**Table 2. Flight Accident Factors in Indonesia**

No.	Year	Qty of Causes	Estimated Factors			
			Human	Technical	Environment	Weather
1	2007	21	15	5	1	0
2	2008	21	6	12	3	0
3	2009	21	12	9	0	0
4	2010	18	9	8	1	0
5	2011	32	23	7	2	0
6	2012	29	21	4	4	0
7	2013	29	14	5	8	0
8	2014	30	3	4	3	0
9	2015	28	7	1	0	0
<b>Total</b>		<b>229</b>	<b>110</b>	<b>55</b>	<b>22</b>	<b>0</b>

Source: KNKT Investigation Data, as of April 2016

Note: Some data are not yet resolved or reported.

Similar to the previous table (Table 1), on the abovementioned table (Table 2) it shows that human error also occupies the most factor in flight accidents in Indonesia. In relation to both data, the author realized that the mentioned factors may be influence by several aspects which can be reviewed in the aviation world in Indonesia, which are; the value of airmanship and its relation to public policies. This study combines previous research made by Tony Kern regarding airmanship model and study regarding public policy in relation to flight safety which has been examined by the author to provide his Doctoral degree at University of Brawijaya, Indonesia, in his research of; *“Implementation Of Public Policy And Its Relation To Pilot Airmanship With Regard To Achieve Aviation Safety In Indonesia (a Study to the State Act no. 1 year 2009 on Aviation).”* Beyond the description about airmanship as exposed by Tony Kern which shall be owned by every pilot, based on printed and online media information lately, some behavior change occurs to pilot follow-on in degrading their values of airmanship, thereof, behavior is one of the variables used in this research by the author. Based on those data and facts, pilots’ behavior on some airlines in Indonesia in the last decade led to a disregard flight safety.

## II. AIRMANSHIP THEORY

Airmanship or the soul of an airman should be owned by a pilot. Flight accident has a close-relationship with low airmanship [1]. Kern explains that airmanship element consists of 6 properties, namely [2]:

- 1) Judgment (assessment) is situational assessment, to take a decision in an abnormal and emergency condition. Assessment is a trait of airmanship which shall continuously been developed. All elements of airmanship will support good judgment in decision making. As of all elements in a building structure supports the roof.
- 2) Knowledge of Situational Awareness (situational awareness), is the knowledge to control situational awareness.
- 3) In-depth Knowledge (knowledge) – a pilot shall have broad knowledge due to that the knowledge of a pilot will be the nature that supports the way of thinking in the process of airmanship.
- 4) Airmanship founded on skills (expertise).
- 5) Airmanship is founded on proficiency (ability) .Good expertise and capabilities of a pilot including technical and non-technical ability.
- 6) Discipline (discipline) is the main foundation of airmanship, since discipline is the basis for the ability and willingness to fly the aircraft safely.

These airmanship elements have been drawn into an Airmanship Model developed by Tony Kern as shown in Figure 1 below. The pilot has a very important role on a flight procedure and therefore the pilot may experience severe pressure in carrying out the mission [3]. To deal with such heavy pressure, the pilot must have good self-efficacy. Based on Bandura self-efficacy is an individual generative capability includes cognitive, social, and emotion [4]. Self-efficacy to every person is different depending on the knowledge and experience they have. Self-efficacy will usually appear when a person is under heavy pressure. The ability of each individual must be trained and set effectively to achieve the personal goals. Bandura also says that every person has different abilities to be able to organize a strategy that suits the purpose and finalize the strategy well even in a difficult state. A high perceived self-efficacy will motivate individuals' cognitive appropriate action and directed, especially if the objectives to be achieved is a clear goal. Based on the above explanation the authors concluded that self-efficacy is one of the variables that affect airmanship [4].

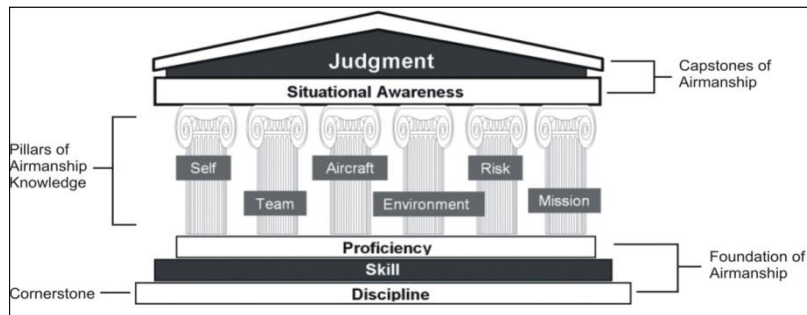


Figure 1. Kern Airmanship Model

Figure 2.

Figure 3.

Another influencing factor to airmanship is Ebbage and Spencer resume who found that airmanship as a personal level allows aircrew to exercise good judgment, demonstrate uncompromising flight discipline and displays profound ability in controlling the aircraft on any situation [5]. That shall be maintained through continuous self-improvement and the desire to perform optimally at all times. Based on Ebbage definition, airmanship can be concluded as a combination of discipline, IQ, and emotional intelligence, and in general airmanship consists of three levels of dimensions which are the principles, knowledge and results.

Airmanship foundation as described by Ebbage and Spencer was built in groups of knowledge, skills and attitude (see Table 3). The elements in Table 3 are the basic to understand Airmanship, which is also in line with Kern Airmanship Model, although in a different perspective [5]. As of that both Tony Kern and Ebbage says that airmanship is a continuous development process, therefore to excellence airmanship, a development plan and step by step process should be implemented. Captain David Koch, an 18,000+ hour airline, military and general aviation pilot and a Certified Flight Instructor (CFI), who is also a speaker at the Center For Airmanship Excellence (CFAE) which supports aviators' quest for airmanship excellence by teaching the Kern Airmanship Model in detail and cosponsored by the FAA Wings Program, says in his presentation that besides understanding Kern Airmanship Model, it is very essential to have a personal airmanship development.

Table 3. Foundation of Airmanship

THE FOUNDATIONS OF AIRMANSHIP		
KNOWLEDGE	SKILLS	ATTITUDES
<b>Knowledge of aircraft</b> - Deep understanding of aircraft sub-systems, emergency procedures, cockpit automation, aircraft flight characteristics and operating limits.	<b>Physical skills</b> - Flying skills - Navigation skills - Instrument flying - Emergency handling/recovery - Combat survival	<b>Hazardous attitudes</b> - Understanding the five main hazardous attitudes, the antidotes and the impact on airmanship (see Table 2)
<b>Knowledge of environment</b> - Understanding the physical environment and the effects on aircraft control.	<b>Cockpit management skills</b> - Avoiding the pit falls of automation (over-reliance, complacency, bias) - Information management skills	<b>Professionalism</b> - Understanding the values and principles embodied in airmanship.

THE FOUNDATIONS OF AIRMANSHIP		
KNOWLEDGE	SKILLS	ATTITUDES
<ul style="list-style-type: none"> <li>- Understanding the regulatory environment.</li> <li>- Understanding the organisational environment and the challenges posed to airmanship.</li> </ul>	<p><b>Communication Skills</b></p> <ul style="list-style-type: none"> <li>- Vigilance in monitoring communications</li> <li>- Using appropriate communication (phraseology, clear, concise)</li> <li>- Active listening</li> <li>- Inquiry through communications</li> </ul>	<p><b>Self-improvement</b></p> <ul style="list-style-type: none"> <li>- Developing the motivation needed for life-long learning</li> <li>- Understanding the requirement for self-assessment in flight.</li> <li>- Developing the will to achieve performance excellence</li> </ul>
<p><b>Knowledge of risk</b></p> <ul style="list-style-type: none"> <li>- Understanding the risks to discipline, skill and proficiency, knowledge, SA, judgement, aircraft, self.</li> </ul>	<p><b>Cognitive skills</b></p> <ul style="list-style-type: none"> <li>- Understanding and maintaining situational awareness</li> <li>- Problem solving/decision-making skills</li> <li>- Understanding and managing workload</li> <li>- Self-assessment</li> </ul>	<p><b>Discipline</b></p> <p>Discipline in terms of:</p> <ul style="list-style-type: none"> <li>- flight preparation</li> <li>- flight discipline (e.g. vigilance/ look-out, SA maintenance, operational &amp; regulatory policy)</li> <li>- knowledge &amp; skills maintenance</li> <li>- post-flight evaluation</li> <li>- self-discipline (managing stress, managing attitudes)</li> </ul>
	<p><b>Team skills</b></p> <ul style="list-style-type: none"> <li>- Performance monitoring</li> <li>- Leadership/initiative</li> <li>- Interpersonal skills</li> <li>- Co-ordination &amp; decision-making</li> <li>- Team communication and SA</li> </ul>	

Personal Airmanship Development Plans are created within the framework of the Kern Airmanship Model. The elements of this model provide specific guidance in constructing Personal Airmanship Development Plan. The airmanship development plan comprises of 8 steps of process as shown in Figure 4. This Personal Airmanship Development Plan shall lead to airmanship excellence (called as airmanship 2.0, whereas the current airmanship that pilots are doing now are called as airmanship 1.0). Airmanship 1.0 is characterized differently by each pilot and has become a complex understanding and applied differently by each pilot based on their personal understanding.



Figure 4. Airmanship Development Plan

**Step 1** –The process begins with an assessment of the current airmanship level. A Mentor Pilot makes this assessment by meeting and flying with the pilot. The pilot and the Mentor Pilot use airmanship-assessment tools to objectively measure your current airmanship knowledge and skills.

**Step 2** –After assessing the current level of airmanship, with the help of the Mentor Pilot, the next step is setting a realistic airmanship goals for the next twelve months. These specific goals encompass airmanship-knowledge, airmanship-skills and airmanship experience goals.

**Step 3** –Once the specific airmanship goals have been identified, the pilot and the Mentor Pilot shall determine the airmanship training that will be required to achieve the stated airmanship goals. The training will probably include directed self-study, formal classroom training, simulator training, flight training and directed practice in a simulator and airplane.

**Step 4** –The next step in the Personal Airmanship Develop Plan planning process is to define and locate the resources that are necessary to the work plan. These resources typically include directed-self-study materials, a simulator, an aircraft and a flight instructor. And they might include enrollment in a formal training course.

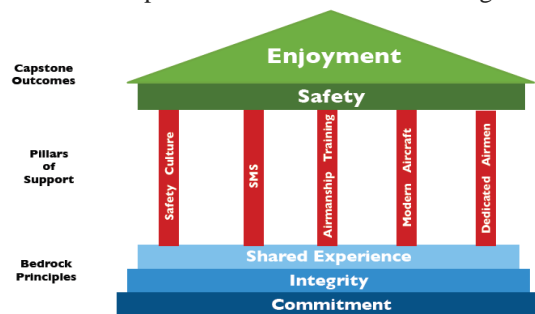
**Step 5** – On step 5, the pilot and the Mentor Pilot shall define specific objectives to be met as the Personal Airmanship Develop Plan is worked during the twelve-month period. For example, two objectives that may be identified for the six-month point in the plan could be the passing of an instrument proficiency check and demonstrated precision in short-field landings that exceeds that required by the qualification standards for the type of flying you are doing.

**Step 6** –Then, the pilot and the Mentor Pilot plan the instruction and training that is required to reach the specific objectives that were defined in the previous step. At this point, they will actually schedule the instruction and training at the appropriate points in the plan. This is a very important step.

**Step 7** – The pilot will then work on their Personal Airmanship Develop Plan. It will challenge the pilot to find their limits and improve their airmanship knowledge and skills. Every pilot shall also keep an Airmanship Journal that contains their airmanship-related questions and thoughts.

**Step 8** –At the end of the twelve-month period, the Mentor Pilot will once again shall evaluate the pilots' airmanship level, and then cast this assessment against the stated airmanship goals in the plan and determine whether they were met, exceeded or not achieved. The Mentor Pilot and the pilot will then put together another twelve-month Personal Airmanship Develop Plan that will redress any shortfalls and establish new airmanship-development goals for the next year.

The Personal Airmanship Development Plan that every pilot shall practice will outcome an Airmanship 2.0 which maintains includes elements like Airmanship Challenges that motivate the pilot to fly more often by providing exciting and airmanship-developing aeronautical challenges. Also, the practice of Airmanship 2.0 requires pilot to fly often enough to maintain the proficiency that is required for safe flying. The social aspects related to membership in an Airmanship 2.0 culture also significantly add to an pilots' enjoyment of personal flying. And the rewards and recognition that are an integral part of the culture meaningfully enhance an airman's overall enjoyment of flying. Airmanship 2.0 also notably increases the value to get flying dollar over that derived from Airmanship 1.0. The overall costs of practicing Airmanship 2.0 can be even lower than those incurred while practicing Airmanship 1.0. But even if they are higher in specific cases, the value received in terms of utility, enjoyment and safety are well worth it. Airmanship 2.0 continuously enhances your airmanship skills, knowledge and capabilities. Airmanship 1.0 does not. Airmanship 2.0 is a sure-fire way for you to become a safer, more-proficient aviator. An airmanship 2.0 model can be shown in Figure 5.



**Figure 5. Kern Airmanship 2.0 Model**

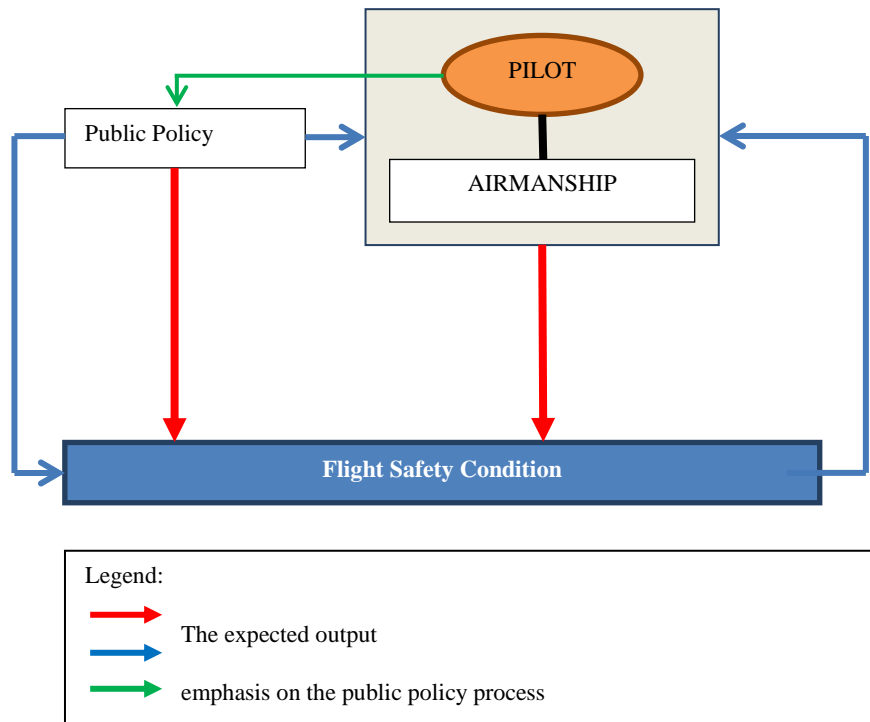
### **Public Policy**

The view of experts on the implementation of public policy has been linked very closely to one another with policy formulation. Implementation regarded as the provision of means to conduct a policy and can cause impacts / consequences to a certain thing. Implementation can be interpreted as an act prepared after a defined policy and how that policy can achieve the goal. Without an implementation the policy will not be able to achieve the intended results and often a variety of interpretations on goal may occur.

Van Meter and Van Horn in Winarno define public policy implementation as actions in previous decisions. These actions include efforts to transform decisions into operational actions by a certain time and in furtherance of efforts to achieve changes big and small set. Policy decisions made by public organizations directed to achieve the goals that have been set [6]. It can be practically concluded that the implementation of the policy will not begin until the goals and objectives are set out or identified by policy decisions. In practice, the implementation is a process of activities carried out by various actors or organizations that are likely to get such result that is in accordance with the goals or objectives of the policy.

### **Airmanship And Its Relation To Public Policy**

To be able to see the relationship between Airmanship and Public Policy, it is essentially to identify in advance the definition and what is meant by Airmanship. As previously mentioned about the theory of Airmanship, it can be concluded that Airmanship are the values and attitudes that must be owned by a pilot in order to achieve the perfection of a pilot in carrying out its duties and functions as well as to achieve the purpose of flight safety. In this matter, it can be obviously seen that the relationship between Airmanship and the Public Policy is the achievement of flight safety. For more details can be seen in Figure 64.



**Figure 6. Relationship between Airmanship and Public Policy**

In the picture it appears there three types of flow which describes the relationship between Public Policy and Airmanship; (1) the expected output, (2) emphasis on the public policy process, and (3) pilot knowledge (knowledge in an Airmanship).

Relations between Public Policy and Airmanship as described above can be explained as follow:

- 1) Public policy in regard to achieve the aviation safety, which is issued either by the regulator and operators, are proposed in general (not directly related to the Pilot) or specific (directly related to the Pilot).
- 2) Public policy of a general nature, although not directly related to the Pilot, shall be apprehend and understood by a pilot, in order to improve the service quality of a pilot particularly with respect to flight safety.
- 3) A pilot must know and understand the public policies that relate either directly or indirectly to aerospace and aviation safety but may impact on flight safety, it is in accordance with the pillars of knowledge that exist in Airmanship.

### III.

#### IV. PREVIOUS RESEARCH AND RESULT ON PUBLIC POLICY

#### V. IN RELATION TO AIRMANSHIP

As previously stated, this research is a continuous research from the authors' previous research, and following his conceptual framework to assemble an insight of airmanship and public policy in regards to acquire flight safety can be extract as seen in Figure 5.

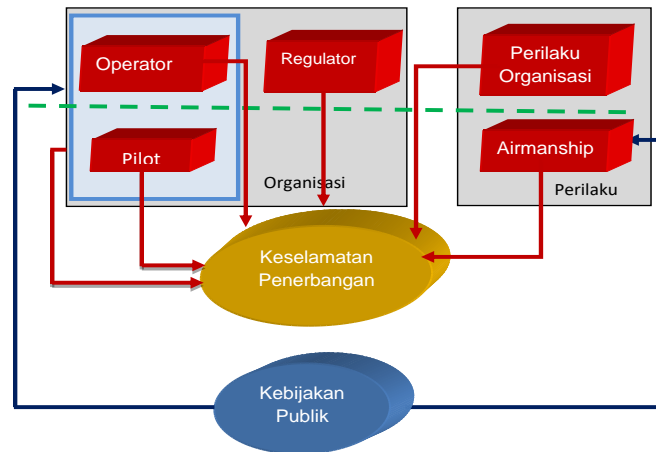


Figure 7. Conceptual Framework

It shows that a pilot as a part of an aviation operator is obligated to public policy to acquire flight safety, and in other hand it shall mean that airmanship as the value of a pilot shall also be obligated to such public policy in regards to acquire flight safety. Based on this conceptual framework, airmanship cannot be detached from public policy therefore factors or variables which might impact airmanship shall be investigated further. Below is a research framework used by the author to investigate the correlation of behavior to airmanship. The author is using a Structural Equation Modelling (SEM) in processing the variables for quantitative method. Whereas the quantitative method data are obtained from questionnaires against 270 pilots, and processed using AMOS software, with a final result as displayed in Figure 9.

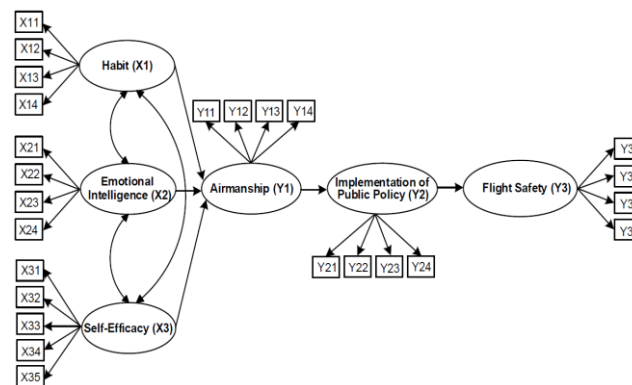


Figure 8. Research Framework

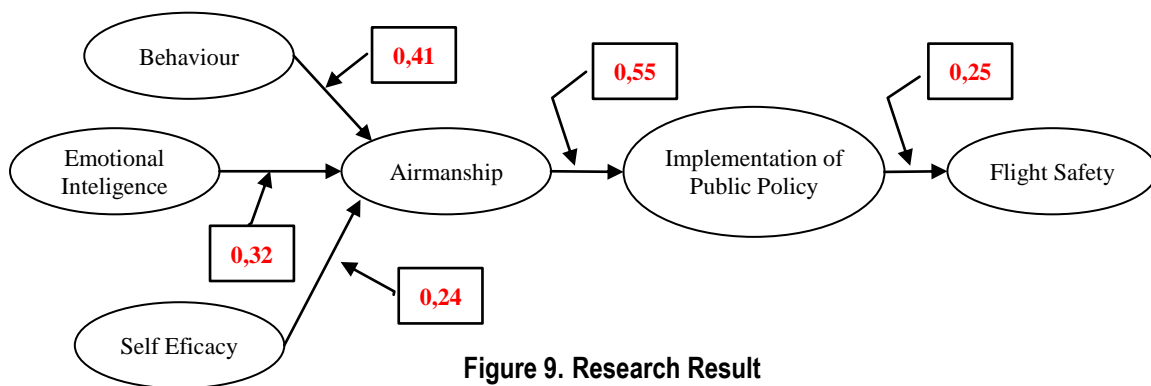


Figure 9. Research Result

As shown in Figure 9, the correlation between pilots' behavior and airmanship is very significant, and the correlation between airmanship and public policy is also significant. This means that to acquire a flight safety, an excellence in airmanship is essential to implement the required public policy, whereas an excellence in airmanship involves good and governance behavior. In relation to extract an excellence in airmanship, the understanding of airmanship as well as to compile a comprehensive picture about airmanship is compulsory. The author has conducted a qualitative method in a form of deep interview and Focus Group Discussion, which results that the formulation of the concept of airmanship is complex. Most of the pilots are defining airmanship first and foremost comprising of the knowledge about flying an aircraft.

## VI. BLANKET OF AIRMANSHIP

In regards to the above mentioned theory and the previous research results, the author has investigate the flying accident rate which has remained virtually unchanged for over 30 years, despite intensive awareness and education campaigns. In addition, pilots are leaving the flying community at an alarming rate. Those pilots that remain are flying less and new pilots are not joining the flying community due to a tight schedule to fulfil on commercial duty.

Current pilots are characterized their airmanship based on:

- Flying less-than-modern aircraft.
- Using minimum government standards for airmanship qualification.
- Letting those qualifications deteriorate over time.
- Insufficient initial, recurrent and upgrade training.
- Flying when not fully qualified to do so.
- Not using flight-risk-assessment tools.
- Making critical flight-related decisions alone.
- Not learning and using formal Aeronautical Decision Making skills and techniques.
- Flying aircraft without modern safety devices.
- Not fully participating in a formal aviation-safety culture.
- Not flying with a professional safety-management system.

It is obviously that current commercial pilots are in short not flying with the right airmanship, and with a tight commercial duty schedule, the pilots are unable to understand and improve their airmanship which shall result in a high possibility to flight accident. Concerning this condition and the mentioned theory above, the author has formulated Blanket of Airmanship, which is a policy for the aviation sector in general and for pilots particularly to understand and improve their airmanship into excellence of airmanship. The Blanket of Airmanship is a total airmanship development process to ensure safety flying condition by applying the right airmanship model and giving an uniform understanding regarding airmanship to all pilots, and it can be explained in a framework as shown in Figure 10.

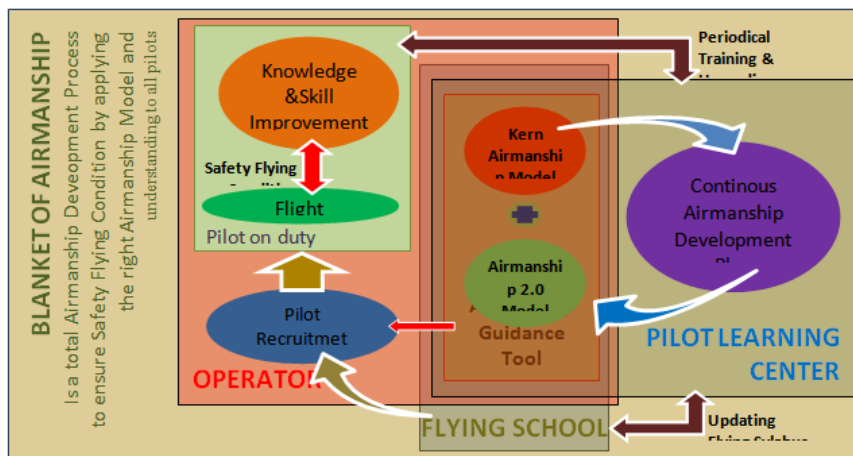


Figure 10. Blanket Of Airmanship

Figure 11.

## VII. CONCLUSION

Safety flying condition shall lead to flight safety has high human factors influence which in this case are pilots. To obtain pilots safety flying condition, it is essential to build an excellence airmanship character, however due to a complex understanding regarding airmanship, it is almost impossible to build a standardized



airmanship character to pilots. After evaluating the pilot learning process up to their tight flight schedule after hired as a pilot on duty, the author defines a Blanket of Airmanship a a total Airmanship Development procedure to be implemented starting from Flying School to be continuously upgraded periodically.

This Blanket of Airmanship is expected to provide a uniform insight and understanding about airmanship as well as deeper and attached concept to the pilots, which shall results flight safety. Therefore this Blanket of Airmanship is a guideline or policy to be acknowledged and complied by the appropriate parties.

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