ABSTRACT

This study investigates the nationwide implementation of an information technology project conducted for the Royal Thai Police. In an attempt to enhance efficiency and transparency, the Royal Thai Police decided to implement CRIMES (Criminal Record and Information Management Enterprise Systems) for all police stations in Thailand. This project was the largest IT project ever undertaken by any law enforcement agency in Thailand. CRIMES was intended to increase the police stations’ efficiency and productivity. CRIMES consists of five primary functions, including data centralization, search functions, warning and alert systems, statistical analysis and reporting systems, and data management systems. This study explores issues related to the implementation of CRIMES. The CRIMES project faced many obstacles, including scope creep, incomplete information, data fragmentation, data migration, outdated technology, and heavy user resistance. The lessons learned from this project may be used to guide the development of large-scale IT projects for any law enforcement organization.

KEYWORDS

large-scale information technology project, police information systems, information technology project in public organizations

1 INTRODUCTION

One of the most important facets of the management of information systems is project management. The literature indicates that 30-40 percent of IT projects fail (Dennis, 2012). These failures are due to several factors, such as cost and time overruns, the failure to perform as specified, the failure to meet essential business requirements, the failure to provide organizational benefits, and complicated and poorly organized user interfaces (Dennis, 2012). In addition, there has been much research and many cases concerning the implementation of information systems projects in private organizations, but there has been little research or cases on the implementation of information systems projects in public organizations (Williams & Aasheim, 2005). This case explores managerial and technical issues that public organizations face when implementing a large-scale information systems project.

In 2012, Police General Adul Saengsingkaew was appointed to be the National Police Chief of the Royal Thai Police. The Royal Thai Police has been in crisis for several decades due to high corruption and inefficiency in work systems. After his appointment in September 2012, General Adul decided to reengineer the police systems through the use of information technology. The Royal Thai Police thus launched the largest-scale information systems project ever to be implemented in the organization. The new information system was called CRIMES (Criminal Record and Information Management Enterprise Systems). CRIMES aimed to streamline work systems used by all police stations in Thailand. The government allocated 293 million baht (approximately 10 million dollars) for the project. The new systems aim to reduce duplicate work in 1,400 police stations by digitizing all documents and providing a centralized database whereby information may be shared among all police officers. CRIMES also provides a statistical analysis function that police officers may use for planning and managing resources in police stations. CRIMES promised to change not only the police systems’ technology but also their processes, people, and structure. CRIMES was also intended
to reduce corruption among police officers by creating transparency in the systems. However, this change was not easy. Most users resisted the new systems. Some users were accustomed to working with pen and paper and did not want to learn new skills. Others felt uncomfortable using a computer. Some users believed that the new system was intended to catch their mistakes. In addition, the information in CRIMES overlapped with other legacy systems, and this overlap created confusion among users because they were required to enter the same information into many systems at the same time. Moreover, the organizational structure of the Royal Thai Police has traditionally been a bureaucratic, quasi-military organization rather than an open and creative knowledge organization. This characteristic makes it difficult to implement any change in the current system. It is now April 2013, and General Adul knows that CRIMES is important for both the Royal Thai Police and his job, as this is the largest IT project in terms of budget and scope ever to be undertaken in the history of the police. Facing much resistance and many obstacles, General Adul must decide what strategies and measures should be used to ensure the success of CRIMES.

2 LITERATURE REVIEW

2.1 IT and Police Productivity

The relationship between IT and productivity has been investigated in much research. Many studies examining the relationship between IT and police productivity have indicated that IT may improve the image of the police, service delivery, the time needed to solve crime, and overall public safety (Nunn, 2001). In addition, municipal police departments often must make decisions regarding the computerization of police processes through the purchase of computer hardware and software, the improvement of networks, the digitization of documents, and the use of digital files to support automated functions (Northrop, Dutton, & Kraemer, 1982). Moreover, IT may lead to lower costs and higher ratios of crimes solved and stolen property recovered (Danziger & Kraemer, 1985). It was also found that heavy use of IT among law enforcement may reduce the amount of resources such as the administration and labor needed to deliver police services (Tenner, 1996). However, police budgets (like any other public budget) are stringent. More IT and computerized files and function also need more technical support personnel to maintain IT processes and functions (Burris, 1998; Landauer, 1996). Studies show that having computer systems provides little value unless information previously kept on paper is converted into digital form. Police units and their members must use these digital files to perform functions that were formerly performed manually (Nunn, 2001). Briefly, the use of IT should result in improved effectiveness among police agencies because of the tangible and intangible improvement in the police processes. For example, IT may result in faster access to computerized criminal history and spatial crime data. These functions provide better and complete information about the identity, location, and behavior of the criminals and thus increase arrests and the number of crimes solved (Danziger & Kraemer, 1985; Nunn, 2001).

2.2 IT and Investigation

Investigation is the police activity involved with 1) the apprehension of criminals by gathering evidence leading to their arrest and 2) the collection and presentation of evidence and testimony for the purpose of obtaining convictions (Thibault, Lynch, & McBride, 1998). The process of investigation begins with an initial crime scene assessment where sources of potential evidence are identified. The information collected is then assessed for its relevance to the investigation. Next, the information is interpreted to construct inferences and initial hypotheses. The content is normally developed by the investigating officer (Gottschalk & Solli-Sether, 2007). Information about police investigation includes a variety of information sources such as incident reports, crime scene investigator reports, witness statement, suspect statements, tip lines, crime scene photographs and drawings, fingerprints, DNA, and physical evidence (for example ballistics, tool markings, and blood spatter reports) (Fraser, 2004). Generally, investigative performance may be measured by the number of arrests and convictions (Gottschalk & Solli-Sether, 2007).
2.3 The role of computer information systems

Computer and information systems have transformed report writing and record-keeping in the investigation process. Every process in police activities involves a report or some type of form. The majority of police reports in the US written before 1975 were handwritten. Today, police officers in the US may type reports on notebook or tablet computers (Thibault et al., 1998). One of the best examples is the HOLMES system in the UK police department. The basic information entered into HOLMES is the location, time, and data of the incident, victim(s), suspect(s), and other criminal-related data. The HOLMES system has the ability to generate a report with the following information: the introduction, the scene, the victim, and miscellaneous (Gottschalk & Solli-Sether, 2007). Other information systems in police work include COPLINK for knowledge sharing (Chen, Zheng, Atabakhsh, Wyzga, & Schroeder, 2003), geo-computation and geo-demographics for profiling crime scenes (Ashby & Longley, 2005), Surrey Police Information and Knowledge Environment (SPIKE) for mobile access (ComputerWeekly, 2002), and a closed-circuit television with a thinking eye (Surette, 2005).

3 DATA COLLECTION

This is a qualitative study. The researcher conducted a single case study. The data collection consists of an interview, focus group study, document analysis, and the recording of the researcher’s observations. The qualitative data were analyzed using the thematic coding method. Atlas.ti was used to analyze the data. The themes were identified based on the pattern of data.

4 ORGANIZATIONAL BACKGROUND

The Royal Thai Police (RTP) is under the direct command of the Prime Minister. Currently, RTP currently consists of approximately 230,000 officers. In Thailand, the police per inhabitant ratio was 1:311. The total number of police stations nationwide was 1,459 over 77 provinces. The RTP's main responsibilities are as follows: 1 Provide security to His Majesty the King, Her Majesty the Queen, the Heirs to the Throne, members of the Royal Family, the Regent, Royal Representatives, and Royal Guests; 2 Direct and supervise the operation of all police officers to ensure quality service and compliance with the laws; 3. Prevent and suppress crime; 4. Maintain public order and national security; 5. Assist the public; 6. Perform other activities stipulated by Thai law; 6. Carry out law enforcement activities as assigned by the Prime Minister in support of national development. The Headquarters are located at the center of Bangkok (Interpol, 2013). The RTP is divided into six broad sections: 1 Command and General Staff; 2 Special Operation; 3. Crime Prevention and Suppression; 4 Crime and Suppression Supporting; 5 Education; and 6. Service (Interpol, 2013).

The Thai police play a very important role in enforcing the law and maintaining security in Thailand. Thailand, which spans 510,000 square kilometers, is approximately the size of France. The country is bordered by Myanmar to the west and north, by Laos to the northeast, by Cambodia to the east, and by Malaysia to the south. The nature of the borders in this region allows easy and frequent crossings of people and goods. This condition gives rise to potential vulnerabilities that the police must anticipate. Besides being directly geographically adjacent to several neighboring countries, Thailand faces another challenge faced by policymakers–namely, the presence of a wide range of cultural, ethnic, language and religions in Thailand, which need special attention to avoid falling into conflict (Wikipedia, 2003). Police corruption remains a problem in Thailand. Transparency International's Global Corruption Barometer 2007, a survey assessing the public's perceptions and experience of corruption in 60 countries, gave Thai police a four out of five rating, where one represents "not at all corrupt" and five represents "extremely corrupt". Of the respondents, 14% reported paying a bribe to the judiciary, including the police (International, 2013). The Thai Police Department has recognized that IT will be one of the most important crime-fighting tools of the 21st century and has emphasized the commitment to making information one of its most important problem-
solving and management tools. Prior to the rolling out of CRIMES, daily law enforcement activities were conducted in a paper-based environment. Data such as reports, case investigations, and arrest warrants cannot be shared among police stations. In fact, the police system was considered the most inefficient government unit.

**5 FINDINGS**

**5.1 The old systems**

In the pre-CRIMES environment, systems across police stations did not effectively link to each other. As a result, when an officer discovered a pertinent piece of information upon investigation of the case, the patrol officer who originally investigated the case was not usually notified, and there was no mechanism for the notification to occur. If a detective wanted to examine crimes with similar characteristics, the paper reports for those crimes would have to be pulled from the record management systems manually by the officer. Information needed for crime analysis, which identifies patterns that might lead to the prevention of the next crime, was not readily accessible across units.

Although information technology supported the collection of data needed in daily law enforcement activities before CRIMES, it did not meet the needs of the department with respect to sharing, assimilating and reviewing these data. All police activity was conducted manually through inefficient paper-based systems. Some police stations developed their own systems to enable investigators to write cases. However, these systems may only be used within a particular station. No information may be shared.

**5.2 CRIMES**

CRIMES stands for “Criminal Record and Information Management Enterprise Systems”. The objective of CRIMES is to centralize and synchronize fragmented data in the police systems. In addition, CRIMES is also intended to help police record and seek important information. The government has allocated 293 million baht for the 2007-2008 fiscal year. The project is also intended to reduce inefficiency in police station work processes. CRIMES consists of five modules:

1. **Database Systems** The police receive reports and record much paperwork on a daily basis. Case officers must type the same information many times. CRIMES promised to digitize all reports and documents. C.R.I.M.E.S. has standard forms, enabling police officers to simply click and choose information, easily recording the case. Case officers simply fill information only once, with CRIMES allowing information to be in every form. Officers can, for instance, save a report by clicking an icon and print out documents immediately. As a result, C.R.I.M.E.S is streamlining the documentation process.

2. **Search System**: C.R.I.M.E.S connects information from all police stations in Thailand. Police officers may use C.R.I.M.E.S to search all information of all department. For example, Provincial Police Region 5 was investigating a top drug gang in northern Thailand. Officers recorded individual information and vehicles of suspects on the CRIMES system. Mr. A, the head of the drug transportation unit, knew that the police suspected him, so he escaped to Pathum Thani and rented a house to stay and keep drugs there. The police did not know this information, but people who lived there saw several suspicious people visiting this house often and notified the police. The police spent just few minutes, checking photo of people who lived there and vehicle license with the C.R.I.M.E.S database. They found that the photo of the suspect was Mr. A, leader of the drug gang, who had escaped from northern Thailand. The police also found many vehicles there involved with the drug gang. The police arrested the gang and found 3 million amphetamine tablets.

3. **Warning System**: This system consists of an Alert function and an Alarm function. The Alert system reminds officers about important information such as warrants of arrest or firearms reported lost or stolen. C.R.I.M.E.S also records all information on database (name, registration number), enabling the police to access the information instantaneously. The alarm function may remind officers about important scheduling information such as important meetings and due dates.
4. Statistical Analysis and Reporting System: C.R.I.M.E.S is able to perform accurate statistical analysis of the data and helps officers to utilize resources efficiently.

5. Data Management System: C.R.I.M.E.S links data within the police and other public organizations such as the Ministry of Justice, vehicle registration systems, the Ministry of the Interior, and court systems. Officers may easily search important information such as citizen information, vehicle information, employment histories, firearm registrations, and criminal records.

Figure 2 CRIMES’s primary functions

CRIMES has five primary functions: 1) Data Entry 2) Data Search 3) e-Data Service 4) Data Management and 5) Alarm & Alert Services

Data Entry
Police officers may record data such as crimes, crime scenes, traffic accidents, compliance reports, lost documents, lost people, lost cars, and lost property into the database, which is shared between all Thai police units and stations. Different icons in Figure 3 represents variety of crimes.

Figure 3 The main menu

Each icon in the main menu provide the data entry function. Each icon represents incidents and crimes. Once the officers click on each icon, the form related to the incident and crime will appear (see Figures 4 and 5).

Figure 4 Example of Form 1

Figure 5 Example of Form 2

All forms were designed appear similar to paper forms from the old paper-based systems. Consequently, police officers are familiar with the form structures.

Data Search
Police officers may search and retrieve data from the CRIMES database and any other databases both inside and outside the police department. The data that may be retrieved from CRIMES database include criminal records, crime scenes, traffic
accidents, compliance reports, lost documents, lost people, lost cars, and lost property. The system is linked with other governmental systems. The data that may be retrieved from the database outside the police department include citizen registration information, vehicle registration information, and gun registration information.

**Figure 6 Example of criminal record**

**e-Data Service**
The system delivers statistical reports. These reports may summarize crime statistics by type of case, area, and timeline. The report may be displayed on a dashboard and be printed out. Police superintendents may possibly use this report for the planning and management of police activities in the police stations.

**Figure 7 Example of CRIMES interface**

**Alarm & Alert Services**
The system provides alarm and alert services for users. The system provides the calendar service to warn users about important information and report submission deadlines. The system also provides alert services for any requested information.

**Figure 8 Example of CRIMES statistical report**

**Data Management**
The system provides data management modules for administrators to manage user accounts and access control. The users’ rights are specified based on their roles and responsibilities. Different users have different degrees of access to data. The identity management is managed by an LDAP server.

**Figure 9 Calendar service**

**Figure 8 Example of CRIMES statistical report**

**Figure 9 Calendar service**
5.3 How CRIMES works
Major functions of CRIMES include 1 administrative and personnel functions; 2 incident reporting; and 3 case management, arrest, investigation, and crime analysis activities. The incident reporting systems capture all necessary information needed to file an initial police report. These data include suspects, vehicles, victims, witnesses, relationships between suspects and victims, the role a person plays in a crime and prior offenses.

5.4 CRIMES Infrastructure

5.5 The Development & Implementation Process
The development process for CRIMES has been lengthy and costly, running five years from concept to rollout. The development was based on the systems development life cycle (SDLC). The SDLC is the process for understanding how an information system may support the needs of a business, then designing, building, and implementing the systems (Dennis, 2012). SDLC is also known as the waterfall approach—that is, when tasks in one phases must be completed before the work may proceed to the next phrase. SDLC is very suitable for a large IT project that requires control, accountability, and error detection. The major disadvantage is that it is very inflexible, time-consuming, and expensive and leads to discouraging changes once the user’s requirements are met.

5.6 The Analysis
Systems analysis is the process of analyzing a problem(s) that the organization is facing and offering solutions to this problems using information systems. Systems analysis involves defining the problem, identifying causes, and specifying solutions in the form of information systems. In this phrase, the development team must examine the business problem that an organization plans to solve with information systems. The main objective is to gather information about existing system (as-Is systems) to determine requirements for the new or improved systems. The deliverable takes the form of system requirements. For the CRIMES project, the development teams gather information about the problem of police stations’ as-Is systems using surveys, in-depth interviews, and focus groups. A survey was sent to every police station asking them about problems and inefficiencies in the current systems. The users were asked to identify the critical success factors (CSFs) of the new systems. The development team conducted focus group meetings using joint application design, which is a group meeting in which selected users meet with the analyst and the developers. During the meeting, users and developers jointly define
and agree on system requirement. In addition, all documents, such as investigative case reports, missing person reports, lost vehicle reports, and death reports were analyzed. According to the survey and interview, the problems of the current systems are as follows:

1. The system was based on paper and pens. The document may be lost or stolen.
2. The police officers and staff cannot search for necessary data such as gun and vehicle registration data, criminal record data, immigration data, and other data needed to solve crimes.
3. The same information must be inputted several times. First, the officers must enter data (by writing) into the document, and then they have to enter the same information into POLIS (the old systems).
4. Data cannot be shared across police stations.
5. Police officers and staff are IT illiterate.

The findings indicate that:

1. The new systems should provide data centralization that links to every police station.
2. The new systems should allow police officers and staff to be able to search for criminal-related data both within the police and outside agencies such as citizen databases, vehicle registration data, gun registration data, hospital information, Interpol data, and business registration data.
3. The data must be up-to-date and correct.
4. The new system must provide a fast and efficient means of inputting data into the systems. The same data should be entered only once.
5. The new systems should be able to provide statistical data that the police chiefs may use to manage their police departments’ resources and personnel.
6. The new systems should provide alert and warning systems to the investigator to handle their case efficiently. The alert and warning systems should be able to be sent over SMS.
7. The new systems should provide geographical information systems that allow the visualization of crime related data.
8. The new systems should provide 24/7 front-desk support to end users.
9. The new systems should be user friendly. The systems must be accessible to users online using a web browser.

The Design
Systems design describes the details of how an information system will meet the information requirements determined by the systems analysis. The deliverable includes design specifications. Whereas systems analysis describes what a system should do to meet business and information requirements, system design describes how the information systems will fulfill the objectives specified in the analysis. The development team must conduct both logical design and physical design. The logical design specifies what and how the systems perform using abstract specifications. Physical design describes using actual physical specifications how the system will perform its functions. That is, the systems design translates the objectives in systems analysis to concrete design, showing how the system performs its function and how users interact with the system. Systems design also entails user interface design, report design, and form design.

5.7 Implementation
The implementation involves the translation of the design specification into a set of software and hardware. Once the design specification was approved by the management board, CRIMES was implemented using the MENDIX platform, which is model-driven development. MENDIX provides tools to build enterprise applications based on business needs.

5.8 Training
The systems requirements indicated that the developer had to provide training to 8,000 officers and staff members nationwide. Later, the police administrator demanded that the company provide training to every police officer and staff in every police station. A total of 200,000 of police officers and staff members were to be trained. The
development team realized that they were unable to provide the training to all officers and staff members within a short period of time. Therefore, e-learning and superuser programs were used. e-Learning was provided in the form of classroom, DVD, and online training. Officers and staff may access the training materials through the website. In addition, classroom training was provided at every police station. Once the training was finished, the company provided DVD training to the police station commanders. Moreover, superuser training was utilized. After conducting the classroom training, the development team realized the resistance from many officers and staffs. The users were not willing to use the systems. The users also reported that the training was difficult to understand. As a result, the development team decided to use superuser training, which is the training method that allows users to train themselves. At first, some key influential officers in the regions were selected for training with the development team. There users were selected based on their technical skills and willingness to cooperate with the project. Once the superuser finished the training, he or she was asked to train other users in the regions. The police provided financial reward to the superusers for every training session. This method was very successful because end users were willing to listen to their peers rather than to the development team.

Figure 12 Training Session

5.9 Testing

Testing involves the process of testing the systems to determine whether the system produces the desired results under certain conditions. Generally, there are four types of testing.

1. Unit tests involve testing each program or module separately.
2. Integration tests test the system as a whole to determine whether all modules or programs are able to function together as planned.
3. Usability tests test the quality of the user’s experience when interacting with the system.
4. Acceptance tests determine whether the system meets the original business requirements and objectives. Acceptance tests provide the final certification that the system is ready for use.

The development team and a consultant spent three days from 9am to 5pm to review the unit test, integration test, and acceptance test. For the unit test, the consultant asked the developer to review each function in the system under different scenarios such as issuing the arrest warrant and reporting lost vehicles. For the integration test, the consultant tested all scenarios that require cross functions such as investigation processes. In the acceptance test, the consultant and the developer assessed whether the systems meet all business requirements and design specifications defined in the analysis and design phrases.

Conversion

Conversion is the process of changing from an old system to the new system. There are four types of conversion strategies.

1. Parallel conversion: both the old and the new systems are operating together for a period of time until everyone is assured that the new system functions correctly.
2. Direct cutover conversion: The new system entirely replaces the old system on an appointed day. This is a risky approach because there is no other system to fall back on if the new system encounters a problem.
3. Pilot conversion- The new system is implemented in one part of the organization on a
trial basis. Once the new system is working properly, it is introduced to other parts of organization.

4. Phase conversion - the new system is implemented in stages until the entire new system is operational.

The management board chose to employ pilot conversion. Selected police stations were used to test the new system. The criteria for choosing the piloted location were as follows: 1) pilot stations should process many crimes because the development team did not want to risk using the new system in stations that face high crime rates; 2) the pilot station should be in or near Bangkok to enable the development team and management board to easily travel and monitor the progress; and 3) the commander and officers at the pilot station must be willing to work with the development team.

6 MAJORISSUES

6.1 Difficulty in connecting with other non-police systems

To be effective, CRIMES needed to be integrated with other governmental systems. These systems include citizen registration databases, vehicle registration databases, and gun registration databases. However, other agencies do not want to collaborate or share information with the police. Without this outside information, CRIMES is an isolated data. In addition, data definitions are defined differently among governmental agencies. More importantly, data in many agencies, such as gun registry, are stored in traditional paper-based environments.

Many agencies, including the Department of Land Transportation, the Department of Special Investigation, and the Ministry of Interior were unwilling to share information with the police. One of the staff mentioned “Other agencies do not want us to access their information. They agree to provide access to us only when we agree to share our information.”

In addition, the police do not want to share their information such as arrest warrants and criminal history records with other agencies.

6.2 Data Fragmentation

The police culture was marked by the independence of agencies. Different police agencies have different legacy systems with different databases. For example, the immigration bureau maintains immigration data, and the tourist police has tourist information. However, the data from both agencies were stored in different formats.

6.3 Incomplete Information

The information from the old systems was based primarily on paper-based systems. Because the data were stored manually, some datasets were incomplete. There was no error-checking system when the officers entered the information. In addition, the data contain substantial of duplication. This condition significantly increased the difficulty of migrating the data in the legacy systems to the new systems. Once the data were migrated, there was a problem of data integrity. Some data were incorrect or outdated. Both the developers and police officers had to spend tremendous time cleaning the data.

6.4 Migration from the legacy systems

The legacy systems was called “POLIS”. There were conflicts between POLIS and CRIMES in terms of data definitions. Both store the same data differently. The same data may have different attributes. In addition, POLIS was operated by another company called “CDG” Group. POLIS would end after the rolling out of CRIMES. As a result, CDG was not being helpful in incorporating this CRIMES project.

Scope Creep

Scope creep is defined as the introduction of new requirements after the project has already been defined (Roth, Dennis, & Wixom, 2013). Scope creep is one of the most common reasons why the project goes over schedule and budget. Despite early success in the requirement analysis, CRIMES soon suffered from scope creep. User requirements continued to change throughout the project. Some changes came from outside factors. For example, the terms of reference (TOR) indicated that the systems must be able to link information with other agencies such as the Department of Special Investigation, the Department of Land Transportation, and the
Ministry of Interior. However, these agencies did not allow their information to be shared with the police. The project team had to improvise by copying the data from other agencies and manually putting the data in the CRIMES database.

One of the staff members mentioned the following:
“We had to beg other agencies to give us the access of their data, which is based on paper. Then, we had to manually enter this information into CRIMES databases. Some data are incomplete, so we need to leave the field blank.”

6.5 Outdated technology
The requirements for CRIMES were written in 2006. Five years were needed for the project to start implementation. When the project was implemented, the initial specification was out of date; the technology had been changed tremendously. For example, the specifications required a single server at the police headquarters with 8,000 client computers. If all clients requested service from the server, the server would be unable to handle all of the requests.

6.6 User resistance
The users of CRIMES consist of staff, investigators, and detectives. Most staff members were older than thirty years old and had been writing reports for many decades. Changing from writing to typing the report was a challenge for them.

One of the staff mentioned the following:
“I’m too old to learn “computer”. There was nothing wrong with written report. I’ve been doing this for thirty years. Using “keyboard and computer” is too difficult for me”

In addition, CRIMES was perceived among investigators as being intended to catch their mistakes because every incident and crime must be recorded in the system. If an incident or crime is reported, the officers have no choice but to process the case.

One police officer in the experimental station mentioned the following:
“This system is intended to catch our “mistake”. Every activity is recorded. Before, we did not need this system. “Why we need it now. I do not want to be part of it.”

Moreover, there was a conflict between police officers at the police stations and the technician from the developing company.

7 LESSONS LEARNED
The use of IT is viewed as one of the major drivers of efficiency and effectiveness in police work and processing as well as in the use of crime prevention tools. The benefits of digitization for policing are generally accepted as providing increased efficiency in both administrative and operating processes (Hoey, 1998). In this case, CRIMES provides several benefits, including the digitization of data, the integration of data, a data search system, a data entry system, a warning system, a data management system, and statistical analysis and report systems. The implementation process took almost six years from the start to the finish of the analysis. The police invested almost 10 million dollars for the system. However, the project faced several unexpected problems. The requirements required the systems to be able to connect with other government systems outside the police. The police never thought in the beginning that other governmental agencies would not be cooperating with the project. The issue comes down to politics because to connect the system with other agencies, the police must make their data available to these agencies as well. Not connecting CRIMES with other governmental systems may limit police as they seek important data such as vehicle and gun registration information, immigration information, and business registration information. Moreover, data from the legacy system were fragmented and incomplete. The legacy data were kept in a paper-based format. In addition, different (police) agencies maintain different formats. This condition resulted in difficulty in migrating the data from the old systems to the new systems. Furthermore, because the initial requirements were created five years before the implementation, some outdated technology remained. Some key technology or architecture was already considered
to be outdated. In addition, the requirements continued to change, resulting in project delays lasting over five months. Lastly, as in any other IT project, user resistance to CRIMES was prevalent, even though the development team invited many users to participate during the analysis and design phases. In addition, user resistance derived from the age factor. Most police staff members are senior members. Some of these members were not comfortable with the use of new technology. Some of the staff members did not want to change their current practices. Most critically, many police officers viewed CRIMES as being intended to catch their mistakes. This phenomenon came as a complete surprise during the implementation. This result shows that the implementation of information systems may lead to unexpected results.

8 CONCLUSIONS

This study concerns the implementation of a large-scale IT project in a law enforcement organization. CRIMES (Criminal Record and Information Management Enterprise Systems) was intended to enhance efficiency in police stations. CRIMES consists of five primary functions: 1. Data Centralization 2. Search Functions 3. Warning and Alert Systems 4. Statistical Analysis and Reporting Systems and 5. Data Management Systems. The project promised to reduce inefficiencies in police work processes. The project took five years from start to implementation. The project was conducted using a system development methodology. The project faced many obstacles, including scope creep, difficulty in data migration from the legacy systems, incomplete data, data fragmentation, and heavy user resistance. The lessons learned from this project may be used to guide other large-scale projects for public organizations.

7 REFERENCES


