

IMPROVEMENT OF INFORMATION QUALITY IN DIGITAL FORENSIC GUIDELINE TO  
INCREASE USER SATISFACTION AT DIGITAL FORENSIC DEPARTMENT MCMC

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IMPROVEMENT OF INFORMATION QUALITY IN DIGITAL FORENSIC  
GUIDELINE TO INCREASE USER SATISFACTION AT DIGITAL FORENSIC  
DEPARTMENT MCMC

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## **DEDICATION**

All praise and thanks is due to Allah SWT for His blessings, benevolence, and guidance at every stage of our life.

This research wholeheartedly dedicated to my wife, children, parents, supervisor, lecturers, ALPS members, DFD personnel, and MCMC who have been my source of inspiration and gave me the strength and guidance morally, spiritually, emotionally, and financially.

To anyone involved and aware of this research,  
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## ABSTRACT

This research focuses on improvement of information quality in digital forensic guideline to increase user satisfaction at Digital Forensic Department (DFD) Malaysian Communications and Multimedia Commission (MCMC). Due to the lack of clear guidelines, most users of digital forensic services at MCMC DFD fail to supply adequate documents and information when requesting digital forensic support. As a result, the problem has disrupted the digital forensic analysis process and has left its users dissatisfied because their cases were not accepted. There are three objectives in this research: To identify the documents and information that are most often not supplied when applying for digital forensic support, to identify the improvement of the quality of the information in the new digital forensic support application guideline, and to measure the user satisfaction when following and using the improved guideline. The interview session was conducted involving 3 personnel from MCMC DFD and the data was analyzed using NVivo. The questionnaires distributed pre-intervention and post-intervention to 15 investigation officers that using MCMC DFD services this year to assess level of information quality with the user satisfaction, and data was analyzed using SPSS for descriptive analysis and to measure the improvement. The results of the interview found out that the factors contributing to the problem is in terms of lacking in documents and information when requesting for digital forensic support. From the analysis, the data from pre and post intervention shows improvement of information quality in the new guideline and user satisfaction. The research shows the importance of the information quality in the digital forensic support request guideline. The research will lead to the improvement of user satisfaction and MCMC DFD digital forensic services. The conducted research may serve as a model for other research and services by replicating the study procedure or intervention program.

**Keywords:** Information Quality, User Satisfaction , Services, Improvement,

## ABSTRAK

Kajian ini memfokuskan kepada peningkatan kualiti maklumat di dalam garis panduan forensik digital untuk meningkatkan kepuasan pengguna di Jabatan Forensik Digital (DFD) Suruhanjaya Komunikasi dan Multimedia Malaysia (SKMM). Disebabkan oleh garis panduan yang kurang jelas, beberapa pengguna perkhidmatan forensik digital di MCMC DFD gagal memberikan dokumen dan maklumat yang mencukupi apabila memohon bantuan forensik digital. Oleh kerana itu, masalah tersebut telah menyebabkan proses analisis forensik digital terganggu dan penggunaanya tidak berpuas hati kerana kes mereka tidak diterima. Terdapat tiga objektif dalam penyelidikan ini: Untuk mengenal pasti dokumen dan maklumat yang paling sering tidak dibekalkan ketika memohon bantuan forensik digital, untuk mengenal pasti peningkatan kualiti maklumat dalam garis panduan aplikasi sokongan forensik digital baru, dan mengukur kepuasan pengguna semasa mengikuti dan menggunakan garis panduan yang ditambah baik. Sesi temu ramah dilakukan bersama 3 orang pegawai dari SKMM DFD dan data dianalisa menggunakan NVivo. Soal selidik pra-intervensi dan pasca-intervensi diedarkan kepada 15 pegawai penyiasat yang menggunakan perkhidmatan SKMM DFD tahun ini untuk menilai tahap kualiti maklumat dengan kepuasan pengguna, dan data tersebut dianalisa secara deskriptif menggunakan SPSS untuk mengukur penambahbaikan. Hasil temu ramah mendapati bahawa faktor yang menyumbang kepada masalah tersebut adalah dari segi kekurangan dokumen dan maklumat ketika meminta bantuan forensik digital. Hasil analisa data dari pra dan pasca intervensi menunjukkan terdapat penambahbaikan kualiti maklumat di dalam garis panduan baru dan juga kepuasan pengguna. Kajian menunjukkan pentingnya kualiti maklumat dalam garis panduan permintaan sokongan forensik digital. Kajian ini juga akan menambahbaik kepuasan pengguna dan perkhidmatan forensik digital MCMC DFD. Kajian yang dijalankan boleh dijadikan sebagai model untuk penyelidikan dan perkhidmatan lain dengan mengikut prosedur atau program intervensi kajian ini.

**Kata Kunci:** Kualiti Maklumat, Kepuasan Pengguna, Perkhidmatan, Penambahbaikan

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## LIST OF ABBREVIATIONS

MCMC	-	Malaysian Communications and Multimedia Commission
DFD	-	Digital Forensic Department
MCMCA	-	Malaysian Communications and Multimedia Commission Act
CMA	-	Communications and Multimedia Act
PSA	-	Postal Services Act
STA	-	Strategic Trade Act
PSA	-	Postal Services Act
DSA	-	Digital Signature Act
HQ	-	Headquarters
3R	-	Royal, Religious, Racial
SOSMA	-	Security Offenses (Special Measures) Act
POTA	-	Prevention of Terrorism Act
POCA	-	Prevention of Crime Act
PDRM	-	Polis DiRaja Malaysia
MACC	-	Malaysian Anti-Corruption Commission
IS	-	Information System
LEA	-	Law Enforcement Agencies

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This research aims to improve information quality in the digital forensic guideline to increase user satisfaction at Digital Forensic Department (DFD) in Malaysian Communications and Multimedia Commission (MCMC). MCMC is a Malaysian regulatory body tasked with regulating the communications and multimedia industries according to the authority granted by the Malaysian Communications and Multimedia Commission Act (MCMCA) 1998, the Communications and Multimedia Act (CMA) 1998, the Postal Services Act (PSA) 1991, the Strategic Trade Act (STA) 2010, and the licensing of certification authorities under Digital Signature Act (DSA) 1997. MCMC regulates and promotes the communications and multimedia industries, including telecommunications, broadcast, social media, Internet services, postal and courier services, and digital certification, while delicately balancing the aggregate interests of consumers, industry, and government.

The MCMC's ten primary functions include assisting and fostering cooperation and coordination among agencies, corporations, industries, and individuals involved in communications and multimedia operations. To ensure that these functions implemented, DFD established to provide technical assistance in matters and investigations related to communications and multimedia. DFD is one of the departments that exist in MCMC and it is located under the Network Security Division under Regulatory Sector. DFD provides technical expert assistance such as digital forensic support, data preservation, on-site first responders, data recovery, and training to MCMC as well as other agencies.

Digital forensic is one of the branches in forensic science that inspect, identifies, analyses, and preserve the digital evidence locate from any types of electronic devices. Digital forensics practices using scientifically derived and proven

methods of preservation, identification, extraction, and documentation of computer to ensure evidence is admissible and presented in the court of law.

This chapter will discuss the company's history, the problematic situations that arise within it, the research questions and objectives, the researcher's role, ethics, the theoretical and practical implications of the proposed research, and term definitions.

## **1.2 Case Company Introduction**

MCMC is one of the statutory bodies that established on 1 November 1998 under MCMCA 1998. Initially, MCMC was located at Putra World Trade Center, Kuala Lumpur, and started operating in Cyberjaya, Selangor, in 2005. Then in 2015, MCMC started operates at MCMC Tower 1, but DFD still operates at MCMC Old HQ. Starting with only 10 staff, MCMC now has about 831 staff with five sectors, approximately 20 divisions and 70 departments, and offices in each state.

MCMC established the DFD in 2012. Initially, the DFD only had the strength of two people led by Mr Rahmat Abu Nong and Mr Masrudy Ismail. Currently, Mr Masrudy Ismail started leading the DFD in May 2021, replacing Mr Rahmat with workforce strength of fourteen people. There are four units in the DFD, namely operations, data preservation, first responder, and quality. The operations unit conducts DFD's basic operations of digital forensics and case management, while the data preservation unit conducts data or content preservation processes especially content posting on social media sites, and first responders provide on-site technical support during inspection or raid operation. The quality unit is responsible for ensuring that all operations in digital forensic laboratories meet the accreditation requirements of MS ISO/IEC 17025:2005 under the Malaysian Laboratory Accreditation Scheme (SAMM).

Digital forensics at DFD divided into two branches, namely computer forensics and mobile device forensics. Computer forensics covers the identification, preservation, collection, analysis, and reporting of evidence found on computers, laptops, and storage media or devices supporting investigations and legal proceedings. Mobile devices forensics refers to the recovery of electronic evidence from mobile

phones, smartphones, SIM cards, PDAs, tablets, and game consoles. At this point, digital forensic services only focus on investigations for offences under the CMA 1998, 3R (Royal, Religious, Racial), national security, and public interest.

Section 233 of the CMA 1998 stated that a person who uses any network facilities (e.g., communication or broadcasting facilities) or network service (e.g., Internet, mobile data, or etc.) or applications service (e.g., social media applications, multimedia messaging service, or etc.) knowingly makes, creates or solicits and initiates the transmission of, any comment, request, suggestion or other communication which is obscene, indecent, false, menacing or offensive in character with intent to annoy, abuse, threaten or harass another person or initiates a communication using any applications service, whether continuously, repeatedly or otherwise, during which communication may or may not ensue, with or without disclosing his identity and with intent to annoy, abuse, threaten or harass any person at any number or electronic address, commits an offence.

### **1.2.1 External Environmental Analysis**

The main factor that will have an effect and impact on the use of digital forensic support is cybercrime. Cybercrimes is also indirectly involved in communication and multimedia activities. Cybercrimes are mostly investigated under the Communications and Multimedia Act 1998 (CMA), the Computer Crimes Act 1997 (CCA), the Penal Code and other law (Mohamed, 2012). Generally, cybercrime associated with any crimes committed using technologies, the internet, network, computer and any communication devices as an instrument or apparatus to commit those crimes (Mohamed, 2013). There are about eight categories of cybercrime in Malaysia and one of them is content related cybercrime (Jayabalan, 2014). Content-related cybercrime is the crime of relating content that has been created and uploaded through any application linked through the internet. Evidence of cybercrime can only be obtained through digital forensic services, data preservation, and first responders under section 45 of the Evidence Act 1950.

The digital forensic industry, and more specifically the MCMC DFD, can be further analyzed using the PEST Analysis, which incorporates Political,

Environmental, Social, and Technology factors. These factors can be used to assess the impact on organizations such as the Ministry of Communications and Multimedia and the MCMC, which regulate the Malaysian communication and multimedia industries. The external environmental analysis using PEST is described in Table 1.1 below.

Table 1.2 The PEST Analysis

Factors	Opportunity	Threat
<p><b>Political factor:</b> The direction of cybercrime is determined by the political circumstances that shape the country's governance. The government can enact laws related to offences committed over the Internet based on the current situation.</p>		✓
<p><b>Environmental factor:</b> Courts in Malaysia still refer to documents and their copies printed on paper.</p>		✓
<p><b>Social factor:</b> Internet users and usage are increasing every year.</p>		✓
<p><b>Technology factor:</b> Increased security levels for devices, operating systems, and even applications for each new device as well as updates.</p>		✓

### 1.2.1.1 Political Factor

The ruling political party has the authority to draught and implement all policies, including legislation, economic policies, and other policies (Shin & Aslam, 2013). In May 2018, after the 14th general election was over, the Malaysian government ruled by Barisan Nasional for 60 years was taken over by Pakatan Harapan with 121 seats in Parliament. Subsequently, the Pakatan Harapan government imposed

a moratorium on several acts such as the Sedition Act 1948, Section 223 CMA 1998, Security Offences (Special Measures) Act (SOSMA) 2012, Prevention of Terrorism Act (POTA), and Prevention of Crime Act 1959 (POCA). However, in 2019, the acts were re-enforced as there was an increase in crime related to the acts. Indirectly, government action will disrupt the work of the DFD where there is an influx of new cases, and the evidence is likely to be challenging to find.

#### **1.2.1.2 Environment Factor**

In the Evidence Act 1950, document evidence is evidence that a Prosecutor or Lawyer can submit for examination by the Court, and it is called documentary evidence. According to Yahya et al. 2020, a document is also defined as a statement made or a note made on official paper, paper, sealed, or otherwise written by an authority or judge or ordinary citizen. Although Courts in some countries have begun to move to paperless, there has been no effort in that direction in Malaysia yet. The thickness of the documents issued by the DFD analyst often depends on the number of exhibits and objectives of the case, where the report will be thicker if the exhibits and objectives of the case are many. The use of paper will indirectly lead to increased deforestation and environmental pollution.

#### **1.2.1.3 Social Factor**

In terms of social, based on the 2020 Internet User Survey conducted by MCMC, 88.7% of the total population in Malaysia has access to the Internet, which is about 33.49 million users. Of that number, 28.6% use the Internet for 5 to 8 hours, 24.9% use the Internet for 1 to 4 hours, 21.5% use the Internet for 9 to 12 hours, 11.5% use the Internet for more than 18 hours, 9% use the Internet for more than 13 to 18 hours, and 1.3% use the Internet for less than 1 hour. Based on the survey that has been made also found that 98.7% access the internet through smartphones, 37.9% access through mobile computers, and 16.2% through desktop computers. While the most popular online activities were text communication by 98.1%, social media by 93.3%, video watching by 87.3%, voice/video communication by 81.1% and 74.3% was to seek information. Although there has been an increase in internet users and usage, the share of online content is 19% when compared between 2020 and 2018. However, the

number of cases that need to be resolved by the DFD increases every year as shown in the figure below.

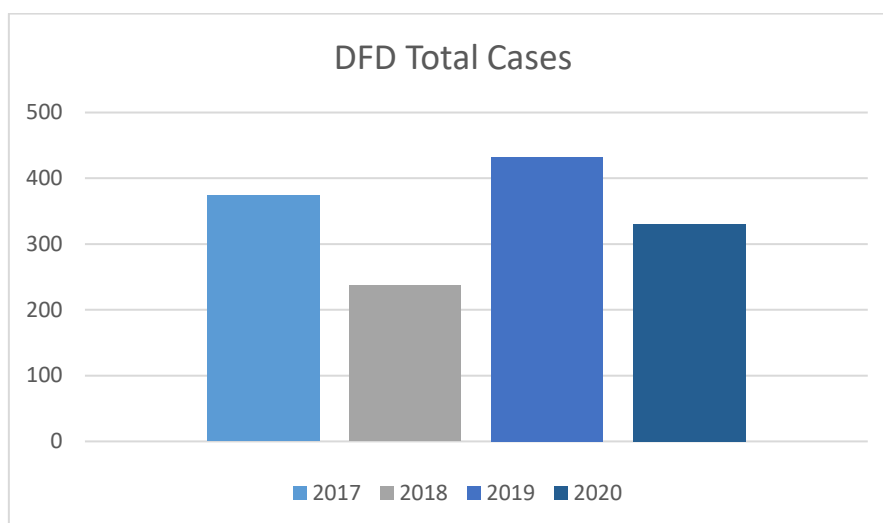


Figure 1. 2 The total case received by DFD

#### 1.2.1.4 Technology Factor

In terms of technology, the widespread adoption of new technologies in computers, laptops, and mobile devices and their increasing functionality have compelled both businesses and consumers to depend on these devices for daily tasks. The huge increase in smartphone usage and the incorporation of enterprise-level mobile applications have raised significant security concerns, which lead to the new security enhancement like fine-grained policies model, policy management and usability, non-by-passable and tamper resistance, minimal code-base changes, and open-source distribution (Khan et al., 2012). These security features are indirectly likely to interfere with the digital forensic process.

#### 1.2.1.5 Conclusion

Based on the analysis made, many threats will lead to an increase in cybercrime cases and lead to a rise in cases requiring digital forensic analysis. To facilitate all matters and investigations, the processes that are in the process of digital forensics need to be improved.

#### 1.2.2 Internal Environmental Analysis

Internal environmental analysis of an organization identifies both its strengths and weaknesses. Internal analysis can be accomplished by determining the organization's current situation and environment, which may include human resources, tangible and intangible assets, management, and operational efficiencies. The DFD's internal strengths and weaknesses in terms of digital forensics services can be evaluated further to substantiate the findings, as shown in the table below.

Table 1. 3 The Internal analysis

Factors	Strength	Weakness
<b>Marketing Assessment</b> The forensic digital analysis reports issued by DFD are very detailed and easy to understand, causing many agencies to trust the services provided by DFD MCMC.	✓	
<b>Process Assessment</b> Digital forensic tools and devices are easy for analysts to use because most use automated systems	✓	
<b>Financial Assessment</b> License prices for digital forensic training, devices, and tools increase annually.		✓
<b>Operations Assessment</b> The staff is primarily minimally trained analysts, especially those involving digital forensic certification.		✓
<b>Quality Assurance</b> Governed by general requirements of MS ISO 17025:20015 through Quality Management System.	✓	

The main strengths of DFD are based on the reports issued by DFD analysts based on the marketing assessments made. Most of the reports issued by the DFD are

detailed and easily understood by any person, including investigating officers, prosecutors, lawyers, and even judges. However, the report's details are based on the objectives of the case given by the investigating officer. The more detailed the case objectives, the more evidence, and information the DFD analyst will seek. Besides, the convenience of digital forensic tools and software is also one of the strengths that DFD has. Digital forensic tools and software carry out the identification and collection process automatically. After the process of identification and data collection is completed, the forensic analyst will carry out the process of extraction, analysis, and presentation of the evidence contained in the exhibit using the same tools and software. In addition, the work in the DFD is monitored by Quality Assurance officers to ensure that all work complies with the standards set out in MS ISO 17025: 2005 and best practices. Quality assurance enables a business to meet the demands and expectations of its customers. High quality fosters customer trust, reduces costs, resolves issues before they become more prominent, and contributes to establishing and maintaining quality standards by preventing problems in the first place. Effective quality assurance procedures instill pride in both business owners and employees. Due to the strength that DFD has, most agencies choose MCMC DFD to do digital forensic analysis for their cases such as Polis DiRaja Malaysia (PDRM), Malaysian Anti-Corruption Commission (MACC), and others.

However, MCMC DFD also has some weaknesses that have been identified. First of all, the cost of purchasing or renewing a license for a digital forensic tool and software is high, reaching tens of thousands. These costs are also seen to be rising at an average rate of almost 15% per year. With this increase, DFDs may face difficulties in acquiring new assets in facilitating their work. In addition, the cost of training and certification of analysts is also quite high and increases every year. The certification of the use of digital forensic tools and software is very high when compared to the usual digital forensic training. Because of this, there is some DFD staff, especially digital forensic analysts, who are minimally trained, and some no longer have the proper certificates. In addition, the certification also needs to be updated all the time as there are changes in technology as well as a variety of new cases.

### **1.2.3 SWOT Analysis**



Based on the external and internal analysis that has been made on MCMC DFD, especially in digital forensics, the strengths, weaknesses, opportunities, and threats that exist are shown in the table below.

Table 1. 4 The SWOT Analysis

STRENGTH	WEAKNESS
<ul style="list-style-type: none"> <li>- DFD digital forensic reports are detailed and easy to understand</li> <li>- Availability of the digital forensic tools and software</li> <li>- Quality assurance of all processes in the DFD</li> </ul>	<ul style="list-style-type: none"> <li>- Some of the DFD digital forensic analyst are minimally trained</li> <li>- The cost of license and certification of digital forensic are high and increasing every year</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>- Digital forensic-related knowledge is growing and expanding based on prolonged case handling experience</li> </ul>	<ul style="list-style-type: none"> <li>- The process of digital forensic analysis is likely to take longer with technological innovations</li> <li>- Political interference is likely to disrupt and add to the work of the DFD</li> <li>- Has a slight adverse effect on the environment</li> </ul>

In conclusion, the SWOT analysis does not directly contribute to the problems in this research. Still, it is supporting information that will help the need for this research because there are still weaknesses and threats that need to be addressed and dealt. In addition, this SWOT analysis also shows the current state of digital forensic services offered by MCMC DFD.

### 1.3 Problem statement

Cybercrime-related cases, especially content-related crime cases, are on the rise with the new application created and available quickly, such as social media applications, chat applications, and other applications that enable connected communication and multimedia that exist in this world. Although MCMC DFD has

the expertise to analyze cases related to such applications with the availability of knowledgeable analysts and sophisticated tools, but most investigating officers from other agencies do not have extensive knowledge of the features and functions of such applications. The investigation officer's knowledge about the case to be investigated is fundamental because the case must prove every element stated in a section of an act to convict or acquit a person of a crime that has been committed. To fulfill those elements, the objective of the case supplied by the investigating officer is critical to ensure that the digital forensic analyst obtains the evidence relevant to the case without interfering with the other information that exists in the exhibit. Cybercrime investigation requires a framework that keeps pace with rapidly evolving technology and being confronted by criminals who use digital technologies, particularly mobile devices, and social media (Mir et al. 2016). To ensure that the cybercrime investigation process runs smoothly, DFD also needs to provide quality guidelines and easily updated with the passage of time and technological development. According to Michaelidou et al., (2011), information is one of the fundamental components of marketing in the B2B sector. DFD must provide a complete information about their needs in the guidelines to ensure that all documents, information, and objectives supplied by investigating officers are complete. The documents, information, and objectives typically required to initiate and complete digital forensic analysis are as shown in Table 1.4.

Table 1. 4 The digital forensic requirements

Type	Requirements
Document	<ul style="list-style-type: none"> <li>- Representative letter (if the representative of the investigating officer who sent the exhibit)</li> <li>- Request letter</li> <li>- Attachment related to the case</li> <li>- First digital forensic report (for second opinion)</li> <li>- Handover/receipt declaration form</li> </ul>
Information	<ul style="list-style-type: none"> <li>- Investigation paper / report / complaint number</li> <li>- Sections and offenses act</li> <li>- Exhibit related information</li> <li>- Password set on exhibit</li> </ul>
Objective	<ul style="list-style-type: none"> <li>- Information to search for in the exhibit</li> </ul>

	<ul style="list-style-type: none"> <li>- Content or data needs to be extracted</li> <li>- Proof of whether the exhibit was used to make the matter under investigation (e.g. uploading process)</li> </ul>
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At this point, DFD MCMC has released the MCMC Digital Forensic Laboratory Handbook as a guide to anyone who wants to use its services. The book presents relevant information of introduction of DFD, investigation under the CMA 1998, DFD services, DFD clients, standard procedures, and evidence handling procedures. However, problems still arise, especially for new investigating officers from other states where they fail to supply adequate documents and information. Sometimes they also do not know that they need to make an appointment first before applying for digital forensic support. When they fail to meet the conditions and procedures set by the DFD, they will feel dissatisfied.

### 1.3.1 Problem Diagnosis

This research will use Ishikawa (fishbone) diagrams, to explain in more detail the causes and effects faced by case investigating officers who wish to apply for MCMC DFD digital forensic support as shown in Figure 1.2.

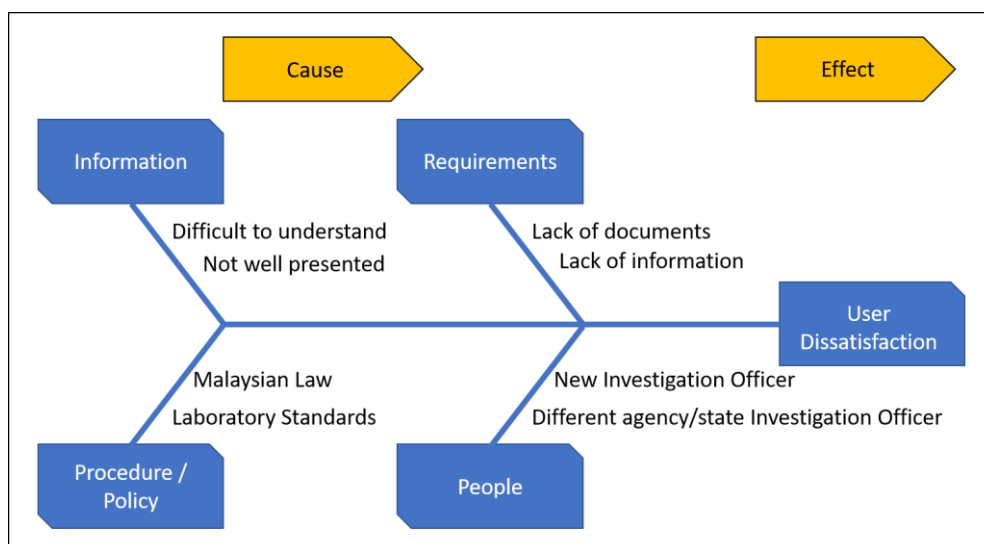


Figure 1.2 Fishbone Diagram for Problem Diagnosis

The figure shows the root causes of the dissatisfaction of users of MCMC DFD's digital forensic services when they want their exhibits analyzed. There are four main factors contribute to the problem: information, procedures, policies, requirements, and people. For information, although MCMC DFD has prepared a handbook to help the investigation officers prepare the documents and objectives of the case, the information provided is not detailed and only covers the essential parts. The information provided in the handbook is not well presented and challenging to understand by new users. The second factor contributing to user dissatisfaction is the procedures and policies that the MCMC DFD laboratory has set. The prescribed procedures are not flexible and need to follow by all people who use MCMC DFD services as they related to the set standards and Malaysian law. The next factor is the requirements for documents and information by MCMC DFD to initiate and conduct analysis of the exhibits submitted to MCMC DFD based on the investigation conducted by the investigating officer. The required documents are crucial, as those documents will provide support to the MCMC DFD analysts when testifying in Court. In addition, such documents are required as records to meet standard operating procedures set by the DFD. The information in the documents must also be detailed and clear to facilitate the analyst to make the analysis efficiently and meet all the requests and purposes of the investigation conducted. The last factor is the people, i.e., the investigating officers who use MCMC DFD's digital forensic services. Although MCMC and PDRM have enforcement and investigating officers, only a few will use digital forensic services, such as officers from the Content Unit of the MCMC Investigation Department and the PDRM Commercial Crime Investigation Department. Yet, at some point, officers from other units transferred to units that require them to use digital forensic services. Problems will arise if they do not understand and continue to do work without guidance and blindly. Typically, these new officers do not supply adequate documents, and the objectives of the case are not explained and detailed.

### **1.3.2 Theoretical Gaps**

Any research conducted should contribute to the advancement of knowledge in a particular field of work. The research results or outcome should impact the industry and be applicable outside the context of the research. Based on searches and

analyzes made through the Web of Science, 26 research publications related to the improvement of digital forensic processes. However, only five areas are closely related to digital forensics Computer Science Information Systems, Computer Science Interdisciplinary Applications, Computer Science Theory Methods, Computer Science Artificial Intelligence, Computer Science Software Engineering, Management, Development Studies, and Education Educational Research as shown in Figure 1.3.

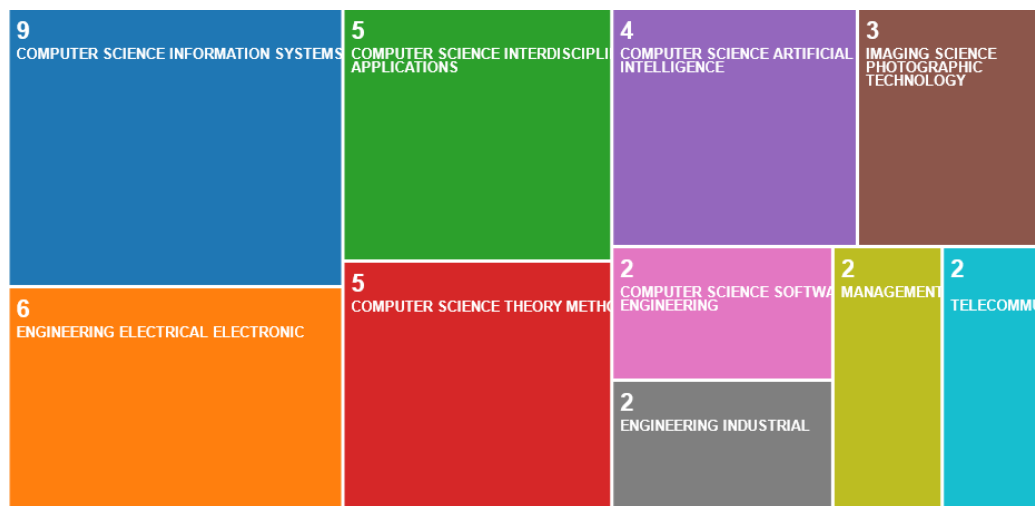


Figure 1. 3 Tree Map Topic relate on Digital Forensic Services

In addition, the Web of Science also shows that most of the research publications related to the improvement of digital forensic processes are from America, England, India, Italy, and Russia, and there is one publication issued from Malaysia. Southeast Asia also does not produce many such research publications.

### 1.3.3 Practical Gaps

The topic that chosen for the research plays a significant role to the MCMC DFD digital forensic support user. The research will lead to the improvement digital forensic service delivery towards user's satisfaction that require digital forensic support from MCMC DFD. Even though MCMC DFD rarely receives complaints related to the reports issued, but the level of user satisfaction of MCMC's digital forensic services must be maintained in order to maintain the good name of MCMC as a whole. Many studies conducted internationally aim to improve digital forensic methods, but sometimes they cannot be applied to all countries because the laws in

each country are different. Nevertheless, studies related to process improvement and digital forensic services can be used by any organization nationwide.

#### **1.4 Research Questions**

After developing the problem statement, the research questions considered the active step in this research. It is critical to direct the research's flow, indicate what to look for, and establish a clear purpose. As a result, the research questions for this research include the following:

Research Question 1:

What are the documents and information that are most often not supplied when applying for digital forensic support?

Research Question 2:

Is there an improvement in the information quality in the intervention carried out?

Research Question 3:

Does the improved information quality in the new digital forensic guideline can increase user satisfaction?

#### **1.5 Research Objectives**

The development of the research's objective is inextricably linked to the research questions. The research objectives should be attainable, transparent, and verifiable, as they contribute directly to answering the research questions. As a result, the objectives of this research consist of the following:

1. To identify the documents and information that are most often not supplied when applying for digital forensic support.
2. To identify the improvement of the quality of the information in the new digital forensic support application guideline.

3. To measure the user satisfaction when following and using the improved guideline.

## **1.6 Researcher's Role**

The researcher plays a critical role in ensuring the quality of this research. This action research project can aid the organization or department develop and provide superior service to their user. Due to the fact that this research is being conducted while the organization employs the researcher, the researcher will require assistance from the Head of Department and the Quality Manager of MCMC DFD. The researcher is responsible for clarifying the methodology, data collection and proposing implementation strategies to improve the digital forensic guideline. The researcher desired to make a positive impact on the department and organization.

## **1.7 Research Ethics**

Ethics are moral rules and standards that guide us in upholding the values we hold dear. The researcher will conduct this research ethically. The researcher will consider all potential ethical issues carefully during the studies conduct, organize, and structure the research so that unethical errors avoided. Perhaps the most foundational ethical issue in research is how research participants are treated. It entails preventing physical or psychological harm to research participants. All records and data kept private and confidential and used solely for the purposes of this research. The researcher is also responsible for maintaining the confidentiality of information categorized as confidential information through consultation with the MCMC DFD Quality Manager.

## **1.8 Significance of the Research**

This research done to improve one of the processes and workflows in the organization. By identifying the existing problems, this research will also suggest an intervention to improve the process and, to some extent, solve the current issues. This research also indirectly contributes to the organization and the community.

### **1.8.1 Significance to Theory**

The study of process improvement never stops, and it is done to find the most effective way to improve the process and at the same time save time and cost. Many studies, methods, models, and theories used in enhancing processes; however, this research focuses on improving the quality of the information in improving processes. Almost all services in the world need quality information to plan and respond to the changes brought about by information technology in their respective industry sectors. This research can also, to some extent, contribute to the existing process improvement models and fill the theory gap.

### **1.8.2 Significance to Practice**

Now, the rapid development of information and communication technology will also contribute to cybercrime. In the fight against cybercrime, digital forensic services are one of the essential factors. In Malaysia, almost all law enforcement agencies have digital forensic services and other forensic services such as corpses, firearms, and accounting. Although this research only focuses on the early part of the initial process, improving digital forensic processes and services can contribute to the knowledge to improve processes that are very similar to the processes practiced by digital forensics and fill the practical gap.

## **1.9 Definition of Terms**

**Digital forensic -** The process of preserving, identifying, extracting, and documenting computer evidence that can be used in a court of law. It is a branch of science concerned with obtaining evidence from digital media such as computers and mobile or smartphones. (Carrier, 2003)

**Guideline -** A statement or explanation that serves as a guide when establishing standards or deciding on a way to proceed. A guideline standardizes specific processes following a



predetermined routine or accepted practice. (Oxman et al., 2006)

**Information** - A set of knowledge received or communicated about a particular statement or occasion. (Madden, 2000)

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