Critical Success Factors Affecting B737-800 Pilot Initial Training
ปัจจัยความสำเร็จเชิงวิกฤตที่มีผลกระทบต่อการฝึกอบรมหลักสูตร INITIAL ของนักบินแบบเครื่อง B737-800

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Abstract

The purposes of this study were to (1) identify suitable key performance indicators and critical success factors of B737-800 initial pilot training in Thailand, (2) prioritize these critical success factors based on the experts' perspectives (instructor pilots' and trainee pilots' perspectives), and (3) examine significant differences between ranking results.

Two certain groups of experts, fifteen instructor pilots (IPs) with over five years of experiences in training and fifteen first officers who passed B737-800 pilot initial training within one year with satisfactory results, were selected to share their perspectives. Based on a review of literature, four primary key performance indicators (KPIs); effective work performance, customer's satisfaction, learning and development, and passing criteria, and 12 primary critical success factors (CSFs) from four groups; (1) training course (2) instructor (3) trainee and (4) equipment and evaluation were determined. Questionnaire surveys with key stakeholders to determine the applicability of these KPIs and CSFs in the context of Thailand were used before developing a hierarchy model. Pair-wise comparisons, weight were calculated based on AHP approach and consistency check were also conducted. Priority ranking of all CSFs was based on their global weights then, analyzed the relationship between rankings from two expert groups by Spearman Rank Correlation Test.

It was found that factors affecting B 737-800 pilot initial training that were prioritized according to twelve obtained CSFs, with views of instructor pilots and trainee pilots. Comparison of two expert groups' view showed that Spearman rank correlation coefficient is 0.71, with null hypothesis was all rejected. Therefore, no statistically significant difference

between the rankings of the critical success factors with a 95% confidence interval. Factors affecting B 737-800 pilot initial training were prioritized (1) knowledgeable and skillful instructor (2) curriculum is aligned with organization's goals (3) trainees understand the objectives and have a good attitude towards training (4) adequate and sufficient training equipment. The necessity of having training equipment/ instrument available, the most popular and modern in a given period was perceived as less significant. However, based on the correlation test, there was no statistically significant difference between the rankings at level of 0.05

Keywords: Initial Pilot Training, Key Performance Indicator, Critical Success Factor

บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อ (1) ระบุดัชนีชี้วัดและปัจจัยแห่งความสำเร็จในการฝึกอบรมหลักสูตร INITIAL ของนักบินแบบเครื่อง B737-800 ที่เหมาะกับบริบทประเทศไทย (2) จัดลำดับความสำคัญของปัจจัยแห่งความสำเร็จในมุมมองของผู้เชี่ยวชาญ (ครูนักบินและนักบินผู้ผ่านการฝึกอบรม) (3) ประเมินความแตกต่างระหว่างผลการจัดลำดับอย่างมีนัยสำคัญ

ใช้วิธีเลือกลุ่มตัวอย่างที่เฉพาะเจาะจงสองกลุ่มคือ กลุ่มครูนักบิน (IPs) ที่มีประสบการณ์ในการฝึกอบรมมากกว่า 5 ปี จำนวน 15 คน และกลุ่มนักบินผู้ช่วยที่ผ่านการฝึกอบรมในหลักสูตรนี้ ที่มีผลการประเมินระดับดีมากในเวลาไม่เกิน 1 ปี จำนวน 15 คน จากการทบทวนวรรณกรรมที่เกี่ยวข้องสามารถระบุดัชนีชี้วัดความสำเร็จเบื้องต้นได้สี่ตัวชี้วัดดังนี้ (1) ประสิทธิภาพในการปฏิบัติงาน (2) ความพึงพอใจของผู้โดยสาร (3) การเรียนรู้และพัฒนา และ (4) การสอบผ่านเกณฑ์ และระบุปัจจัยแห่งความสำเร็จเบื้องต้นได้ 12 ปัจจัย โดยแบ่งเป็นสี่กลุ่มดังนี้ (1) กลุ่มหลักสูตรการฝึกอบรม (2) กลุ่มวิทยากร (3) กลุ่มนักบินผู้ผ่านการฝึกอบรม และ (4) กลุ่มอุปกรณ์การฝึกอบรมและการประเมินผล ใช้แบบสอบถามสำรวจความคิดเห็นของผู้เชี่ยวชาญหลักเพื่อพิจารณาดัชนีชี้วัดความสำเร็จและปัจจัยแห่งความสำเร็จในการฝึกอบรมที่เหมาะกับบริบทการอบรมนักบินในประเทศไทย ก่อนที่จะนำมาสร้างตัวแบบเพื่อการตัดสินใจตามระเบียบวิธี AHP จากนั้นใช้วิธีเปรียบเทียบเชิงคู่ คำนวณค่าน้ำหนักของปัจจัยทุกปัจจัยในแต่ละลำดับชั้น ตรวจสอบความสอดคล้องของดุลยพินิจด้วยวิธีของสเปียร์แมน (Spearman Rank Correlation Test) พบว่า มีค่าสัมประสิทธิ์สหสัมพันธ์ 0.71 และปฏิเสธ H0 แสดงว่าการจัดอันดับของปัจจัยความสำเร็จโดยผู้เชี่ยวชาญสองกลุ่มไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ

ผลที่ได้จากการจัดลำดับปัจจัยแห่งความสำเร็จ (CSFs) 12 ปัจจัยที่มีผลกระทบต่อการฝึกอบรมหลักสูตร INITIAL ของนักบินแบบเครื่อง B737-800 คือ (1) วิทยากรที่มีความรู้ความสามารถ (2) หลักสูตรสอดคล้องกับความต้องการของสายการบิน (3) นักบินผู้เข้ารับการอบรมเข้าใจวัตถุประสงค์และมีทัศนคติที่ดีต่อการอบรม (4) อุปกรณ์การอบรมที่ครบถ้วนเพียงพอ ส่วนปัจจัยที่ได้รับการพิจารณาว่ามีความสำคัญน้อยคือ อุปกรณ์

การฝึกอบรมที่ได้รับความนิยมและทันสมัยในช่วงเวลาที่อบรม อย่างไรก็ตามจากการทดสอบค่าสัมประสิทธิ์สหสัมพันธ์ พบว่าการจัดลำดับความสำคัญของปัจจัยแห่งความสำเร็จทั้ง 12 ปัจจัยของผู้เชี่ยวชาญสองกลุ่มไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติความสัมพันธ์ที่ระดับนัยสำคัญ 0.05

คำสำคัญ : การฝึกอบรมนักบินหลักสูตร INITIAL ดัชนีชี้วัดความสำเร็จ ปัจจัยแห่งความสำเร็จ

Introduction

Airline business is a globalized industry, expanded rapidly and reaches its maturity at the same time. Air travel is affordable for everyone; not specific for rich people anymore, so traveling by air become a part of many people's lifestyles. Air carrier operations are generally regulated by the country of their registrations, for instance, CAAT (Civil Aviation Authority of Thailand) oversees prescribing, regulating, and auditing all activities of Thai civil aviation. At the meantime, FAA (Federal Aviation Administration in the USA) and JAA (Joint Aviation Authority in Europe) are playing influential roles in regulating aviation guidelines globally. International flights are heavily regulated and controlled by ICAO (International Civil Aviation Organization).

Flight crew trainings are very challenging activities for successful achievement business and safety operations, so there are needs to find out the success factors involved. These elements will impact not only on human resources management but also on rectifying risk management as well. There are a lot of researches on critical training factors in various aspects however, There has been no recent research on factors affecting pilot initial training with aircraft type. Therefore it needs to study in this area. This research is focused on studying supporting factors that lead to the success of the pilot training, especially for those airlines that operate with Boeing737-800, which is popular aircraft type for Thailand low cost airlines.

The AHP Analytic Process is utilized to increase chances for success and in doing so, the existing resources more marginally applied to allow the airlines to select and design the training modules efficiently.

Research Questions

The following questions guided the study:

1. What is the critical success factor affecting B 737-800 pilot initial training?
2. Are there any significant differences in ranking the results of critical success factors from two groups of experts?

Objectives

The purposes of this study were to (1) identify suitable key performance indicators and critical success factors affecting B737-800 initial pilot training in Thailand, (2) prioritize these critical success factors based on the experts' perspectives (instructor pilots' and trainee pilots' perspectives), and (3) examine significant differences between ranking results of two certain groups of experts.

Scope and Limitation

This research scopes include identifying and prioritizing success factors of B 737-800 pilot initial training in Thailand. The study was limited to Thai carriers such as Nok Airlines Co., Ltd, Nok Scoot Co., Ltd, Thai Lion Air Co., Ltd, Thai Air Asia Co., Ltd. K-Mile Air and NewGen Airways Co., Ltd. The survey has been conducted within the period or August to November 2017.

Definition of Operational Terms

The terms used in this study are defined below (CAAT., 2017)

- Aircraft type. The aircraft has a separate airworthiness type certificate or has handling requirements for additional flying or simulator training.
- Airline Transport Pilot License (ATPL). An aircraft pilot certificate that is authorized to act as pilot in command on scheduled air carrier's aircraft.
- Captain. Pilot in control of the aircraft.
- Civil Aviation Authority of Thailand (CAAT). Its responsibilities include prescribing, regulating, and auditing Thai civil aviation.
- Commercial Pilot License (CPL). Airline transport pilot certifications do not have special endorsements, such as an instrument rating, as airline transport pilots must already possess knowledge and training in these areas.
- Experts. Certificated flight instructor pilot who id certified by CAAT to be instructor, experienced pilot training personnel and possess flying not less than five thousand hours.
- International Civil Aviation Organization (ICAO). UN specialized agency, established by States in 1944 to manage the administration and government of the Convention on international Civil Aviation (Chicago Convention).

- Instructor Pilots (IPs). Pilot who was appointed by the airline to provide training course and technology flight instruction to airline pilot as initial or recurrent training.
- Instructor (CFI) certificate. A certificate which allows instructors to train pilots pursuing private and commercial pilot certificates.
- Instructor CFI instrument (CFII). A certificate which allows instructors to train pilots pursuing instrument ratings.
- Instructor (MEI). A certificate which allow instructors to train pilots pursuing multiengine. Performance Indicators. Tools used to measure performance or evaluation operations in various areas, which can display the measurement results or evaluation measured in quantitative data to reflect the efficiency and effectiveness of operations.
- Pilot in Training/ Trainee pilot (PT). Pilot who is under taking flight lessons.
- The International Air Transport Association (IATA). The trade association for the world's airlines. Its mission is to represent, lead and serve the airline industry. Membership of IATA amounts to some 280 airlines in 120 countries.

Literature Review

Initial pilot training course; a preliminary training course for pilots without any type rating endorsement on their pilot license. At the end of the training, they shall have competency and authority as the first officer on type rating as specified. In the initial training course, the pilots shall have a proficiency evaluation in several areas including:

- Flight skills assessment
- Practical in-flight scenario exam to test instrument skills and airmanship
- Oral exam to evaluate judgment skills
- Written exam to determine aeronautical knowledge

If any areas of proficiency are detected, the organization or training provider should arrange additional flight training to bring the pilot up to the necessary flight skills level. This evaluation will also help determine which pilots will be most likely to succeed in the training program based upon general aviation knowledge, time and type of experience. In general, the initial ground training required 86 hours (AOCR issue 5, CAAT, 2017).

Recurrent training course; the course requires that pilot undergo a proficiency check every 12 calendar months. If a pilot failed any of the required maneuvers, he needs to repeat the maneuvers following additional training from a flight crew training department. If a pilot

being evaluated was not meet the satisfied performance, he may not be allow to operate flight as a flight crew in minimum list (CAAT regulations, 2013).

Training is widely understood as a planned communication process directed at exclusive population for developing their needed skills, modifying behavior and increasing competence (Ampote., 1997 and Flint., 1993) . Adult learners tend to be motivated by internal drives such as increased job satisfaction, self-esteem, their sense of accomplishment, and quality of life issues. (Beebe., 2004) Attention on the changes in performances against the training are needed to be evaluated and classified which is the sequencing of the training process. (Bramley., 1990) All training actions are aimed at changing behavior of three attributes. (Falletta., 1998)

1) Increased knowledge to cope up with changed environment and to compete increase productivity.

2) Increase skills and aid to mitigate loss of work due to lack of skills and experiences.

3) Changing of attitude to help create new ideas.

Key Performance Indicators and Critical Success Factors; KPI usually use for measuring or assessing performances in quantitative data to reflect the efficiency and effectiveness of operations. Indicators can be divided into several levels: Organizational indicators, Departmental indicators, and Individual indicators. (Sitzmann & Weinhardt., 2017) Objectives and indicators generally may vary depending on the supervisors' discretion.

Critical Success Factors; CSF are the factors lead to the success of organizations operations against organization's vision and mission. (McLeod., 1992) Training department must be more accountable and to be measured of its contributions. (Phillips., 2002)

Hierarchical analysis; Analytic Hierarchy Process (AHP) is a multi-criteria decision-making process used in diagnosis. (Simachokedee., 1999) The AHP decision is effective by dividing the problem into parts in the form of a hierarchical chart, then diagnosis and compares of various factors by calculating and prioritizing them accordingly. The structure mimics the process of human thought (Venkadasalam., 2015) The AHP method consists to break down complex problems into a hierarchical tree structure (Hierarchy Structure) each class consists of a basis for decisions related to the issue. If there is a significant difference, important factors should be taken at least down to the floor next to it.

Example chart AHP hierarchical structure with four levels as Level 1 : Goal, Level 2 : Main criteria, Level 3: Sub criteria, and Level 4: Alternative (See Figure 1)

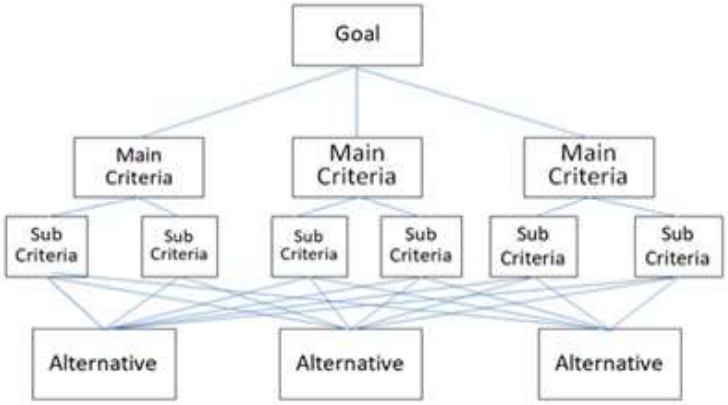

Figure 1: Analysis chart of the process sequence tactic. (Source: Arun., Sutham. 1997)

B 737-800 Pilot Initial Training; Initial pilot training course; A preliminary training course for pilots without any type rating endorsement on their pilot license. (CAAT., 2013). At the end of the training, they shall have competency and authority as the first officer on type rating as specified. In the initial training course, the pilots shall have a proficiency evaluation in several areas including:

- Flight skills assessment
- Practical in-flight scenario exam to test instrument skills and airmanship.
- Oral exam to evaluate judgment skills.
- Written exam to determine aeronautical knowledge.

Passing criteria, "Tests of pilots' competence and, where applicable, flight engineers' competence are administered by Authorized Flight Examiners: (a) Initial type rating tests - to qualify for type endorsement on a pilot's or flight engineer's license; (b) Tests for the renewal of a type rating (Certificate of Test); (c) Tests to extend the validity and initial issue of an instrument rating." (CAAT., 2017) For licensing of pilots, pilots must pass the theoretical examination in these subjects e.g. air law and practices and methods related air traffic services, aircraft general knowledge, flight performance planning and loading, human performance, meteorology, navigation, operation procedures, principles of flight and radiotelephony. After passing the theoretical test within 12 months the pilots in training must go to practical examination and they must pass within 3 attempts. (CAAT., 2013)

Research Methodology

This research is focused on the prioritization of the critical success factors affecting B-737-800 pilot initial training by means of Analytic Hierarchy Process (AHP) decision of two expert groups, the respondents were experts in B737-800 pilot initial training. The first group is 15 experienced instructor pilots who have over five years of experiences in training. 73.33% of instructor pilots are Thai and another 26.67% are non –Thai, whom there are two Indonesian, one American, and one Singaporean. The second group was 15 pilots who passed B737-800 pilot initial training within 1 year with satisfactory results. They all are Thai who have been employed by airlines in Thailand e.g. Thai Airways International, Thai Lion Air, Nok Airlines, Thai Air Asia, K-Mile Air, Bangkok Aviation, NewGen Airways and the CAAT that employs pilots with Boeing 737-800 typed rating. The majority of instructor pilots are in 50 years up as 80% and another 20% are between 40-49 years. There are 86.67 % or 13 instructors who have flying experience more than 10 years and 13.33% of them have 7-9 years flying experience. It is shown that all the experts in group one is high experience in both flying and pilot training. Then test of the significant difference factors in prioritization between two expert groups.

Research methodology is divided into four parts: 1) Comprehensive review of relevant literature. 2) Identifying suitable indicators and critical success factors of a pilot initial training in Thailand by using surveyed questionnaires to collect data and measure. 3) Prioritizing the critical success factors by using the AHP approach orderly for example develop a hierarchy model, establish a pairwise comparison matrix, check the consistencies of the judgments and combine the opinions from several experts by using geometric mean.

Tools used in research are (1) Surveyed questionnaire to evaluate the suitability of the indicators of success and the critical success factors, and (2) Survey and comparative AHP.

Sources of the data were obtained in the various airlines in Thailand, namely, Nok Airlines, Nok Scoot Airlines, Thai Lion Air, Thai Air Asia, K-Mile Air, Bangkok Aviation, Thai Airways International, and NewGen Airways.

The respondents were asked to assess the suitability of the indicators of success and success factors of using the measurement by mean of questionnaire utilizing a five-point Likert scale (where1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree). The results were used to calculate the average value. The hypothesis testing, t-test, is used to determine whether or not each indicator or each success factor is suitable in the context of a pilot initial training in Thailand, by which a mean score of an indicator (or success factor) greater than 4 indicates that this may be suitable in the context, while a mean

score less than or equal to 4 representing unsuitable indicator (or success factor) will not be included in the AHP-based model.

H_0: $\mu = 4$

H_1: $\mu > 4$

The null hypothesis (H_0) is that "an indicator of success (or success factor) is suitable in the pilot initial training."

And the alternative hypothesis (H_1) is that "an indicator of success (or success factor) is not suitable in the pilot initial training."

Results and Discussion

The research methodology has divided into 4 parts, as follows:

(1) Results of identification of the performance indicators and critical success factors of B 737-800 initial pilot training

(2) Results of identification of the suitable key performance indicators and critical success factors in the context of a pilot initial training in Thailand.

(3) Results of prioritization of the critical success factors by using the AHP approach.

(4) Results of examination whether there are significant differences between two sets of critical success factors rankings by two groups of experts.

Part I: identification of the performance indicators and critical success factors of B 737-800 initial pilot training**.** As reviewed of literature on performance indicators and critical success factors of pilot initial training, four success indicators as shown in table 1 were:

Table 1: Performance Indicators that reviewed from literature and related researches.

Performance indicators	Description	References
1. Effective work performance	Consisting of training outcomes that are; (1) Trainees' reactions to the training program. (2) Change in behavior and (3) Improvements in individual or organizational outcomes	(Govindarajulu., 2009) (Thirty., 2004)
2. Customer satisfaction	Customer satisfaction including safety awareness that leads to safe flight. The smooth of flight, reliable, on time performance and make a right judgment as professional.	(Sitzmann., 2017)

Performance indicators	Description	References
3. Learning and development	Learning consist of (1) technical knowledge, aircraft system, emergency situation devices (2) Performance skills, ability to make good judgment (3) Attitude, self-esteem, values, and perception, that will motivate behavior.	(Beebe., 2004)
4. Passing criteria	Test scored more than 70% of all subjects will be considered to pass the theory examination. After passing the theoretical test within 1 2 months, acquire practical examination pass with no less than the third attempt.	(CAAT., 2013)

Twelve critical success factors (CSF) were:

CSF(1)_ Appropriate Curriculum designed and met the needs of the airline. (Gonzalez., 2012; Govindarajulu., 2009)

CSF(2)_ Appropriate Designed content for trainees. (Govindarajulu., 2009)

CSF(3)_ Constantly updated and standardized Curriculum. (Gonzalez., 2012; Khawaja., 2012; Sitzmann.,2017)

CSF(4)_Knowledgeable and skillful instructor. (Khawaja.,2012; Traci., 2017)

CSF(5)_Instructor selection criteria. (Khawaja., 2012; Beebe., 2004; Traci., 2017)

CSF(6)_Creating good training atmosphere. (Buranapansaktirom., 2010; Thirty., 2004)

CSF(7)_Trainees participation in learning activities. (Gonzalez., 2012; Khawaja., 2012)

CSF(8)_ Trainees understand the objectives and have a good attitude towards training. Gonzalez., 2012; Thirty., 2004; Khawaja., 2012)

CSF(9)_ Trainees qualifications and self- efficacy. (Khawaja., 2012; Thirty., 2004)

CSF(1 0)_Adequate and sufficient training equipment. (Khawaja., 2012; Beebe., 2004; Sitzmann., 2017)

CSF(11)_ State -of-the art training facilities. (Khawaja., 2012; Beebe., 2004;Sitzmann.,2017)

CSF(1 2)_ Follow up of evaluation results and improve the evaluation results. (Sitzmann, 2017; Khawaja., 2012)

Part 2 : identification of the suitable key performance indicators and critical success factors in the context of a pilot initial training in Thailand.

Used hypothesis testing, t-test, to determine each indicator or success factor is suitable in the context of a pilot initial training in Thailand, by which a mean score of an indicator (or success factor) greater than 4 indicates that this is suitable while a mean score less than or equal to 4 representing unsuitable indicator (or success factor) will not be included in the AHP-based model. All p-Values were less than 0.05. H0 will be rejected if the mean of the factors is greater than 4,

Part 3: prioritization of the critical success factors by using the AHP approach

See figure 2

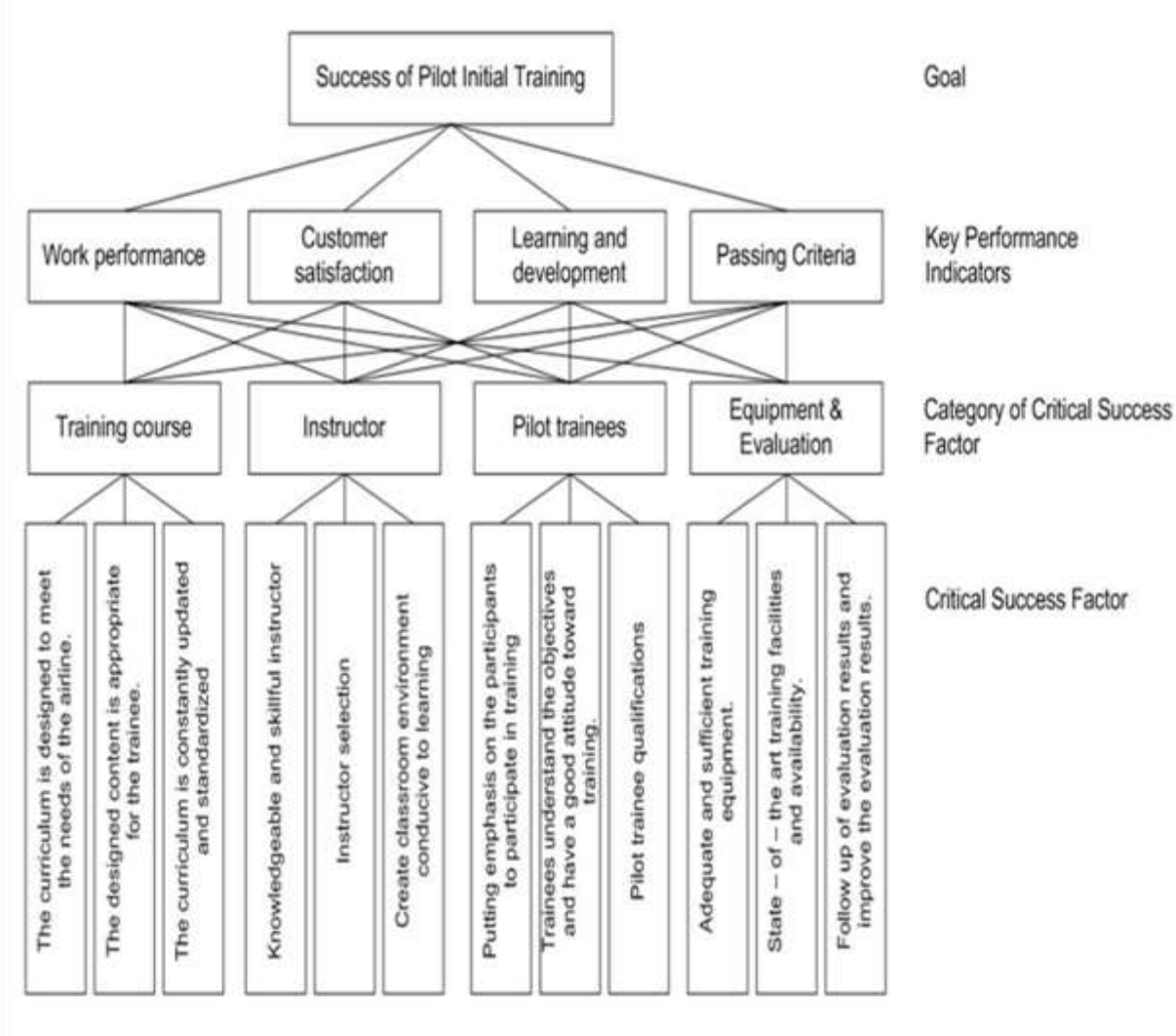

Figure 2: Hierarchical structure for prioritizing the critical success factors in pilot initial training.

Part 4: examination whether there are significant differences between two sets of critical success factors rankings by two groups of experts**.** Instructor pilots' views were compared with results of pilots in trainings' views by Spearman's rank correlation test to examine the statistically significant differences between two sets of rankings with a 9 5 % confidence interval.

AHP-based prioritizing results: Based on the views of two groups of experts (instructor pilots and pilots in training) In this study, prioritizing results by using AHP for rankings from both instructors and pilots in training (the combined preferences of all experts, n=3 0) are shown in Table 2.

Table 2 Weights of the CSFs and their priority rankings (based on two experts groups' views

KPIs	Weights	CSF Categories	Weights	CSFs	Weights	Rankings
KPI(1)	0.400	Training course	0.238	Curriculum is designed appropriately and met the needs of the airline.	0.132	2
KPI(2)	0.139	Instructor pilots	0.328	Designed content is appropriate for the trainee.	0.036	11
KPI(3)	0.233	Trainee pilots	0.234	Curriculum is constantly updated and standardized.	0.070	6
KPI(4)	0.228	Equipment evaluation	0.200	Knowledgeable and skillful instructor	0.185	1
				Instructor selection criteria	0.069	7
				Creating good atmosphere in training.	0.074	5
				Putting emphasis on the participants to participate in the learning activities.	0.067	8
				Trainees understand the objectives and have a good attitude towards training.	0.111	3
				Trainee pilot qualifications and self- efficacy.	0.056	9

KPIs	Weights	CSF Categories	Weights	CSFs	Weights	Rankings
				Adequate and sufficient training equipment.	0.108	4
				State –of-the art training facilities and availability.	0.035	12
				Follow up of evaluation results and improve the evaluation results.	0.056	10

Note: KPI(1) = Effective work performance, KPI(2) = Customer satisfaction
KPI(3) = Learning and development, KPI(4) = Passing criteria

The priority rankings based on two experts groups' views can be summarized into three levels as follows; (1) Level of key performance indicators: Two groups of experts (instructor pilots and trainee pilots) rated the most important key performance indicators to "effective work performance" (weight is 0.400) follow by "learning and development" (weight is 0.233). The indicator of "customer satisfaction" was rated less important (weight is 0.228). (2) Level of categories of critical success factors: Two groups of experts rated the most important category of critical success factors were "instructor" (weight is 0.328), and followed by "training course" (weight is 0.238) while the "equipment/ instrument and evaluation system" was rated the least important (weight is 0.20). (3) Level of critical success factors: Two groups of experts rated the most important factors in critical success factor was "knowledgeable and skillful instructor" (weight is 0.185), follow by "the training course aligned with organization's goals. "Curriculum is designed appropriately and met the needs of the airline" (weight is 0.132), and "trainees understand the objectives and have a good attitude towards training" (weight is 0.111) while "state-of-the art training facilities and availability, on-going effort to make training equipment/ instrument up-to-date and available together with having the most popular and modern equipment/ instrument training in a given period" was rated the least important (weight is 0.035).

Conclusions

The relationship between the rankings of CSFs based on two expert groups is examined using the Spearman rank correlation test.

Table 3 Rankings comparison

CSFs	Trainers		Trainees		All experts	
	Weights	Rankings	Weights	Rankings	Weights	Rankings
CSF(1)_Category(1)	0.113	3	0.149	1	0.156	2
CSF(2)_Category(1)	0.028	11	0.046	11	0.099	11
CSF(3)_Category(1)	0.055	9	0.085	5	0.103	6
CSF(1)_Category(2)	0.224	1	0.147	2	0.027	1
CSF(2)_Category(2)	0.080	6	0.058	9	0.055	7
CSF(3)_Category(2)	0.081	5	0.066	7	0.046	5
CSF(1)_Category(3)	0.069	8	0.063	8	0.044	8
CSF(2)_Category(3)	0.119	2	0.100	4	0.060	3
CSF(3)_Category(3)	0.073	7	0.042	12	0.187	9
CSF(1)_Category(4)	0.091	4	0.123	3	0.107	4
CSF(2)_Category(4)	0.024	12	0.051	10	0.060	12
CSF(3)_Category(4)	0.044	10	0.069	6	0.055	10

Rankings comparison can be done through Spearman Rank Correlation Coefficient in equation as follows:

$$r_s = 1 - \frac{6\sum_{i=1}^{n}(d_i)^2}{n(n^2-1)}$$

This research sought to determine (1) suitable key performance indicators and critical success factors of B737-800 pilot initial training in Thailand, (2) critical success factors based on the experts' perspectives (instructor pilots' and pilots in training perspectives), and (3) verify that are there any significant differences between ranking results of instructors pilots (IPs) and pilots in training (PT) views. Research has divided methodology into 4 parts, so the results are summarized as follows: knowledgeable and skillful instructor (instructor category)

1. The training course aligned with organization's goals (training course category)
2. Trainees understand the objectives and have a good attitude towards training (trainee category)

3. Adequate and sufficient training equipment.(equipment & evaluation category)

The Spearman rank correlation coefficient is found to be = 0.71. Thus, the null hypothesis was rejected. It can be said that there is no statistically significant difference between the rankings of the critical success factors with a 95% confidence interval.

Level of critical success factors: Two groups of experts rated the primary important factors in critical success factor to knowledgeable and skillful instructor, the training course aligned with organization's goals, curriculum is clear, concise, practical and complete, and adequate and sufficient training equipment. The experts did not perceive the necessity of having training equipment/ instrument the most popular, up-to-date, available and modern in a given period.

Discussion of critical success factors affecting pilot training; There has been no recent research on factors affecting pilot initial training with aircraft type but some researches related factors affecting training as follows; Siriporn (2001) proposed a set of factors that affect transfer of training in Thailand that perceiving content validity is the most important factor to explain transfer of training in the Thai culture. The research showed that the Thai transfer system factors vary depending on organizational type, training type, gender, age, educational level, and years of work experience. The highest number of factors that differed among these independent variables was organizational type. Herchko (2012) explored the pilot source (background) factors that affected success in regional airline initial training are pilots who had a college degree, a degree in aviation, a flight degree accredited by Aviation Accreditation Board International, a flight instructor certificate, or between 500 and 1,000 total flight hours were more likely to complete training.

Recommendations

In suggesting the utilization of prioritized critical success factors affecting B737-800 pilot initial training, the following recommendations are proposed:

1. In the development of pilot initial training, the curriculum objectives are related to the training effectiveness, for this reason, it to be acquired in each subject.

2. Future research may be conducted in order to determine the best techniques of instructor pilots (IPs) because instructor is the top priority affecting training. Also studying more in details of other important professional groups for effective airlines operations, e.g. maintenance staff members, dispatchers and ground service agents. At present, limited

research has been done regarding those groups. Future research must be undertaken to find out how airline maintenance employees, dispatchers and ground staff agents are trained to be prepared to adapt to technology and innovation changes in airlines.

3. Feasibility study for online training for the convenience of both professional, instructors and work schedules, therefore, estimating its impact on the work performance.

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