

O-ST042

## **Quality system for ensuring crime scene investigator's competency**

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### **Abstract**

Quality of crime scene investigation's work directly reflects the competency of the practitioner from their performance. In this study is qualitative research that data relating to the crime scene investigator were collected by in-depth interviewing and data collecting from document in forensic police officers from 5 centers based on ISO 17020 and international standards relating to crime scene investigation and analyzed. Model of a quality system for ensuring crime scene investigator's competency for the police forensic science office involving factors which were preservation and control scene, strategic and evaluate scene, examine scene, manage about evidence, interpret, analyses and sequence event, decide, record, and present to courts was then proposed which this model quality system would help to maintain the efficiency and effectiveness of the practitioner's performance, thus resulting in equity of good quality service, and providing a guideline for future developments in the crime scene investigation area.

**Keywords:** quality system, crime scene investigation, competency, ISO 17020

## Quality system for ensuring Crime scene investigator's competency

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### Introduction

Crime scene investigation is an important area in forensic science as it is the first step of criminal investigation process. It is also a crucial step to make the criminal investigation process being operated completely. Frequently that crime scene investigation starts from crime scene investigation practitioners' findings when physical evidence are collected and submitted to Forensics Laboratory. Information obtained from the forensic examinations provides investigation leads which can then support the allegation, provide linkage of event between the suspect, victim or relating witness, and can also provide proof of innocent. This scientific evidence is useful for criminal investigation. Unsuccessful recovery and collection of evidence in the crime scene by crime scene investigation practitioners, and malpractice operation has direct impact on the success of the forensic process. Thus, crime scene investigation work is the first and most important step in the forensic process, which consequently affected the downstream judicial process.

Credibility and reliability of forensic laboratory examination results are key issues in forensic investigation. It is necessary to ensure that all steps taken in the forensic process are correctly and appropriately conducted from crime scene to court. Quality control and quality assurance procedures can help to clarify and demonstrate that all steps in the process had been carried out by meeting an agreed 'standard', which is accepted by all stakeholders taken part in the process. Quality system contains the following components:-organization structure, job description, standard operational, procedure, processes, procedures, resource and information that use to operate or contribute to successful quality management. Then quality system is relating to an operation following standard guidelines or many regulators of organization resulting a quality outcome which will create satisfaction for clients. Standard establishes norm or requirement for example technical criteria, method, processes and practices (Hadley, Keith.2008), thus providing a quality outcome and good service. Therefore, standard is then the key to everything associated with ensuring competent performance and outcome.

In field of crime scene investigation, there are documented standard and guidelines criteria for ensuring quality in crime scene investigation established by agreement to consensus of recognized body aimed at the achievement of the quality crime scene investigation work.

ISO 17020 is the General Criteria for the Operation of Various Types of Bodies Performing Inspection. It is formally accepted that an organization performing inspection can carry out the task with impartiality.

ENSFI promoted and encouraged the implementation of ISO 17020 in crime scene investigation by issue guidance on the implementation of ISO/IEC 17020 in the field of crime scene investigation in the forensic process. It is also intended to harmonize the assessment of crime scene investigation services for the purpose of accreditation.

Because one of the most common criticisms rose against expert is that of competency. Competency proposed by Prof. David C. McClelland from Harvard University in 1990, means characteristic or trait which indicates a person's ~~about~~ knowledge, skills, attitude, belief and trait (Santhong, N. 2004). It is suggested that hard skill (knowledge and skill) can be developed through education, training and coaching practice, and is easier to develop than soft skill (attitude, belief and trait). Good management of organization that must use quality system. It is essential tools for operation because quality system will put to create competency in crime scene investigation practitioners. And it is ensuring that practitioners still have competency correctly in their job and expectation of organization A competent expert witness must be a specialist in the pertinent field. An expert witness is an individual that through his/her knowledge and skills assists the court of law. Then expert opinion presented by scientists lacking the specifically required knowledge. The issue of the forensic witness competency is strongly tied to the Daubert standards which have been stated in a variety of ways since 1993 (Jehuda Hiss, 2007).

The European Network of Forensic Science Institute (ENSFI) launched ENFSI QCC Competence Assurance Project (CAP) Group which issued the "Performance Based Standards for Forensic Science Practitioners" and was then approved in 2004. (ENFSI 2004) This is written in terms of outcomes which described 9 major categories of what a 'competent crime scene investigation practitioner' should be able to achieve; i.e., the ability to undertake initial actions at the scene of incident, the ability to develop a scene investigation strategy, the ability to undertake scene investigation, the ability to interpret scene findings and order further examination, the ability to develop a laboratory examination strategy, the ability to prepare to carry out laboratory based examinations, the ability to examine items and samples, the ability to Interpret findings, and lastly, the ability to report findings (ENFSI 2004)

These suggested that good management of organization that must have quality system. Quality system is an essential tool for operation because it helps to control the process which finally produced a quality outcome. Thus, reflecting the maintenance of the competency in crime scene investigation practitioners carrying out the task. In other words, it is then ensured that practitioners are competent in their job and meeting the expectation of organization.

In this study, output is a model of quality system for the Royal Thai Police Office of Forensic science to ensure Crime scene investigator's competency, and the quality of service being provided-has been created and proposed. The proposed quality system can be implemented and revised to fully benefit the organization in preparation of sustainable planning in human resource an organization development in the future.

### **Objective/Research Question**

To propose a quality system for the Royal Thai Police Office of Forensic Science to ensure crime scene investigator's competency-based on international standards of crime scene investigation and criteria of ISO 17020

### **Research Methods**

Qualitative data reported in this research work was collected by in-depth interviewing and data collecting from document. Five police officers, currently working at scientific crime detection center 1, 3, 5, 7 and central scientific crime detection division, holding the position chief of the crime scene section or higher, were interviewed in this study. Scope of interview was based on international standards and guidelines (Hadley, Keith.2008), relating to crime scene investigation, i.e., ABC approach, CRFP registration program, Proficiency Testing, National and Scottish Vocational Qualifications Levels and National Occupational Standards, and guidance for the implementation of ISO/IEC 17020 in the field of crime scene investigation (EA-5/03). Interview data were then analyzed and compared in order to propose a quality system. The police organization was also taken to considerations so that the quality system had been customized to fit the organization without compromising the standards. Staff developmental programs had been suggested to capacity build and maintain competency of investigator. Which research methods have 5 steps are:

#### ***4.1 Standards and Guidelines***

This research used standards and guidelines that determined key competency for crime scene investigation were preservation and control scene, strategic and evaluate scene, examine scene, manage about evidence, interpret, analyses and sequence event, decide, record, and present to courts. (ENFSI 2004)

#### ***4.2 Preparation of questions for interview***

Questions had been set up for interviewing according to International standards of crime scene investigation that are 3 categories and Guidance for the implementation of ISO/IEC 17020 in the field of Crime scene investigation which are classified to 12 categories as following

1. Administrative requirement
2. Independence, impartiality and integrity
3. Quality system
4. Personnel
5. Facilities and equipment
6. Inspection methods and procedures
7. Handling inspection samples and items (exhibit)
8. Records
9. Inspection reports (Investigation reports)
10. Subcontracting
11. Complaints and appeals

## 12. Cooperation

### ***4.3 Data collection by in-depth interviewing***

Study with interviewing from chief officer of crime scene investigation of the Royal Thai Police Office of Forensic science or position that upper chief officer that responds in crime scene investigation. The numbers of sample were 5 samples that were crime scene investigation bodies of The Royal Thai Police Office of Forensic science such as: Scientific crime detection center 1, center 3, center 5, center 7 and Central scientific crime detection division. That had been approached for in-depth interview. The questions had been sent to the interviewee in advance. Then the interviewer had made appointment for the interview.

### ***4.4 Data analysis***

The Data and information that collected from in-depth interviews, from the Royal Thai Police Office of Forensic science had been analyzed and compare with

4.4.1 International standards of crime scene investigation (Hadley, Keith.2008)

4.4.2 Guidance for the Implementation of ISO/IEC 17020 in the field of Crime scene investigation.

4.4.3 Regulations and procedures according to crime scene investigation Under taken by the police office.

Analysis of data had suggested the overall picture of current status of crime scene investigation process.

### ***4.5 Quality system proposal***

A quality system had been draft up using managerial tools based on data obtained from the interview.

## **Results**

From Literature review and results that obtained from in-depth interviewing that is chief officer of crime scene investigation of the Royal Thai Police Office of Forensic science or positions that upper chief officer that responds in crime scene investigation. There are 5 samples that are scientific crime detection center 1, center 3, center 5, center 7 and Central scientific crime detection division. Which have added and summarize answer of interviewing almost 5 samples which found that:

1. Question about measuring competency and performance of investigator.

How do measure or evaluate investigator?

1.1 Knowledge and ability

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by qualification, Training, performance, knowledge test, examination, interview and observed operation of investigator in crime scene by questioning and evaluated from investigator' report.

1.2 Skill and Professional

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by success of job, performance of hard case, qualification, test, observing, questioning and analyzed, experience and application of investigator.

#### 1.3 Reasoning and understanding in the job

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by report, result of exam, questioning and observed from operation of investigator about planning and can reconstruction.

#### 1.4 Knowledge application and continuous improvement

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by report, seminar, and result of exam, training, questioning and problem solving.

#### 1.5 Measuring performance about quantitative or period time

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by a record of performance about number of cases and criteria of job

#### 1.6 Measuring performance about qualitative

Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure by problem solving, hard job, application by science, audit to performance, report and questioning.

### 2. Question about method of evaluation for investigator.

2.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences observed operation of investigator that have knowledge and understanding in operation by questioning, performance and report

2.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences evaluate investigator by questioning that ask investigator and evaluate from answer and reasoning.

2.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't use to evaluate investigator by expertise.

2.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences in part of scientific crime detection center 1 evaluate investigator about knowledge or expert in Technical knowledge by twice for year. But another's Crime scene investigation bodies don't evaluate this.

2.5 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't use to evaluate investigator by benchmarking.

### 3. Question about method of measuring knowledge, understanding and method of operating of investigator

3.1 Investigator has evaluated data to be obtained from client that need to prepare tools and equipment or request another expert and strategic planning before investigation.

3.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure ability about problem solving of investigator by observing in operation and asking in report.

3.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure about understanding in objective and hypothesis of investigator in case of investigation by observed investigator in crime scene, asking and result of report.

- 3.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure about understanding and method of operation in physical evidence by observed investigator in crime scene, report and asking.
- 3.5 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure about best method of investigation that investigator has used by observed investigator in crime scene report and asking.
- 3.6 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences measure about recording of investigator and correcting relation in reasoning in addition to decision making of investigator by Checklist, report and asking.
- 3.7 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences has format of report and in report has had reasoning from Science, discovery and confirm in result in addition to present to court.
4. Question about standard of crime scene investigation.
  - 4.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't use quality system for guidance to operation.
  - 4.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't obtain evaluation from Standard organization that can admit inspection body.
  - 4.3 Crime scene investigation body of The Royal Thai Police Office of Forensic sciences use Standard Operating Procedure (SOP)
5. Question about administrative requirements
  - 5.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences operate follow by regulation and law.
  - 5.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't have risk management and evaluation in job.
  - 5.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use job description for determination about competency in each level of practitioners.
  - 5.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences ensure about right document that can reply objective almost record and report by checklist and examine draft report of crime scene investigation.
6. Question about Independence, Impartiality and Integrity
  - 6.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't have threat that effect to integrity of Crime scene investigation bodies.
  - 6.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have a code of conduct and policy document for prevent something that may be impact to decision making of investigator.
  - 6.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use method to prevent investigator that create condition in result of report to impact with client by emphasis in meeting and a code of conduct

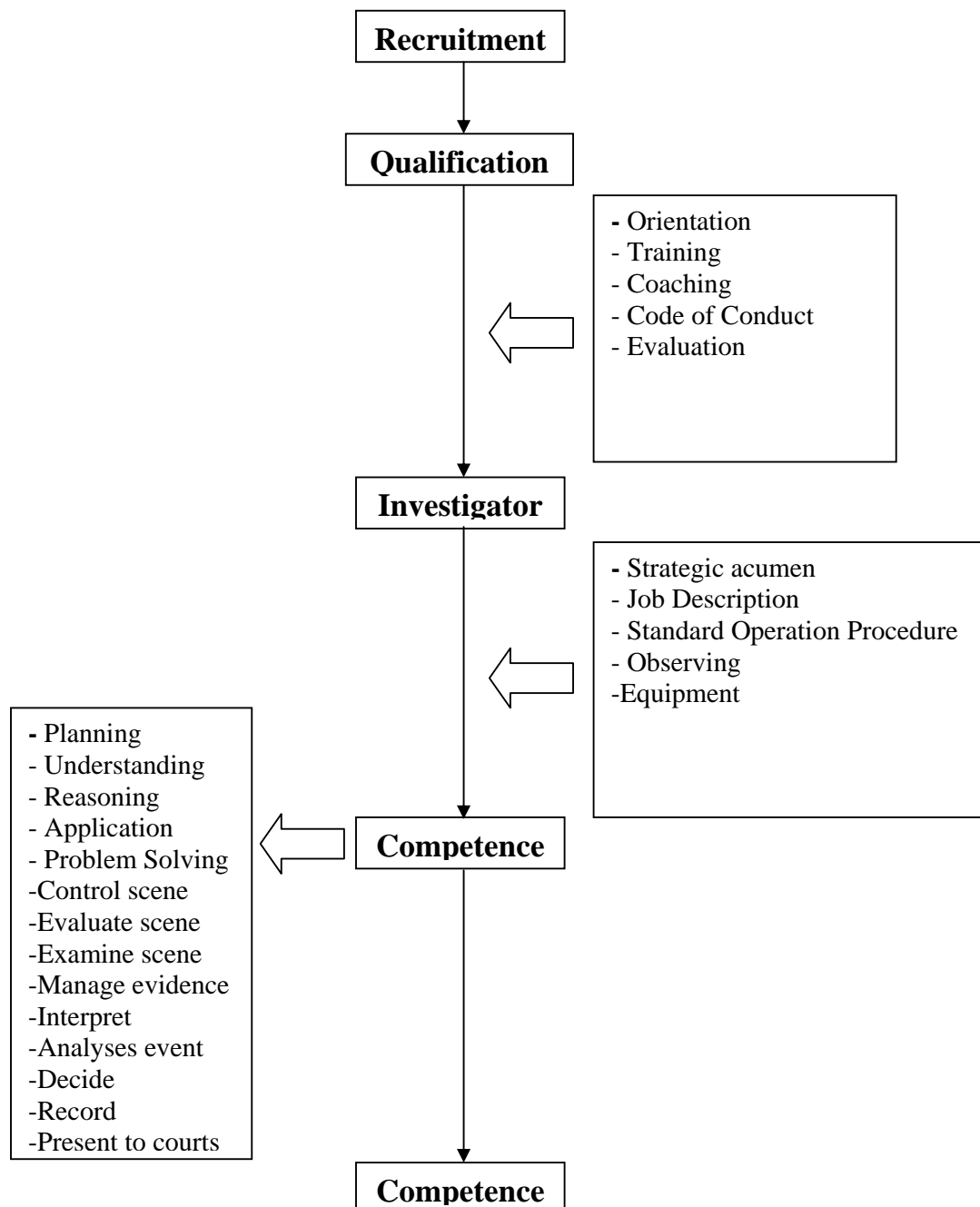
- 6.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use method to prevent investigator that involved with victim, suspect or client by change investigator or set in from committee.
7. Question about Quality system
  - 7.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't have document about quality ensuring.
  - 7.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences manage about document, copy and electronic media that involve regulator and law by document file and computer system.
  - 7.3 If to be changed document or method of examine that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences will report to investigator immediately.
  - 7.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have internal audit every years but scientific crime detection center 1 have internal audit 4 times per years.
  - 7.5 In case of operation cannot act normal or conflict in job that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences will set committee for joint consider?
8. Question about Personnel
  - 8.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences examine investigator about that has knowledge update new technology and when investigator had trained then how they can develop their competence by examine from performance, observing, asking in report, seminar and evaluation but in part of scientific crime detection center 5 has set discussion about case in crime scene investigation later.
  - 8.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have recorded annals training and competency evaluation of investigators.
  - 8.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have a code of conduct.
  - 8.4 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences obtain salary and compensation that is over time.
9. Question about Facilities and Equipment
  - 9.1 Equipment and reagent that use in crime scene investigation have person that take care and control the right for prevent error.
  - 9.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use policy or operate about person who can use equipment for ensuring to use right and prevent contamination by investigator must always practice.
  - 9.3 Almost equipment that effect to quality of examines that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have labeled detail about name and method to use.
  - 9.4 About quality of equipment that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have examined and maintenance equipment but don't have calibration.



- 9.5 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't have standard reference reagent.
10. Question about Inspection Methods and Procedures
  - 10.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have system that ensuring about addition physical evidence that obtains by examine data right and can applied method that match with job.
  - 10.2 In abnormal situation crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have modified method of investigation for suitable for that crime scene.
  - 10.3 About safety in operation crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use Standard Operating Procedure (SOP) and equipment for prevent hazard and always practice.
11. Question about Handling Inspection samples and Items
  - 11.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use method collect physical evidence and maintenance before send to laboratory by record chain of evidence, photography and always practice in operation.
  - 11.2 In case of abnormal physical evidence that may be explosive that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences will report Explosive Ordnance Disposal (EOD) that examine first.
  - 11.3 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences use document about record chain of evidence, detail, packaging and good maintenance about deliver physical evidence before send to laboratory.
12. Question about Investigation Reports
  - 12.1 Component of investigation report of crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have 3 parts that are report, photograph and diagram which report has had detail about incident, result, conclusion and suggestion.
  - 12.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't use to find investigation report that possible for ambiguity.
13. Question about Subcontracting
  - 13.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't have subcontracting or person from outsource that work in crime scene investigation bodies.
  - 13.2 In case of abnormal crime scene or needs for specialist expert that crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences will coordinate activities with outsource that are teacher in university or engineering association, etc.
14. Question about Complaints and Appeals  
Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences don't find complaints and appeals that if may be happen will use to examine and set committee for investigate and operation.
15. Question about Co-operation

15.1 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have participated in the exchange of experiences every month.

15.2 Crime scene investigation bodies of The Royal Thai Police Office of Forensic sciences have participated in the exchange of experiences with similar organizations in sometime.



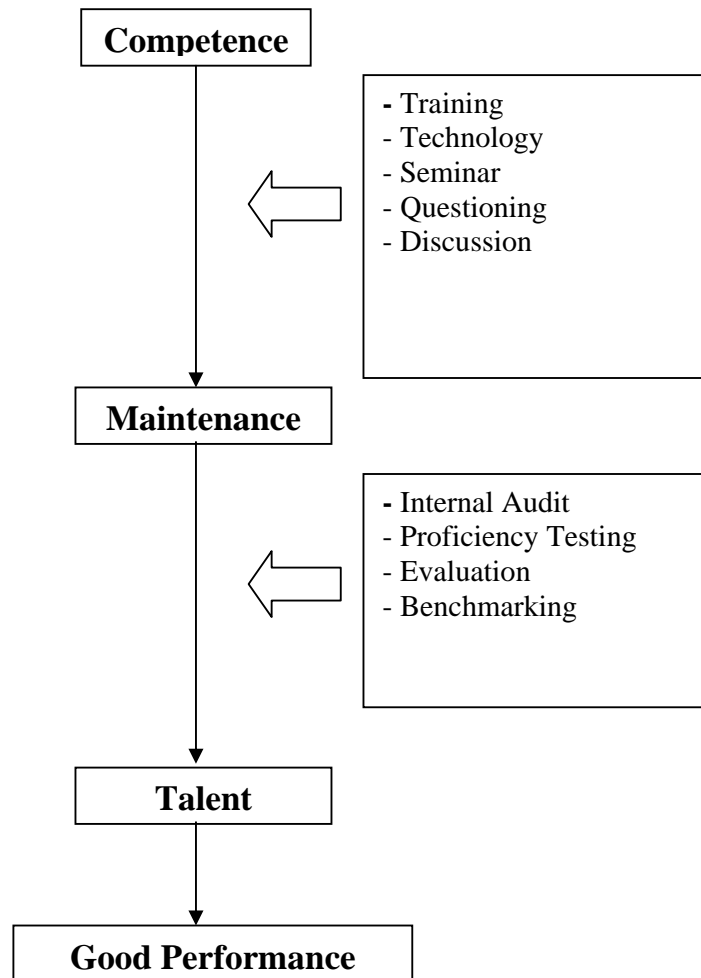


Figure1: **Model of Quality System for Ensuring Crime Scene Investigator's Competency.**

### Discussion and Conclusion

In addition to encourage implementation of ISO 17020 for application in crime scene investigation would make crime scene investigation meet standard. Because ISO 17020 is the standard internationally accepted by every organization performing inspection by meeting the ISO 17020 criteria, will help to demonstrate that ensure quality system. And additions to competency of crime scene investigation body for go to international standard. It can use to ask for accreditation the next time. Finally, when we use ISO 17020 and international standard of crime scene investigation create

to quality system that will help to ensure competency in crime scene investigation practitioners. This result will be increase efficiency and effectiveness that will relate to productivity and good service. This is crime scene investigation body development.

However, result of crime scene investigation will be good then it come from practitioners and system or management of crime scene investigation bodies that related with quality system, competency and ISO 17020 that cannot separate. Quality system will ensure quality performance in addition to ensure competent too. Which, competency is direct relation with practitioners. Competent practitioners will create quality performance. In part of ISO 17020 will ensure standard of inspection bodies for admitting of clients and universal. Then, this research will be usefulness to crime scene investigation bodies of the Royal Thai Police Office of Forensic science. That has quality system to fit one for ensuring crime scene investigator's competency and using this model easy for implementation too.

From literature studies-and in-depth interview result, a model of quality system for ensuring crime scene investigator's competency is proposed as shown in Figure 1. Main task of the crime scene investigation team is to, firstly, assess the crime scene being investigate, then plan and decide on the examination strategy before performing examinations and collecting evidence using recovery procedures as required as part of the crime investigation process; lastly, examinations would then be reviewed and re-analyzed as necessary. (ENFSI 2008) According to ENFSI QCC Competence Assurance Project (CAP) Group which issued the "Performance Based Standards for Forensic Science Practitioners" (ENFSI 2004) Which competence of investigator would be happened that have many factor that is investigator and from organization. Then the first time recruitment would have qualification need to be graduated in science. Before operation that need to orientation for to know about role and many task in work place and must train for adjust base on knowledge to match with function and task in that position for they can work. Training is process that will make trainee has knowledge, understanding, attitude, experienced and change behavior follow objective that determination. Training is the one thing from many things of human resource development in organization. Then crime scene investigation bodies would set training always and systematic for addition knowledge and skill. It make investigator can use in their job. In addition to it help to problem solving and reduce error in operation. Chief would control and coaching for practice closely. This can evaluate competency of investigator too. When investigators have complete quality already then they can promote to be investigator competence who can examine and doing investigation report. Performance appraisal that is evaluate value of person in many side almost performance and other characteristic that is value to operation in limit time that help to manage efficiency. Performance appraisal has 4 tools that are job description, standard operating procedure, performance appraisal format and person regulations about Performance appraisal which it makes evaluation is accurately that is accept by practitioners. Investigator would be obtained development for competency increasingly by use job description for guideline to work suitable position. And use Standard Operating Procedure (SOP) that is document about step by step of right operation. It make everybody can operate reliably and reproducibility. Standard Operating Procedure (SOP) can be used in training for new person that use tools or can operate right that it is quality and good service. Chief would observe and support by tools and equipment for comfortable in job. Chief would use strategic

planning that strategy is planning to implementation for achieve target subject to analysis suitable environment or strategy analysis that is analyze strange, weakness, opportunity and threat in period time. When Investigators is competence that know from evaluation that they would plan in crime scene investigation well and understanding in job that use reasoning for examine and report in addition to Application knowledge and can problem solving. In addition to preservation and control actions at the scene that have strategic in examine and can evaluate scene, importance thing that is examine scene well. Not only would that investigator manage about evidence for example collect, maintain, package and store items and sample. Investigator must interpret about crime scene and can analyses and sequence event. Investigator would decide on which items and samples are to be examined further. Finally, would record, reports and present to courts. (ENFSI 2004)

The role of organization that is helped maintenance competency of investigators by many methods such as training for update knowledge and use new technology in job. Discussion is importance thing in work place that chief would take part and set questioning to ask practitioners about reason and can evaluate too. Crime scene investigation bodies would be seminar with other organization for exchange Experian in similar work or bring knowledge to use in investigation. Maintenance competency of investigators that could be develop person to be talent that is professional in investigation by internal Audit always and use proficiency testing frequently for check about maintenance competency of investigators that relate with performance. Crime scene investigation bodies would evaluate in other side and use benchmarking with other organization that work the same for knows about best practice. Finally, it will be good Performance, efficiency, effectiveness and good service too.

## **Suggestions**

From Literature review, result, discussion and conclusion that had proposed model of quality system for ensuring crime scene investigator's competency. Which competency of investigator will be happened that have factor 2 parts that is investigator and from organization. Competency in investigator contain as knowledge and skill. Crime scene investigation bodies need to orient and training for investigator always and systematic. Other things would be coaching and evaluate competency of investigator. Crime scene investigation bodies must set job description and Standard operating procedure (SOP). Chief would use strategy about observing, support equipment, technology, internal audit and proficiency testing for investigator. Crime scene investigation bodies need to discussion in job and seminar almost internal or external. Finally, would to be benchmarking with other inspection bodies that work the same. In addition to characteristic of good investigator are planning, understanding, reasoning, application, problem solving, preservation and control scene, strategic and evaluate scene, examine scene, manage about evidence, interpret, analyses and sequence event, decide, record, and present to courts.

In addition, training programs and activities to capacity build and maintain competency of crime scene investigator may be suggested. These are preparing for sustainable plan in human resource an organization development in the future.

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