

Criminal profiling and industrial security

Chang-Moo Lee

Received: 25 February 2014 / Revised: 30 March 2014 / Accepted: 8 April 2014 / Published online: 29 May 2014
© Springer Science+Business Media New York 2014

Abstract Criminal profiling may provide an effective measure for industrial security. While criminal profiling has been frequently applied to support the prevention and investigation of crimes, particularly violent crimes, it has not been applied to industrial espionage. Criminal profiling such as behavioral and investigative data profiling could help to identify the criminals leaking the secrets. The application of criminal profiling may contribute to prevent and reduce industrial espionage. The purpose of this study is, therefore, to attempt to apply criminal profiling to industrial security and eventually prevent and control industrial espionage.

Keywords Criminal profiling · Industrial security · Information security · Industrial espionage · Investigation · Investigative mining

1 Introduction

The World has been witnessing the dramatic change that scientific technology would determine the competitiveness of the country. With the importance of technology, the security industry is emerging as the blue ocean. The market size would be estimated to exceed 370 billion dollars in 2013. The loss damage from industrial espionage had surpassed 200 billion dollars during the period of 2004–2008 in South Korea NIS, [10].

According to the Korea Chamber of Commerce & Industry, 20.5 % of the companies surveyed in 2006 had experiences of victimization from industrial espionage, indicating the seriousness of industrial espionage in South Korea NIS, [10]: 14. Although the leakage of industrial secret depends upon various methods, the leakages by current employees or ex-employees occupied most of the cases. With the accessibility and exposure of industrial secrets, it is very difficult to steal the secrets without the help of employees. However, the researches on industrial espionage have focused upon technical and physical security. Few researches have interest on the persons leaking industrial secrets. While industrial espionage must be a crime, furthermore, criminological approaches have not been provided to detect and prevent such a crime as industrial espionage yet. This could explain the lack of effective solutions for industrial espionage. “Why do some people commit a criminal act like industrial espionage?” “What should be done to prevent or

C.-M. Lee (✉)

Department of Police Administration (Criminal Justice), Hannam University, Daejeon 306-791, South Korea
e-mail: jbalanced@gmail.com

control industrial espionage?” These questions should be answered and can be done by an in-depth analysis based on criminological theory.

In this regard, ‘criminal profiling’ may provide one of criminological solutions for industrial security. While criminal profiling has been frequently applied to support the prevention and investigation of crimes, particularly violent crimes, it has not been applied to industrial espionage. The causes of industrial espionage can be identified by criminal profiling, and also the application of criminal profiling may contribute to prevent and reduce industrial espionage. The purpose of this study is, therefore, to attempt to apply criminal profiling to industrial secrets, and eventually prevent and control industrial espionage.

2 The concept of criminal profiling

‘Criminal profiling’ was introduced in the 1970s in the United States when the Federal Bureau of Investigation (FBI) agents of the Behavioral Science Unit applied behavior analysis technique to solve serial crimes for the first time. Criminal profiling has been attempted in many areas with different forms, which might be attributed to various terms of criminal profiling. The terms for criminal profiling include ‘offender profiling,’ ‘behavioral profiling,’ ‘crime scene profiling,’ ‘psychological profiling,’ ‘geographic profiling’ [2, 3, 15].

No uniform definition has been established yet due to the various approaches. A. Rider [13] defined criminal profiling as “description of individual’s unique personality traits and behavioral characteristics, focusing on the psychological aspects. A. J. Pinizzotto and N. J. Finkel [12] suggested criminal profiling as” an investigative technique to compare and analyze the personal characteristics of the offenders who commit similar crimes. In addition, Alison et al. [1] focused on the evidence at the crime scene, and defined profiling as an investigative technique to provide the law enforcement agencies with the characteristics of the criminals, criminal behavior patterns based on the analysis of crime scene evidences, eventually helping the agencies identify the suspects. Brent Turvey [15] attempted to make a very comprehensive definition of criminal profiling as an investigative technique to infer the characteristics of individuals responsible for the crimes.

Based on the various definitions, criminal profiling can be defined as an investigative technique to find out the patterns from the behavioral characteristics of the offenders, extract equivalent or similar types of offenders by matching and scoring, and eventually contribute to identify the suspects responsible for the crimes. Criminal profiling means the process to identify the specific types of the offenders through the analysis of various behavioral characteristics appeared at the crime scene, while criminal investigation in general focused on finding out and arresting the offenders on the basis of physical and circumstantial evidences related to the crimes [4–6].

3 The effectiveness of criminal profiling

3.1 The debate about criminal profiling

The debate about criminal profiling might be concentrated on the effectiveness of criminal profiling. Contrary to popular view about criminal profiling which might be a panacea to crime investigation, partly influenced by crime movies and dramas such as ‘CSI’ or ‘Criminal Mind’, criminal profiling has been criticized to be less effective by some researchers like Godwin and Wilson et al. [11].

Despite some critical views about the effectiveness of criminal profiling, the law enforcement agencies worldwide have utilized the techniques, and a number of empirical studies have verified the effectiveness of criminal profiling. An empirical research was performed in the UK to assess the effectiveness of criminal profiling and found out the accuracy of about 75 % from comparing the results of actual events with the information and advice presented to the case on the basis of criminal profiling.

Considering even a small clue may contribute to arrest the offender, the accuracy of 75 % seems to be high enough to show its validity. Most of the police officers who have experienced advice of criminal profiling expressed that criminal profiling helped them solve the criminal cases although it helped indirectly. In other words, criminal profiling does not seem to help arrest the criminals but certainly contribute to set the direction and scope of investigation, which eventually links to the arrest of the criminals [11]. Thus these findings seem to be meaningful. Despite some scholars' negative assessment of criminal profiling, first of all, its necessity and effectiveness can be validated because criminal investigators agree to the practical usefulness of criminal profiling to some extent.

3.2 The role of criminal profiling

3.2.1 *Criminal investigation and arrest*

Criminal profiling contributes to help identify the suspects directly or indirectly, which would lead to the arrest of the offenders. Creating a profile of offenders could narrow the scope of suspects and facilitates the arrest of the offenders. The analysis of the offender's demographic characteristics and developmental process provides to grasp their psychological characteristics, which could also be applied to criminal interrogation [8].

In detail, criminal profiling provides an outline about the offenders. The profile for the offenders includes gender, age, religion, marital status, educational level, as well as psycho-analysis about the offenders. This process narrows the scope of the suspects and saves the investigative personnel and budget to be required. It also reduces the time for the identification and arrest of the offenders.

When the suspects are in custody, then, criminal profiling can be used to improve the efficiency of investigation by providing additional information on the suspects based on the analysis of the data that the suspects have. Criminal profiling, in addition, can be helpful and efficient in questioning the suspects. Based on the analysis of the suspects' behavior and personality, profiling could suggest whether coercive or persuasive interrogation is necessary for an effective method [7].

3.2.2 *Prevention of crime*

Criminal investigation is not the only advantage of criminal profiling. It also enables to prevent criminal victimization in advance by reviewing the victims' vulnerability. Crime prevention can be achieved through a thorough analysis of the victim. Since all crimes require motivated offenders and suitable victim, the analysis about the victims makes it possible to assume the profile of the offenders.

Why did the offender approach to the victim other than anyone else? Answering the question could inspect and identify the victim's vulnerability and prevent another criminal

victimization. The analysis of victim enables to find out the link between the victim and the offender. The links might be geographical and occupational or school related. The analysis of links could provide a clue to draw the outline of the suspects and victim's vulnerability. It also helps to find out the types of victims and predict the future victim.

3.2.3 Prediction of crime

The analysis of the offenders and victims helps to find out the type and pattern of crime, and furthermore the prediction of future crime. The prediction of crime certainly contributes to prevent many crimes otherwise bring about serious effect on society and people. It could also apply to industrial security by the analysis of industrial espionage, particularly focusing on the employees who are likely to leak industrial secrets in circumstances with less tightened security. The strengthened supervision and control over these employees may prevent the leakage of industrial secrets.

Some researchers only explain the prediction of crime from the perspective of offender, asserting that the prediction depends upon the analysis of the types of the crime already committed and the offenders who have committed them. They attempted to control crimes by concentrating only on the offenders, not victims. The occurrence of crime requires, however, both offenders and victims. This is why the thorough analysis of the victims is also essential to predict and control the crime.

However, there have been very few studies on the prediction of crime focusing on profiling, not to mention applying profiling techniques to industrial security. With the rapid growth and seriousness of industrial espionage, however, the researches on the application of profiling to industrial security should be emphasized and supported by the government and the academic fields related.

4 Criminal profiling for industrial security

4.1 The characteristics of industrial espionage

The amount of damage from industrial espionage in South Korea is estimated 7.5 % of the total revenue of the companies, while the expenditure for industrial security falls short of 0.15 % of the revenue. Among the persons arrested for industrial espionage, ex-employees account for 62.4 % followed by current employees and cooperative firm employees. Most of industrial espionages are committed by current- and ex-employees. In fact, few people cannot know better than employees for identifying important industrial secrets of companies and how to steal them. Bribing employees, thus, is the easiest way to acquire the industrial secrets of the company.

The size of company also gives an important characteristic of industrial security in South Korea. Tables 1 and 2 shows clear differences between big companies and small-medium sized companies. The industrial espionages by current employees account for 47.8 % in the big companies, compared to only 5.1 % in the small-medium sized companies. On the contrary, 71.8 % of the industrial espionage was committed by ex-employees, while ex-employees account for 47.8 % of the espionage in the big companies. This could be explained by the differences of perception about the company. The current employees of the big companies could be more satisfied with their companies than the employees in the small-medium sized companies, which would result in the difference in loyalty to their companies.

Table 1 The types of industrial secret leakers

	Big companies	Small & medium sized enterprises
Current employees	47.8 %	5.1 %
Ex-employees	47.8 %	71.8 %
Cooperative firm employees	26.1 %	7.7 %
Rival company employees	8.7 %	12.8 %
Others	8.7 %	10.3 %

Source: NIS [10]

4.2 Profiling techniques for industrial security

With recent advances in statistical techniques and computer technology, a new technique was introduced for criminal profiling, investigative data profiling which combines the statistical techniques with computer technology to investigate criminal cases. It is a tool of data analysis to identify unknown patterns or relationship from the vast amount of data [14]: 1.

Investigative data profiling analyzes criminal cases on the basis of various data such as numbers, letters, video and audio files, and multimedia data. Investigative data profiling was originally based on data mining which was designed for marketing research like customer demand, and began to be utilized for security purposes in the United States and the United Kingdom since the late 1990s. With the surge of counter-terrorism since September 11, 2001, investigative data profiling has been widely used in analyzing terrorists' connection and identifying the suspects.

Figure 1 shows the operation process of profiling program based on data mining. It analyzes a pattern by finding out the relationship among astronomical data. Most of these programs are based upon advanced statistical analysis techniques along with artificial intelligence (AI) technology. They attempt to recognize a specific pattern mainly through linkage analysis, text mining, neural network analysis, and machine learning algorithms [9]: 2.

Especially since September 11, 2001 terrorist attacks, the United States began to introduce Computer-Assisted Passenger Prescreening System (CAPPS II) to conduct more efficient searches for terror suspects in the airports. The system attempts to identify the passengers who have security problem by analyzing aviation-related information including passenger list. It is being operated in the international airports despite the problem of accuracy.

In addition, the law enforcement agencies in the United States are employing the investigative data profiling method such as FBI Carnivore program to find out a linkage or pattern through email and telephone records. Figure 2 shows how the email profiling program works

Table 2 The differences between behavioral profiling and investigative data profiling

	Behavioral profiling	Investigative data profiling
Major methods of analysis	Importance of experience and intuition	The amount and quality of data
Information Needed	Critical information	Seemingly unrelated, large amount of information
Purpose	Estimation of type	Discovery of new relationship and patterns



Fig. 1 The operation process of investigative data profiling

to find out an abnormal pattern through enormous amount of email records and notify automatically if it identifies.

The investigative data profiling by pattern recognition is widely used in financial sector to detect insurance fraud and credit card fraud. The transaction of credit card per day exceeds tens of millions and cannot be examined separately to detect fraud, which increases the application of investigative data profiling techniques in credit card companies.

Such a technique usually makes a normal profile of the individual customer based on the data showing average amount of purchase per day and month, maximum and minimum

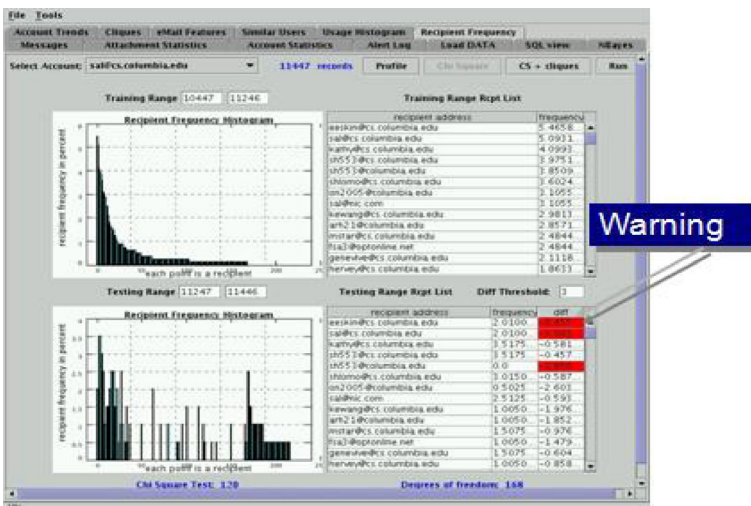


Fig. 2 Email profiling program

amount used, and the main items purchased. The normal profile is, in other words, created by individual purchase pattern. The abnormal profile is also produced to compare with the normal one. The purchase of the same expensive item more than twice at the same store in a day could provide a sign for fraud, and the purchase from the affiliate in the black list also gives an alarm to the card company. Members could use credit cards different from the subscribers, which also provide an abnormal profile. Every purchase of a customer is matched to the normal and abnormal profile, giving a chance to detect a card fraud.

5 Conclusion and policy implication

The importance of industrial security cannot be emphasized too much. The competitiveness of the country primarily depends upon a high-tech industry, which stresses the need to strengthen the effective measures of industrial security. Most of measures, however, have focused upon technical and physical security like access control and surveillance. Others, if any, include legal and institutional remedies.

Few researches have interest upon human factors. Industrial espionage must be a crime committed by a person. Which person does leak industrial secrets? Industrial security should begin with answering to this question. Focusing on the criminals leaking secrets, industrial security experts should inquire the types and patterns of the criminals. As examined above, thus, criminal profiling such as behavioral and investigative data profiling must be helpful to identify the criminal leaking the secrets. It may contribute to solve the cases, otherwise hard to be approached by other measures. The detection and subsequent arrest of the criminal must be, in this regard, conducive to prevent industrial espionage by deterrence effect.

However, criminal profiling cannot be a panacea for industrial security. It only composes of the many measures of industry security, but effective one undeniably. That is why criminal profiling should be considered for industrial security.

References

1. Alison L, Bennel C, Mokros A (2002) “The personality paradox in offender profiling: a theoretical review of the processes involved in deriving background characteristics from crime scene actions. *Psychol Public Policy Law* 8:115–135
2. Bartol CR (2003) *Criminal Behavior: a Psychosocial Approach*, 6th edn. Upper Saddle River, New Jersey
3. Bumgarner JB (2004) *Profiling and Criminal Justice in America*. ABC-CLIO, Santa Barbara
4. Davis BJ (2007) *Crime Scene Science: Criminal Profiling*. World Almanac Library, WI
5. Douglas JE, Burgess AW, Burgess AG, Ressler RK (2006) *Crime Classification Manual*, 2nd edn. Jossey Press, San Francisco
6. Girod RJ (2004) *Profiling the Criminal Mind*. iUniverse, New York
7. Hicks SJ, Sales BD (2006) *Criminal Profiling: Developing and Effective Science and Practice*. American Psychological Association, Washington, DC
8. Holmes RM, Holmes ST (2002) *Profiling Violent Crimes: An Investigative Tool*, 3rd edn. Sage Publication, Thousand Oaks
9. Mena J (2003) *Investigative Data Mining for Security and Criminal Detection*. Butterworth Heinemann, Boston
10. NIS (National Intelligence Service). (2009). *Current Trends in High-Tech Industry Protection*, Vol. 10
11. Park KB, Bae HC (2002) Micro- and Macro- utilities of criminal profiling for crime investigations and policy evaluation. *Korean J Psychol* 21(1):1–24
12. Pinzzotto AJ, Finkel NJ (1990) Criminal personality profiling: An outcome and process study. *Law Hum Behav* 14:215–233

13. Rider A (1980) “The firesetter: a psychological profile. *FBI Law Enforcement Bull* 49(6):12–17
14. Seifert JW (2007) *Data Mining and Homeland Security: An Overview*. Congressional Research Service, Washington, DC
15. Turvey B (2005) *Criminal Profiling: An Introduction to Behavioral Evidence Analysis*, 2nd edn. Elsevier Academic Press, San Diego



Chang-moo Lee is a professor at Hannam University in Korea.