



The Error Prevention in Filling Exported Documents in Air Cargo Operation

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Abstract

The research topic is the error prevention in filling exported documents in air cargo operation is qualitative research and the objective is: 1. to study error in filling exported document in air cargo operation; and 2. to suggest prevention in filling exported documents in air cargo operation. This research has purposive sampling which XYZ airline and interview with a populations of 10 from XYZ airline's staffs. The results found that 1. airline staff have never found intended errors; however they found unintended error; 2. the three most causes of unintended error was that documents are not clear and computer and software is not stable; the error from was an imported documents; staff was listening to the radio/watch television during the work; and last one is staff are not familiar with the software; 3. all 10 airline staff have error prevention in the same direction. If an error come from themselves, they will stop the activity that causes the error such as stop talking or practice by themselves to get more familiar with their job. If the error come from other causes, they will ask for information or help such as ask information from customers and call technicians to check the computer.

Keywords: Air cargo, Error prevention, Human error, SHELL model, Crew resource management

1. Introduction

From the Thailand logistic development plan No.3 (2017-2021), the first strategy to develop transport infrastructure and logistic networks along the strategic route to reduce transportation costs and optimize transit and logistics networks that link the origin and destination of logistics routes such as Rail, Sea, and Air. In the Air transport part Thai Government promotes to develop Suvarnabhumi Airport, Don Mueang International Airport, and U-Tapao Rayong-Pattaya International Airport, expand the capacity of the regional airport in order to prepare for the increasing demand of freight transport, improve airport management process for maintain quality of safety, availability of equipment, facilitate passengers and cargo, and emergency responding to meet international standards and comply with memorandum of international cooperation (NESDB, 2017).

Air transportation is a part of logistics which has many components such as Airport, Airline, and Air traffic service. Activities in air transport (Airline part) must have air cargo operations to distribute time sensitive products such as perishable goods, seasonal goods, medicine products or valuable product, however if air cargo operation staffs fill a wrong information of document may effect in other department since accounting department (revenue) to flight operation department (flight delay). Researchers interviewed ten airline staff and found that the average fill of wrong information from documents is 39 times per month, an average of 1 time per day (Table 1) that means an error will occur every day.

The SHELL model consists of Software, Hardware, Environment, and Liveware (Aviationknowledge, 2010) which explains that humans (Liveware) can be a cause of an accident or an error can come from another component. Crew resource management (CRM) (Kanki, 2010) is a solution to relieve or prevent errors that are caused because humans will be trained in many skills such as communication, decision making, teamwork, leadership, and situation awareness.

For the reasons above we have interest to research in the error prevention in filling exported documents in air cargo operation by using SHELL model and CRM. Results from this research are expected to give error prevention in filling exported documents to the airlines.

**Table 1** Airline staffs make an error per month

Staff	Frequency of error per month
1 st	1
2 nd	1
3 rd	5
4 th	1
5 th	5
6 th	7
7 th	1
8 th	7
9 th	5
10 th	6
Total	39
Average	39/30 = 1.3 per day

Approximately 1 time per day

2. Objectives

1. To study errors in filling exported document in air cargo operation
2. To suggest prevention in filling exported document in air cargo operation

2.1 Research question

1. Do most errors come from humans (Liveware)?
2. Are there more unintended errors than intended errors?
3. Are there more errors from staff who have less than 5 years' experience than staff who have more than 5 years' experience?

2.2 Benefit from this research

1. To give error prevention in filling exported document to the airlines

Research scope

1. Content, main content is the theory of the SHELL model and human error.
2. Time, because we have limited time so this research uses purposive sampling (Crossman, 2018) with XYZ Airways, Thailand.
3. This research has 10 airline staff who work in the air cargo operation department from XYZ Airways as populations.

3. Materials and Methods

This research's primary data was collected by a semi-structure interview (Adam, 2015) with a population of 10 from the airline's staff who worked in an air cargo operations department and literature review were collected by offline and online databases.

3.1 Research tools

The research tool in this research was a semi-structured interview which was divided into three parts. The first part was staff information, second part was errors during filling exported documents, and the last part is open-end question.

3.2 Data collection

Researchers created a semi-structured interview from the SHELL model (Safety management manual, 2018) and Human error theory (Reason, 1990), and after the tool was created the researchers gave the tool to the three experts in the aviation field to be validated and it and also with data triangulation (Toolkits, n.d). Afterward the researchers called to make appointments with 10 airline staff.



3.3 Data analysis

The error prevention in filling exported documents in the air cargo operation, the researchers divided an analysis into three parts on the following:

- 1) *Part one* will be presented in all 10 staff information and create a table from the SHELL model and the Human error theory to find the most causes in error also find error prevention.
- 2) *Part two* will answer two objectives: To study error and to suggest prevention in filling exported documents in air cargo operation.
- 3) *Part three* will answer three research questions: Do most errors will come from humans, Are there more unintended errors than intended errors?, and are there more errors from staff who have less than 5 years' experience than staff who have more than 5 years' experience.

4. Result

After interviewing all 10 XYZ airline staff we can found on the following:

4.1 Data analysis

Part one: presenting all 10 staff information and create a table from the SHELL model and Human error theory to find the most causes in error and for find error prevention

Table 2 Airline's staffs information

Gender	frequency	Age	frequency	Exp.*	frequency
Male	5	20-30	6	1-10	7
Female	5	31-40	2	11-20	1
-	-	51-60	2	21-30	2
Total	10	Total	10	Total	10

*Working experienced

From Table 2, all 10 airline staff are 5 males and 5 females. 6 staff are aged between 20-30 years old, 2 staffs are age between 31-40 years old, and 2 staffs are age between 51-60 years old. 7 staffs have 1-10 years of working experience; 2 staffs have 21-30 years of working experience, and 1 staff has 11-20 years of working experience.

Table 3 Cause of error in filling exported document (First objective)

Staff	Unintended error	Intended error
1 st	<ol style="list-style-type: none"> 1. Documents are not clear 2. Computer and software are not stable 3. Time limit in filling data 4. Error from customer 5. Error from imported document 6. Staffs are not familiar with software 	-
2 nd	<ol style="list-style-type: none"> 1. Documents are not clear 2. Computer and software are not stable 3. Staffs are not familiar with software 4. Staffs are not check data 5. Listen radio/watch television during work 	-
3 rd	<ol style="list-style-type: none"> 1. Listen radio/watch television during work 2. Staffs are not familiar with software 3. Misunderstand of document 4. Talk to other staff during work 	-
4 th	<ol style="list-style-type: none"> 1. Documents are not clear 2. Computer and software are not stable 3. Error from imported document 4. Staffs are not check data 	-



Staff	Unintended error	Intended error
5 th	<ol style="list-style-type: none"> 1. Computer and software are not stable 2. Listen radio/watch television during work 3. Talk to other staff during work 	-
6 th	<ol style="list-style-type: none"> 1. Error from imported document 2. Staffs are not familiar with software 3. Listen radio/watch television during work 4. Talk to other staff during work 	-
7 th	<ol style="list-style-type: none"> 1. Documents are not clear 2. Computer and software are not stable 3. Error from imported document 	-
8 th	<ol style="list-style-type: none"> 1. Documents are not clear 2. Staffs are not familiar with software 3. Error from imported document 4. Misunderstand of document 	-
9 th	<ol style="list-style-type: none"> 1. Documents are not clear 2. Time limit in filling data 3. Error from customer 4. Misunderstand of document 	-
10 th	<ol style="list-style-type: none"> 1. Documents are not clear 2. Computer and software are not stable 3. Listen radio/watch television during work 	-

From Table 3, all 10 airline staffs have not ever done intended error; however they have done unintended errors before. The three most causes of unintended errors is that documents are not clear and computer and software are not stable, second is an error from imported documents and listening to radio/watch television during work, and the last one is staff are not familiar with the software. Moreover, the 1st staff have done six causes of errors, the 2nd staff has done five causes of error, and 3rd, 4th, 6th, and 8th staff have done four causes of error.

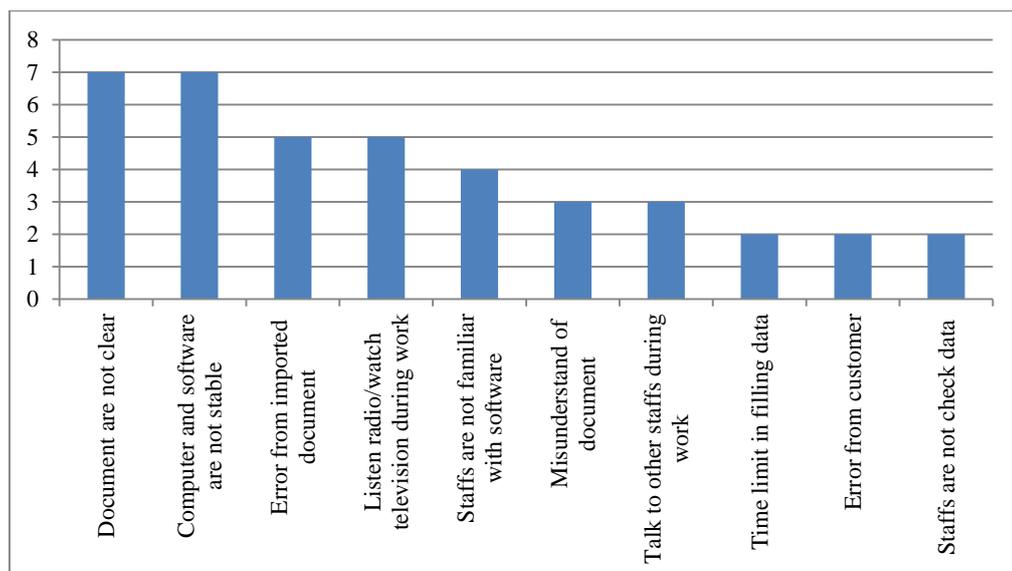


Figure 1 Frequency of maximum error to minimum error

**Table 4** Analyze unintent error with SHELL model

Staff	SHELL model				
	Software	Hardware	Enviroment	Liveware	Liveware (C)
1 st	1,3,5,6	2	-	4	
2 nd	1,3	2	5	-	4
3 rd	2,3	-	1	-	4
4 th	1,3	2	-	-	4
5 th	-	1	2	-	3
6 th	1,2	-	3	-	4
7 th	1,3	2	-	-	-
8 th	1,2,3,4	-	-	-	-
9 th	1,2,4	-	-	3	-
10 th	1	2	3	-	-

*Numbers are from each staff in table 3

From Table 4, the most causes of errors come from software, Liveware (Liveware and Liveware (C)), hardware, and environment respectively.

Table 5 Error correction (second objective)

Staff	Error corrcetion
1 st	-Call to customer for information -Ask technician to check computer -Fill document early -Train to familiar with software
2 nd	-Check information with imported department -Call to customer for information -Ask technician to check computer -Always checks document and ask if a problem occur -Train to familiar with software -Be concentrate/turn off radio and television
3 rd	-Train to familiar with software -Be concentrate/turn off radio and television -Ask if a problem occur -Do not talk to other staffs, except ask for important information
4 th	-Call to customer for information -Ask technician to check computer -Always checks document and ask if a problem occur -Train to familiar with software
5 th	-Ask technician to check computer -Be concentrate/turn off radio and television -Do not talk to other staffs, except ask for important information
6 th	-Train to familiar with software -Check information with imported department -Be concentrate/turn off radio and television -Do not talk to other staffs, except ask for important information
7 th	-Call to customer for information -Check information with imported department -Ask technician to check computer



Staff	Error correction
8 th	-Call to customer for information -Train to familiar with software -Check information with imported department -Ask if a problem occur
9 th	-Fill document early -Call to customer for information -Always checks document and ask if a problem occur
10 th	-Always checks document and ask if a problem occur -Ask technician to check computer -Be concentrate/turn off radio and television

From Table 5, all ten airline staffs have error correction in the same direction. If error comes from themselves, they will stop the activity that causes error such as stop talking or practice by themselves to get familiar with their job. If errors come from other causes, they will ask for information or help such as ask for information from customer and call technical to check computer.

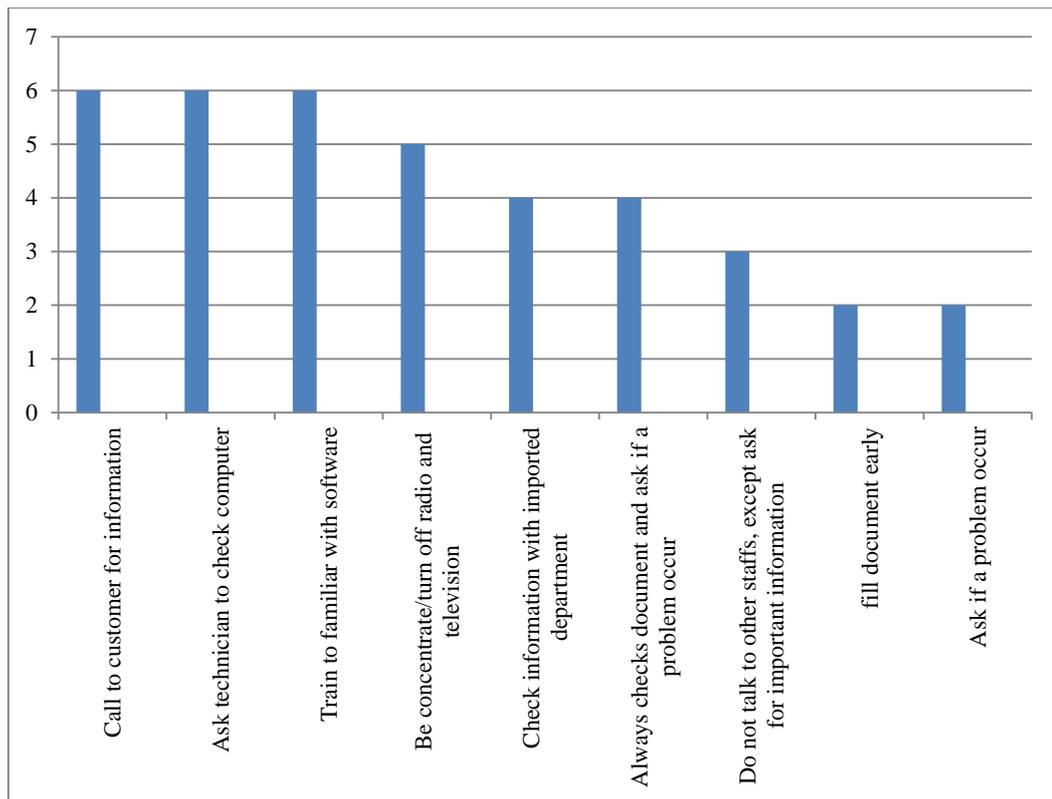


Figure 2 Frequency of error correction maximum to minimum

From Figure 2, the most ways staff correct problems are call to the customer for information, ask technicians to check the computer, and get training to become familiar with the software. Next is concentrate/turn off the radio and television. Next is to check information with the import department and always check documents and ask if a problem occurred. Next is to not talk to other staff, except to ask for important information. The last one is to fill out documents early and ask if a problem occurs.



Part two: answer two objectives

From the first objective, it is to study errors in filling exported documents in the air cargo operation. It can be found in Table 3 that there is no intended error in the air cargo operation, however unintended errors occurred in the following: documents are not clear, computer and software are not stable, error from the imported document, listening to the radio/watch television during work, staff are not familiar with the software, misunderstand the document, talk to other staff during work, time limit in filling in the data, error from the customer, and staff are not checking the data. In addition when compared with the SHELL model in Table 4 we can find that the error occurred in the software on the document is not clear, time limit in filling data, error from imported documents, staff are not familiar with the software, and misunderstanding with the document. Hardware and software in the computer and the are not stable. In addition, in the environment they are listening to the radio/watch television during work, and Liveware receives errors from the customer, as Liveware (center) staff are not checking data and talking to other staff during work.

The second objective is to suggest prevention in filling exported documents in the air cargo operation. We suggest prevention based on Table 5. In causes from Software, airline staff should be trained to be familiar with software and documents and the airline's manager or supervisor should set standard operating procedures (SOP) for staff to correct problems systematically. In terms of hardware, airlines should provide computers that are suitable with each operation and the specs should not be too old. In the working environment, they should not allow to listen to the radio and watch television during work and in the office hours, however staff will be allowed to listen to the radio and watch television during lunch time and when not during office hours. Liveware (Liveware and Liveware center), should design an easy document for customers to understand and also request staff to aid customers if they have any problems.

Part three: Answer research question

The first question is that if the most common errors will come from humans (Liveware), and in Table 4 it compares all factors of the Software, Hardware, Environment, Liveware (Liveware and Liveware center) is the most error occurred is in Software so the most common error will not come from humans (Liveware). The second question is that if there is more unintended errors than intended error; in Table 3 it can be found that all errors come from unintended errors so there are more unintended errors than intended errors. The last question is that if there are more errors from staff who have less than 5 years' experience than staff who have more 5 years' experience, when researchers look at the semi-structured interview and compare errors which occurred to all staff found that there are more errors from staff who have less than 5 years' experience than staff who have more than 5 years' experience.

5. Conclusion and Discussion

Research in the topic of the error prevention in filling exported documents in the air cargo operation had a population of 10 which were 5 males and 5 females. 6 staff are aged between 20-30 years old, 2 staff are aged between 31-40 years old, and 2 staff are aged between 51-60 years old. 7 staff have 1-10 years of working experience; 2 staff have 21-30 years of working experience, and 1 staff has 11-20 years of working experience. The most common error which occurred was in software which is not consistent with research "The study, case of accident according to Human factors analysis and classification system (HFACS) for prevention of aircraft accident according to principle of flying safety, case study of commercial fixed-wings aircraft under investigation of Federal Aviation Administration (FAA)" (Boonyawat and Watsamon, 2017). This research found that the most common cause of accidents is Liveware. The reason for not being consistent may be in filling out document and staff must be concerned with documents (software) than human (Liveware) but in the operation of the aircraft humans are the main system to the operation. Unintended errors occurred randomly in the SHELL model that we call "variable error" and this means we can't predict and it is harder to deal with errors (Crew resource management, 2018) so airlines should have a variety of standard operating procedures (SOP) to cover all the errors. More errors from staff who has less than 5 years' experience is consistent with "motor programmed; If a task is



performed often enough, it will become automatic and the required skills and actions are stored in long term memory” (EASA, 2013). This means more work will be done with less errors.

The error prevention in filling exported document in air cargo operation, airline should use the theory from human factors and the SHELL model to prevent errors, should provide training for staff and create documents easily for customers to understand, and should check the computer and its software once a week.

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