Factors to Prevent Data and Identity Falsification of Traditional Ship and Fishing Boat During its E-Certification

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Abstract: Falsification of traditional ship's identity, data information and certificates that is used especially during ship' operation, raises serious problems and endangers safety of the ship, crew on board and surrounding environment. It has led to the emergence of various tools and methods to prevent from having a traditional ship being operated with false ship's identity, data information and certificates. An extensive study has been carried out in this paper. It focuses on the methods taken to prevent ship's identity, data information and certificate falsification risk. Number of papers including International Maritime Organization and Government Regulation documents have been thoroughly assessed and analysed according to methodology of a model-based analysis. The aim is to seek a greater understanding of the methods in preventing falsification of Ship's identity, data information and certificates. The gaps found regarding methods became the factors to prevent falsification data and identity of traditional ship and fishing boat during its e-certification.

Keywords : Falsification, Identification, Traditional Ship, Fishing Boat, E-Certification.

I. INTRODUCTION

A. Research Background

Traditional ship in Indonesia is regarded as a ship with size of less than 7 gross tons (<GT.7) and it has different treatment compared with other size of ship. They do not need to be registered due to its size however they are being regularly monitored, certified and safety inspected regularly. Small ship or vessel is normally called as a boat. These boats are given a nationality certificate although they are not considered registered as an Indonesian ship.

Registration of a ship in Indonesia is started with the size of ship of 7 gross tons and above (Ministerial Decree no. PM. 39 year 2017).

[2] The ship being registered in Indonesia will have not only nationality certificates and separate other statutory certificates but it will have so called gross akta, a document which can be used as a collateral for a loan.

The nationality certificates for the ship of less than 7 gross tons called Pas Kecil [1]. It is a combination certificate, which consists of a nationality and safety standard of the boat. Most these size of ships are traditional ships including fishing boat. Traditional ships and fishing boats are mostly made of wood that due to wear and tear, it is easily to have some part of boat worn out. Especially when the boat has always exposed to the water and heat of the sun. If it is happened, its boat owner or skipper normally repairs it at times. However repairing its structure parts in some cases could change its dimension and size of the boat. Some cases, due to ignorance or unintentionally the skipper changed its shape. Instead of repairing the rotten parts, it is then considered as modifying the boat structure. Structure changes will effect to identification of the boat. Huge modification would not only affect to the shape of the boat but also to the stability of the boat. Stability is one of the most important things related to safety. Modifying the boat without carefully prepared and calculated could end in disaster. While calculating and preparing for modification could not be done only by the owner. Informing and getting permission from authority is a requirement.

Registration of a boat requires proper tonnage measurement and identification including history of the boat. According to the International Convention on Tonnage Measurement 1969, [3] the methods of calculating the ship's measurement would be applied for a ship of length of 24 meters and above. Therefore the vessel of less than 7 gross tons measurement methods falls under Indonesian domestic tonnage measurement methods.

Identification could not be achieved while there is no proper record or even when there is a record but the boat itself could have been modified voluntarily without informing authority. However there are several occasions where the boat owner has intentionally made its record could not be identified, as the owner would declare the boat as a new built boat and the boat could be re-registered as a new boat.

One of the reasons why some of the owner would prefer to have low age recorded of the boat is due to the insurance premium and other benefit the owner can have the trust of users that low age of boat would be more in safety aspect. Falsification data of the boat is one of the problems faced by the authority that require solution to solve.

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B. Purpose of This Research

This research is made with regards to updates of previous studies by examining definitions and theoretical standards. It is the plan of this study to find numerous examples of identifications and prevention action against fraudulent data information.

There is lack information regarding traditional and small wooden boat identification system. There is not much references have been made regarding this matter. However, several methods have been identified during this study. Each method has its advantages and disadvantages.

C. Problem Identification and Formulation

Under Indonesian Act no.17 year 2008 of Shipping [1], it required for all ship operating in Indonesia to fulfil safety standard and certified. Boat of less than 7 gross tons is required to have one single certificate, which is called Pas Kecil. It is mentioned under Ministry of Transportation Decree no. 39 year 2017 regarding Ship's Registration. Simplification in certification is become intention of the administration to ease the process by implementing single certificate that consist of several aspects. They are registration, measurement, safety and manning matters.

It has been for years, the boat of less than 7 gross tons management was handled by local government office. Each province, district and regency issued Pas Kecil independently and valid for one year. However it is unknown whether the boat will have to return to the same office where previous Pas Kecil was issued or they can go to other offices to apply the same certificate. But is it possible for a boat to have several Pas Kecil from different offices at time? The management of handling this size of boats was taken over by Indonesian act no. 23 Year 2014 [4]. This act ordered to Ministry of Transportation and its branch offices to take charge of the management. It marks the beginning of national data of Pas Kecil is collected. Most of the boats are have to be re-measured before issuance of Pas Kecil. To eliminate the possibility of duplication of certificate, validity of certificate was decided to be a life time period. To make sure that Pas Kecil will last long for a life time, the material is shifted from paper based to plastic type of material that consist of memory chip inside that can store some other information of the boat including photographic views from different angle. In fact, paper based certificate is easy to be worn out since the small ship may be exposed to water due to shipping seas and sea spray.

However the model certificates chosen has to be proved that it can eliminate the possibility falsifying data and information about the boat. Somehow it has to be connected between the boat and the certificate.

D. Research Purposes

The purpose of this research is to find gap between methods available for ship's identification and certification, especially for traditional ships and fishing boats of less than 7 gross tons in order to eliminate the possibility of falsification data information of the boat.

The research aims to answer following research questions:

RQ1: How is the small boat identified and certified to prevent false data?
RQ2: What are major theoretical perspectives that have been used with regards to certification?
RQ3: What are pros and cons of those methods?

E. Benefit of Research

The benefit of this research among others:It gives information on how the system is used and whether the present system can be used to solve the said problems.It gives information on what to be done in case if the current system is not possible to solve problems.

II. LITERATURE STUDY

A. E-Certificate

According to United Nation International Maritime Organization (IMO) through its Fal Committee, had introduced circular FAL.5/Circ.39/Rev.2 in 2016 explained that Electronic certificate means a certificate issued in an electronic format [8] while Certificate itself had been described as a document issued by administration or its representatives that is used to show compliance with IMO requirements and used to describe operating conditions, crewing requirements, and ship equipment carriage requirements. Imo had also mentioned that this does not include publications, manuals, instructions or ships' logs used to record on going operations.

IMO has decided several features that have to be available for electronic certificate as follows:

- Validity and consistency with required format and content by the relevant convention and or instruments.
- The certificate has to be secured. It is protected from edits, modification or revision by the person other than those authorised by the issuer or administration.
- It has to have a unique tracking number used for verification.
- A printable and visible symbol of the issuer or administration.

The guidance of electronic certificate issued by the IMO is used for ship that is regulated under the international convention only. Those ships are not the ship of less than 7 gross tons.

B. Falsification

Data falsification is manipulating data with intention of giving a false impression. This includes manipulating images, adding or omitting data points. Forgery and falsification of documents are considered mechanism to commit fraud. It is the same as conspiracy, theft, corruption, embezzlement, bribery and extortion (Mohammed, 2002).

It is deception to un-honest by making a personnel interest for oneself while creating losses to another. (Yusuf Ibrahim, 2012). Although there are different in variation of definitions, it is about the same model and it must be a fraudulent act which is consciously committed by the accused person.

C. Traditional Ship

Traditional ship or traditional vessel according to Directorate of Sea Transportation in Non-Convention Vessel Standard, 2009 explained that Traditional vessel means a vessel that is built in traditional way and is not following a conventional design. It is a common boat that traditionally built by most of people in the country the way their ancestor used to make. According to Indonesian main dictionary

D. Fishing Boat

According to the Ministerial of Transportation Decree no. KM. 65 Year 2009, Fishing boat or fishing vessel means a vessel that is constructed and is used to catch fish, whales, seals, sea lions or other marine biological resources.

The IMO Safety Of Life At Sea 1974, has described fishing vessel as a vessel being used for catching fish, whales, seals, walrus or other living resources of the Sea. With regards to the collision regulation 1972 Regulation 3, the term of vessel engaged in fishing means any vessel fishing with nets, lines, trawls or other fishing apparatus which restrict manoeuvrability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restrict manoeuvrability.

Fishing boat in Indonesia normally are small boat of less than 7 gross tons. They are operating in Indonesian waters and normally kept just next to their houses.

E. Pas Kecil

Each boat before initial time of operation must be measured to determine the length, width, depth and tonnage of the boat. The result of measurement will determine which certificate will be given. According to the Ministerial of Transportation Decree no. PM. 39 Year 2017 explained that Pas Kecil is a nationality certificate of ship that intended for the ship with size less than 7 gross tons.[2]

Ship with size of less than 7 gross tons are generally a traditional boats and fishing boats. Traditional boat is owned by middle to lower class of people. It is n general are the smallest type of ship. Beside that, the small and low draft of boat is very easy to be swept by the waves, sea sprays or shipping seas. This boat is always exposed with the water. Therefore its certificate, Pas Kecil, are replaced by E-Pas Kecil.

F. IMO Number

The International Maritime Organization has introduced a unique number to distinguished one of another. It has adopted resolution no. A.600(15) in 1987 as for the first time regulation regarding IMO number was introduced [6]. It required that all ships to have unique identification IMO number, which permanently marked on the ship hull. The number remain unchanged even when the ship is transferred, reflagged, overtaken from one owner to another owner or

from one administration to another administration. Lloyds Register, a classification Association was the one who introduce it at first in 1963. Initially it was only 6 digit number but then it was modified to 7 digit number in 1969. This requirement has become full mandatory in 1994 for all cargo ships at least of 300 gross tons and passenger ships of at least 100 gross tons. However these schemes does not enforced to wooden ship.

Further IMO resolution A.1078(28) adopted in 2013 revising requirement of IMO identification number to be implemented to ships of 100 gross tons and above including fishing vessels. [7]

However all ships below that size have not been required to follow this regulation. Although numbering the ship is one of the solution that could be considered. The implementation of this system to a smallest type of ship, the traditional ships and fishing boats are not effectively successful. It is because of the nature of small wooden boat that very easy to worn out and be repaired bay replacing worn out par and appearance will be different.
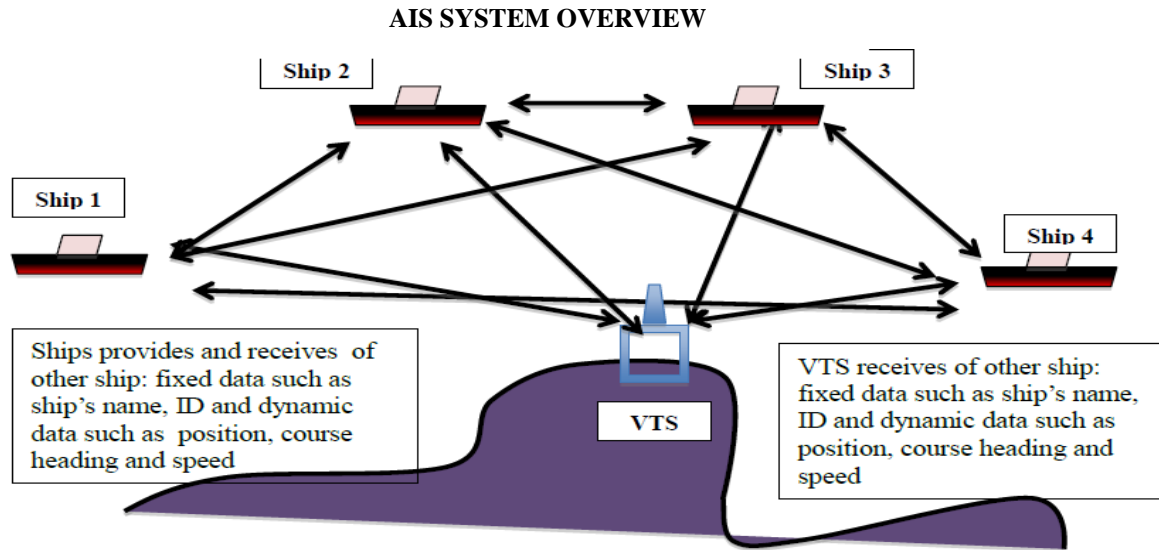
G. Automatic Identification System (AIS)

The other method of identification of a ship is by using electronic equipment called Automatic Identification System (AIS). This is an automatic

tracking system, which uses transponders on ships. It is automatically communicates information of the ship. AIS was primarily used for collision avoidance that enable the ship to identify other ship in surrounding area clearly.

AIS is regulated under Regulation 19 of SOLAS, 1974, Chapter V, Carriage requirements for shipborne navigational systems and equipment. AIS has to be carried for all ships of 300 gross tons and above engaged on international voyages and cargo ships of 500 gross tons and above not engaged on international voyages and all size of passenger ships. This requirement adopted in November 2001 under IMO resolution no. A.917(22) regarding Guidelines for the onboard operational use of shipborne Automatic Identification System (AIS) as amended by IMO resolution no. A.956(23) in 2004 [10] and later re-amended by IMO resolution no. A.1106(29) in 2015 [11].

AIS is an electronic equipment that continuously transmit ship's own data information to other ship and any shore base station receiver (Vessel Traffic System). It also receives the same information from other ships and VTS (when it is required).

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AIS SYSTEM OVERVIEW

Fig. 1 Information transmitted and received

AIS provides information from ship 1 to ship 2 as well as to other ships and VTS provided that the AIS equipment is switched on.

They are three types of AIS. Type A, type B and receive-only.

• Type A: This is required by the IMO/SOLAS with 12.5 watt Very High Frequency (VHF) transmitter (20-40 nautical miles range depending on antenna height).

• Type B: Does not meet SOLAS Standard. it is included a VHF transmitter and restricted to 2 watt of power (5-10 nautical miles range). Although type B is common to be used for non-conventional ship however it is considered not possible for the boat of less than 7 gross tons.
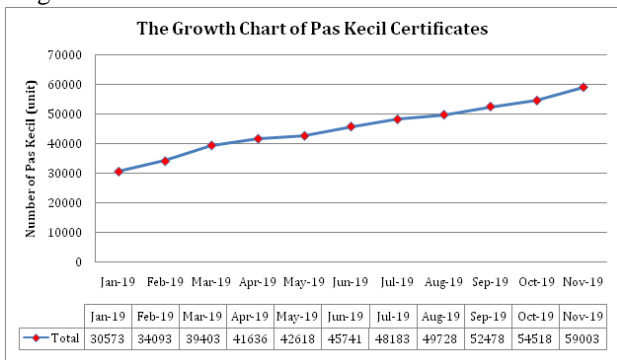

Fig. 2. The growth of Pas Kecil certification (*Source: dephub.go.id*)

Receive only: It is very useful for shore station, which do not required to transmit its information. This type less expensive than the other two.

This system could have solved the problem if only the ship of less than 7 gross tons equipped with power sources and be provided with safe place to keep such electronic equipment. Traditional boats are the smallest ship's that most of them do not have power generator.

While it is considered not possible to enforce the use of AIS for these ships of less than 7 gross tons, the prices of AIS itself will become another problem.

H. Current Strategy

The program of the administration to re-certificates those boat of less than 7 gross tons includes in re-measuring the boat conducted thoroughly in about 260 harbours in Indonesia. It is a campaign of re-measuring and re-certificating of Pas Kecil. Only one port as a pilot project has implemented E-Pas Kecil while the rest of the ports are still using paper based certificates.

Since there are some discrepancies about the total number of boat of less than 7 gross tons, the administration has decided to change the strategy to use electronic certificates and provide electronic database to rectify those discrepancies.

I. E-Pas Kecil

Electronic certificate is used to replace the use of paper based certificate. It is design to gain more benefit and very useful especially with regards to the operational condition of small traditional ship and fishing boat that prompt to shipping seas and other type exposure of water. Further more the small space for retaining certificate or document safely, made the use of electronic card is become the best option.

Fig. 3. Transformatio from paper to Electronic Certificate

Paper based certificate is easy to be worn out. It can not be used for long period especially when the certificate validity is decided to be for a lifetime period.

Boat skipper normally kept certificate in a tube by pipe and sealed with plastic to protect it from the water. However the are another problem that there is a problem in making sure the right boat is the boat with the data information.

Fig. 4. Sealed tube used for keeping certificate *(Source: dephub.go.id)*

The E-Pas Kecil, E-Certificate with the benefit by having several photographs pictures is not effectively works. The number of boats in a place, make it is very difficult to take pictures at the time inspected.

Fig. 5. Number of traditional ships and fishing boats in a traditional port *(Source: dephub.go.id)*

Eventhough the model of E-Pas Kecil has been implemented at a project model port of Muara Angke in Jakarta. The effectiveness of E-Certification with several photographic views in the E-Pas Kecil is difficult to be achieved.

III. RESEARCH METHODOLOGY

A. Literature Study Technique

It uses literature study approach in searching and segregating those papers. This study builds updates the previous studies by examining all aspects including theoretical definitions, foundations and methods being used at present.

This literature study would distinguishes itself from the previous studies. This study adopts the philosophy position of critical realism. Critical realism would let mind to see objective and existing independently.

To understand multi concept and methods available of present condition for electronic certification and all possible preventive actions against fraudulent information. An initial study was used to acquire on overview of literatures achieved. The research questions were prepared base on the findings during study.

B. Papers retrieved

There are about 102 papers and journals from 7 (seven) publishers including from International organization documents and from government regulation. They are:

- IEE Digital Library
- ACM Digital Library
- Science Direct
- Desidoc
- ASTES
- IMO Resolution
- Indonesian Regulations

It used keywords to achieved papers required for the study. They are a combination of words to be used in searching papers and documents with liaison Boolean operators AND, OR, NOT. It is a Boolean value, which are produced after evaluation of programming language. This expressions correspond to proportional formulas in logic. Several keywords used as follows:

- Electronic Certificate
- Electronic Identification
- E-Certificate or Falsification
- E-Certificate or Identification
- E-Certificate and Falsification
- E-Certificate and Identification
- Traditional Ship or Fishing Boat
- Traditional Ship and Fishing Boat
- Falsification Identification
- Data and Identity falsification
- Traditional Ship and Fishing Boat Certification
- Factors to Prevent Data and Identity Falsification of Traditional Ship and Fishing Boat during its E-certification

Table - I: Papers and Documents selection process

Source	Studies Found	Candidate Studies	Selected Studies
IEE Digital Library	11	8	6
ACM Digital Library	3	1	1
Science Direct	66	33	9
Desidoc	3	0	0
ASTES	2	0	0
IMO Resolution	8	6	3
Ministry of Transport	9	7	5
TOTAL	**102**	**55**	**24**

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The combination of keywords achieved 102 papers and documents as "studies found". Out of 102 papers and documents they are further selected to be candidate papers and documents. It is then became 55 papers and documents as "Candidate Studies" and later on, after more in detail study, those papers and documents has to be selected as Selected Studies. It finally has about 24 "Selected Studies"

It shows that most of papers are found available in Science Direct publisher. The second publisher which its papers most taken is IEE Digital Library followed by Ministry of Transport. The Ministry of Transport produced several regulation that can be studied and related to the methods available at present.

Table - II: Percentage of publisher involved in Selected Paper

Publisher	Number	%
Science Direct	9	38%
IEEE Digital Library	6	25%
ASTES Journal	0	0%
Desidoc	0	0%
ACM Digital Library	1	4%
IMO	3	13%
Ministry of Transportation	5	21%
TOTAL	**24**	**100%**

Science Direct is the most publisher papers taken to the selected papers. Most of papers taken for literature study are came from this publisher.

C. Demographics and Trend Characteristics Publishing Outlets

Table - III: Demographics and Trend Characteristics Publishing Outlets

Publication Types	Publication's Names	# Of Papers	%
Ocean Engineering	ScienceDirect	14	13.7%
Marine Policy	ScienceDirect	10	9.8%
Sea Transport Regulation	Ministry of Transport	5	4.9%
Safety Science	ScienceDirect	4	3.9%
International Maritime Standard	IMO Resolution	3	2.9%
Shipping and Logistic	The Asian Journal	3	2.9%
Pattern Recognition	ScienceDirect	3	2.9%
Fisheries Research	ScienceDirect	2	2%
Computer	ScienceDirect	2	2%
Others	Various	56	55%
TOTAL		**102**	**100%**

Marine engineering is holding the most of publication type of papers documents, which are found to be related to information required. They are selected to be studied further. The second most publication type are from Marine Policy and followed by Sea Transport Regulation and Safety Science.

It gave clear pictures on what type of papers are the most related to the topic.

D. Countries involved to selected papers

Table - V: List of Countries

No	Country	No.	%
1	POLAND	1	1%
2	FRANCE	1	1%
3	CHINA	1	1%
4	USA	11	11%
5	JAPAN	6	6%
6	INDONESIA	12	12%
7	HUNGARIA	1	1%
8	UK	19	19%
9	ECUADOR	1	1%
10	TURKIYE	5	5%
11	THAILAND	1	1%
12	KOREA	5	5%
13	ISRAEL	1	1%
14	NORWEGIA	5	5%
15	SPAIN	3	3%
16	GERMANY	2	2%
17	CANADA	2	2%
18	SWEDEN	3	3%
19	IRAN	1	1%
20	MEXICO	1	1%
21	LITHUANIA	1	1%
22	AUSTRALIA	3	3%
23	NETHERLANDS	2	2%
24	CHINA	3	3%
25	SOUTH OF AFRICA	1	1%
26	ARGENTINA	1	1%
27	VIETNAM	1	1%
28	TAMILNADU	1	1%
29	SINGAPORE	1	1%
30	TAIWAN	1	1%
31	INDIA	3	3%
32	ITALIA	1	1%
33	USSR	1	1%
	TOTAL	102	100%

IV. RESULT

Identification of a ship is required not only for security matters but also for the safety of the ship itself.

With regard to the first research question, how the small boat is identified and certified to prevent false data. Can be answered as follow:

- The International Maritime Organization has introduced a unique number scheme to distinguished one of another from 1987 and came into force in 1994. However the scheme has not intended to be implement for small ship. There was not any system in place using digital identification officially introduce for small wooden ship.

- There are several electronic devices used on board a ship such as Radar, Automatic Radar Plotting Aid (ARPA), Long Range Identification and Tracking (LRIT) and Automatic Identification System (AIS) that primary purpose is for safe navigation. Those systems are not suitable to be used on board of small wooden boat without proper electric power source unless if the boat has solar cell panel generator. The AIS is the closest model that might be used, however it costly and difficult to install on a small open type of boat that always exposed to seawater.

- The small boat identification so far used manual old model and paper based certification with identification number given by administration that painted or grafted to its hull. This type is common to be used. However this method is not preventing them from falsification of identification.

Regarding second research question on what have major theoretical perspectives that been used with regards to certification can be understood as follow:

- Most of the small wooden boat has been certificated with ordinary old certification method. They are also given a identification number that has to be painted or grafted to ship's hull.

- Some others are either be registered without giving them a paper and document as certificate. Some other has given them certificate that has to be kept on board and left the boat skipper struggling to safe keeping it, preventing from damage due to seawater exposure.

- Indonesia has introduced electronic certificate (E-Pas Kecil) with the intention to eliminate falsification of identification but after first implementation in the end of 2019, further problem is found and it is still have some weakness to be solve.

With regards to third research question on what pros and cons are of those methods can be answered as follow:

- The use of electronic devices on board has most advantages. Their identification can be gained accurately and certification became easily be done. It can assure the security and some model of certificates being used are last long material and with strong durability against damage from weather and seawater. However, it cost more and in some condition it is not possible to be implemented on a small traditional wooden boat that lack of power source.

- The use of paper base certificate is cheaper in cost of production but the identification of data and information of the boat is less secured. There are also several possible problems occurred. Boat can have more than one certificate or boat data can be falsified for intended purpose.

V. CONCLUSION

The conclusion for each research question can be described as follows:

- For the first research question on how the small boat is identified and certified to prevent false data. Can be concluded, as there are models of identification applied in manual system of certification so far, but they cannot be guaranteed for the accuracy of identification.

- For the second research question on what have major theoretical perspectives been used with regards to certification, can concluded as the certification system available for small traditional ships and fishing boats are paper based certificates and using manual data input for records. This is the same model that presently being used.

- For the third research question on what pros and cons are of those methods can be, can be concluded as the old models of system has been used perfectly at time until further better requirement came. manual identifications and paper based certification were the system available even until present in some area. It less cost and less accuracy including less security. The development of information technology and system provide us for better system using electronic identification and certification. These system are more expensive but when it is compared with the benefit that can be gained, it come with the conclusion that digital system is more expensive in investment however if it is compared with further risk and cost that have to be spend in case problems arises, the use of digital identification and electronic certification system would have been much cheaper and better eventually.

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