Preface

The amount of information that police officers come into contact with in the course of their work is astounding. Such information is captured within police organizations in various forms. A challenge for police organizations is how to surface information, make it into knowledge, and bring it to bear on the problems faced by police officers in a timely and effective manner. This information and knowledge challenge in police organizations is the focus of and the reason for this book.

As will be explained later, a hierarchy of terms is used in this book. The hierarchy consists of data, information, knowledge, and wisdom. Information is data that makes sense to people, while knowledge is information combined with interpretation, reflection, and context. Based on such definitions, this book argues that information can be stored in computers, while knowledge is stored in human brains. Given such distinctions, knowledge management technology supports knowledge work by receiving codified knowledge in terms of information from knowledge workers, and by supplying information that knowledge workers transform into knowledge.

This book is designed as compulsory literature for courses in management information systems and knowledge management at advanced bachelor level and at master level in all police academies and police university colleges around the world. It can be considered supplementary literature in management information systems courses and knowledge management courses in business schools in terms of knowledge work case studies.

In addition, practitioners in business and public organizations as well as the IT industry itself will benefit from insights in this book. This book is based on the premise that it is difficult, if not impossible, to manage an organization without at least some understanding of knowledge management and knowledge management systems.

Last, but not least, this book is written for law schools. Law students have a need to learn how law enforcement works. Some of them will later be employed as police lawyers; others will constantly be in contact with the police as lawyers and attorneys.

As one of the reviewers of the manuscript for this book wrote in the review:

To the reviewer's knowledge, there have not been notable efforts that systematically address knowledge management in police work; to this end, this book has an advantage of being the "sole player" in the field. The book is definitely useful for a number of audiences, starting with police staff at all hierarchy levels, who need to have an insight of the benefits new technologies may bring to their profession, best practices for obtaining them, as well as the that they may face. Lawyers and judicial workers may also benefit from the book, since they will be more efficient in their work if they have an insight of how the police is conducting its business. Finally, information technology staff that undertake knowledge management projects for police, security and similar domains, will find in this book a systematic record of issues that they will face in their projects.

This book combines knowledge management with other subject areas within the management information systems field. The subject of knowledge management is no longer a separate topic, as research and practice have moved into linking knowledge management to its uses. The scholarly value of this proposed book can be found in insights generated from the contingent approach to linking knowledge management to other IT management topics and its uses.

Governments have become increasingly focused upon the setting of targets in efforts to improve the efficacy of police performance. According to Ashby and Longley (2005), there is a lack of clarity and clear methodology in assessing the performance of policing. We argue that police investigation units have the value configuration of a value shop. Furthermore, we argue that police investigation success can be defined as the extent to which each primary activity in the value shop is successfully conducted in police investigations.

Police investigation units represent a knowledge-intensive and time-critical environment (Chen, Schroeder, Hauck, Ridgeway, Atabakhsh, Gupta, Boarman, Rasmussen, & Clements, 2002). The primary mission of any police force in the world is to protect life and property, preserve law and order, and prevent and detect crime (Luen & Al-Hawamdeh, 2001).

In response to the September 11 terrorist attacks, major government efforts to modernize federal law enforcement authorities' intelligence collection and processing capabilities have been initiated. At the state and local levels in many countries all over the world, crime and police report data is rapidly migrating from paper records to automated records management systems in recent years, making them increasingly accessible (Chen, Zheng, Atabakhsh, Wyzga, & Schroeder, 2003).

According to Manwani (2005), we know only too well the importance of information in competing in a global economy or protecting our society against terrorism. This information comes in many different forms, from a variety of sources, and has to be validated, consolidated, and presented in order to make the right decisions. We also recognize that this information has to be controlled and secured so that it is not misused. Both the public and private sector have these common challenges, even though the ultimate use is different.

Police investigations are often dependent upon information from abroad. For example, the intelligence communities of different countries cooperate and share their information and knowledge, such as the Mossad with the CIA (Kahana, 2001). According to Lahneman (2004), knowledge sharing in the intelligence communities after 9/11 has increased rapidly.

Over the past two decades, many police agencies have endeavored to implement the concepts of the "learning organization." The learning organization is characterized by the commitment of a firm to the principles of sharing, innovating, critical review, and systemic thinking. An organizational culture is nurtured, in which adherence to such principles is articulated, encouraged, rewarded, and highly regarded. In policing, this investment is based on two overarching factors. The first is that the very nature of police work necessitates officers needing access to timely, accurate, and up-to-date information. Secondly, the amount of data police officers come into contact with in the course of their work is astounding, and provides vast sources from which to collect information (Hughes & Jackson, 2004).

Information, in a policing context, covers a wide range of diverse organizational activities including crime and traffic management, budget and asset control, human resource deployment, record management, and statistical analysis. For the purpose of this book, where we will narrow our focus on criminal investigations, the term information relates to crime management data. The main sources of such data are usually the product of contacts police officers have with both law and nonlaw-abiding members of the public. This is a largely nonstructured, often tacit source of insight into crime-related events. Other data collection sources include personal and electronic observations, tele-

phone and e-mail intercepts, registered informants, and data accessed via public and private organizations (Hughes & Jackson, 2004).

According to Pendleton and Chávez (2004), there is little evidence that the police profession is aware of knowledge management as an overall management strategy, but is involved in knowledge management activities in an incremental way. Knowledge management, as a purposeful organizational strategy, is more than an innovation in itself, but is a fundamental part of the innovation process that is essential to sustaining an organizational culture that is based in innovation. If the police profession is to sustain its position on the "cutting edge" of innovation, there is a need to integrate the various knowledge management techniques into interrelated systems based on modern information technology.

The fundamental police concern is typically with processing demand for service, not storage, retrieval, analysis, or even record management per se. Policing runs in a crisis mode and is overwhelmed with the present, impending, or possible crisis. Each information technology at first competes for space, time, and legitimacy with other known means, and is judged in policing by somewhat changing pragmatic, often nontechnical, values: its speed, its durability and weight, and its contribution to the officers' notion of the role and routines. New technologies are put into use untested and without arrangement for the maintenance that will inevitably be needed. In other words, innovations are taken up on an ad hoc, here-and-now basis, according to Manning (2003). Some IT facilities are purchased by state or local authorities for multiple purposes, and are not vetted, contracted for, nor acquired by police management or budgetary officers. The lack of understanding of IT has made police vulnerable to vendors, changes in city or county policies, and the handful of officers who have learned IT on the job and found a niche. This has increased maintenance costs, made replacement expensive, and created an array of incompatible databases and systems (Manning, 2003).

Knowledge is a fundamental asset in law enforcement. Increasingly, knowledge is distributed across individuals, teams, and organizations. Therefore, the ability to create, acquire, integrate, and deploy knowledge has emerged as fundamental organizational capability. To be successful, law enforcement departments must not only exploit existing knowledge, but must also invest in continually exploring new knowledge (Sambamurthy & Subramani, 2005).

The centrality of knowledge in organizations is reflected in the emergence of the knowledge-based view as an important theoretical stance in contemporary organizational research. Theoretical proposals indicate that advantages

for a firm arise from cooperative social contexts that are conducive to the creation, coordination, transfer, and integration of knowledge distributed among its employees, departments, and cooperating agencies.

Knowledge is a complex concept, and a number of factors determine the nature of knowledge creation, management, valuation, and sharing. Organizational knowledge is created through cycles of combination, internalization, socialization, and externalization that transform knowledge between tacit and explicit modes.

Knowledge management is of particular relevance to information systems because the functionalities of information technologies play a critical role in shaping organizational efforts for knowledge creation, acquisition, integration, valuation, and use. Information systems have been central to organizational efforts to enable work processes, flows of information, and sources of knowledge to be integrated, and for synergies from such combinations to be realized.

The focus of the deployment of knowledge management systems in organizations has been on developing searchable document repositories to support the digital capture, storage, retrieval, and distribution of an organization's explicitly documented knowledge. Knowledge management systems also encompass other technology-based initiatives such as the creation of databases of experts, the development of decision aids and expert systems, and the hardwiring of social networks to aid access to resources of noncollocated individuals (Sambamurthy & Subramani, 2005).

Information systems developers have evolved several frameworks to articulate themes related to knowledge management, which will be presented in this book. There is a diversity of organizational processes through which information systems affect the management of intangible assets in and between organizations. Furthermore, technical and social processes interact in complementarities to shape knowledge management efforts. For example, although information technologies foster electronic communities of practice, there are social dynamics through which such communities become effective forums for knowledge dissemination, integration, and use.

MIS Quarterly is a leading research journal on management information systems. In March and June 2005, the journal published a special issue, in two volumes, on information technologies and knowledge management. In the introduction to the special issue, Sambamurthy and Subramani (2005) presented three types of organizational problems where knowledge management systems can make a difference:

- **The problem of knowledge coordination.** Individuals or groups face knowledge coordination problems when the knowledge needed to diagnose and solve a problem or make an appropriate decision exists (or is believed to exist), but knowledge about its existence or location is not available to the individual or group. Knowledge coordination problems require a search for expertise, and are aided by an understanding of patterns of knowledge distribution—of who knows what and who can be asked for help. Research suggests that personal, social, or organizational networks facilitate awareness about knowing entities and their possession of knowledge. Similarly, information technologies can facilitate the efficient and effective nurturing of communities of practice through which distributed knowledge can be coordinated.
- **The problem of knowledge transfer.** This problem is often faced by individuals or groups once an appropriate source of knowledge is located (generally after solving knowledge coordination problems). In particular, knowledge is found to be sticky and contextualized as a result of which it might not be easily transferable. Further, the absorptive capacity of the individuals, units, or organizations seeking knowledge might either enable or inhibit their ability to make sense of the transferred knowledge.
- **The problem of knowledge reuse.** This is a problem of motivation and reward related to the reuse of knowledge. This occurs when individuals or groups may prefer to devise a unique solution to a problem rather than reuse the standard knowledge available in repositories. Often, recognizing individuals for knowledge contributions (such as rewarding contributions to the organizational document repository or rewarding individuals for being helpful in sharing their expertise) appears to create disincentives to reuse of the knowledge, particularly when reuse involves explicitly acknowledging the inputs or assistance received.

Advances in information technologies and the growth of a knowledge-based service economy are transforming the basis of technological innovation and organizational performance. This transformation requires taking a broader, institutional and political view of information technology and knowledge management. To succeed, organizations need to focus on building their distinctive competencies (Van de Ven, 2005).

Law enforcement agencies, across the United States and other modern societies, have begun to focus on innovative knowledge management technologies to aid in the analysis of criminal information and knowledge. The use of such

technologies can serve as intelligence tools to combat criminal activity by aiding in case investigation or even by predicting criminal activity.

The development of information technologies during the past few years has enabled many organizations to improve both the understanding and the dissemination of information. The development of powerful databases allows information to be organized in a manner that improves access to it, increases speed of retrieval, and expands searching flexibility. Furthermore, the Internet now provides a vehicle for sharing of information across geographical distance that encourages collaboration between people and organizations (Hauck & Chen, 2005). However, limited security and access control on the Internet often prevent law enforcement agencies from using it.

Information technology has certainly enhanced the capacity of police to collect, retrieve, and analyze information. It has altered important aspects of the field of policing; it has redefined the value of communicative and technical resources, institutionalized accountability through built-in formats and procedures of reporting, and restructured the daily routines of operational policing. The impact of technology on the habitus of policing, however, appears to be much less substantial, according to Chan (2003). The advantage brought about by technology—the capacity for a more responsive and problem-oriented approach to policing—has not been fully exploited. This is because operational police's technological frame sees information as relevant only for the purpose of arrest and conviction.

While officers are aware of the potential for smarter policing approaches, the preference is still to focus on collecting evidence for law enforcement, rather than broader analysis for crime prevention. Technologies that support a traditional law enforcement style of policing are the most successful ones. Where a more analytical approach is taken in relation to crime and intelligence, there is often a clash of cultures between police and analysts. Supervisors are aware of the capabilities that technology provides for better accountability and supervision, but these capabilities are also underutilized because they do not have time (Chan, 2003).

Introduction to Chapters

The core chapters of *Knowledge Management Systems in Law Enforcement: Technologies and Techniques* are organized according to the stages of growth model for knowledge management technology. Generally, stages of

growth models have been successful in explaining and predicting organizational innovation and IT maturity. Specifically, the stages of growth model for knowledge management technology, developed by the author, has proven useful in both theoretical and empirical studies of knowledge intensive organizations (Gottschalk, 2005).

Knowledge management technology is simply defined as technology that supports knowledge work in organizations. According to the distinction between information and knowledge, computers handle information while persons handle knowledge. Knowledge management technology is technology that supports knowledge workers both at the individual level and at the organizational level. An important implication of this understanding of knowledge management technology is that word processing tools, for example, are as much knowledge management technology as case-based reasoning systems. This book focuses on technology that can improve efficiency and effectiveness of knowledge work in law enforcement, rather than advanced technology as such.

There are several benefits from applying the four-stage model for knowledge management technology. It can explain the evolution of knowledge management technology in knowledge intensive organizations. Next, it can predict the direction for future knowledge management projects in organizations. Third, it can guide the accumulation of technologies and techniques as well as infrastructures and architectures to support more sophisticated applications of information technology over time.

The stages-of-growth model, consisting of four stages, is introduced in Chapter IV. The stages are applied in this book mainly as an organizing framework for systems classification, as it is too early to tell whether Stages 2, 3, and 4 are truly observed in the real knowledge management systems in law enforcement. Furthermore, what will happen after Stage 4 is not clear; maybe a more cyclical behavior will occur involving some or all of the stages.

The first stage in the growth model, Officer-to-Technology, is concerned with information technology tools available to police officers as knowledge workers. This stage is discussed in Chapter V. It can be argued that this first stage is a computer literacy stage, which is not really a stage for knowledge management. However, from the user perspective applied in definitions of knowledge and knowledge management technology, it should be clear that the first stage represents the foundation for IT supported knowledge work.

In Chapter V, investigative thinking styles of detectives are introduced. Here, distinctions are made between police investigation as method, investigation as challenge, investigation as skill, and investigation as risk. These thinking styles based on research by Dean (1995, 2000, 2005), cause different knowledge

working styles that represent variations in requirements to knowledge management and knowledge management systems. Some of these requirements can be met at Stage 1 of the knowledge management technology stage model, while other requirements have to wait until the organization matures into higher stages.

The second stage in the growth model, officer-to-officer, is concerned with communication between police officers, enabled and supported by information and communication technology. This stage is discussed in Chapter VI.

Again, to relate knowledge management systems to law enforcement work, as was done with thinking styles, this chapter describes police investigations in more detail, and exemplifies knowledge acquisition by police interviewing.

The third stage in the growth model, officer-to-information, is concerned with the electronic storage and retrieval of information that is useful to police officers. This stage is discussed in Chapter VII. Knowledge acquisition is here exemplified by knowledge derived from eyewitnesses.

The fourth and final stage in the growth model, officer-to-application, is concerned with the applications of artificial intelligence to police work to support police officers in their investigations. This stage is discussed in Chapter VIII. Knowledge application in knowledge management systems is here exemplified in terms of offender profiling, and crossing and checking in police investigations.

While Chapter IV and also Chapter III are focused on knowledge management technology, it is important to point out to the reader that the core Chapters V to VIII are less concerned with technology and more concerned with police work. The law enforcement focus should enable the reader to appreciate the linkages between policing and technology.

In Chapter V, on officer-to-technology systems, this is done by explaining different thinking styles that police officers are using in investigations. In Chapter VI on officer-to-officer systems, this is done by explaining police interviewing. In Chapter VII on officer-to-information systems, this is done by explaining the difficulties of interpreting eyewitness reports. Also in Chapter VII, the resource-based view of policing is introduced, as knowledge codified into information is stored in computer at this Stage 3 of the stages of growth model. Finally, in Chapter VIII on officer-to-application systems, offender profiling and "cross+check" are explained.

The organizing framework of the stages of growth model for knowledge management technology in law enforcement has, of course, limitations. For example, observable facts of Stages 2, 3, and even Stage 4 can occur in an IT-

based law enforcement organization over time, and also at the same time. However, the main focus of knowledge management technology investments in an organization at any point in time will be found at one particular stage, rather than spread randomly across stages. Another limitation might be the sequential structure of the stage model. In reality, we will sometimes find cycles such as a return to Stage 3 after a preliminary visit to Stage 4, because the foundation for Stage 4 in terms of available information to be applied might emerge as not accessible. However, such adoption of the model to different settings and purposes should be considered a challenge rather than a weakness.

Before chapters on the stage model, the book provides background material concerning police work in Chapter I, knowledge management in Chapter II, and IT in knowledge management in Chapter III. In Chapter I, police knowledge work is described. The chapter concludes with a section on ethical issues that are exemplified by investigative interviewing by police officers.

Chapter II covers general topics on knowledge management, such as characteristics of knowledge, knowledge value levels, identification of knowledge needs, and classification of knowledge categories. For those readers unfamiliar with the topic of knowledge management, this chapter provides important background material.

Similarly, Chapter III provides important background material on the role of information technology in knowledge management. IT in knowledge management is presented in terms of knowledge management processes and knowledge management systems. Knowledge managements systems are exemplified by advanced technologies included in expert systems.

After five chapters, IV-VIII, organizing knowledge management systems in law enforcement on the stages of growth model for knowledge management technology, Chapter IX provides another framework to understand the role and importance of knowledge management systems in law enforcement.

Chapter IX describes police work by applying the value configuration of value shop to police investigations. By applying the value shop, we can discuss problem solving in terms of primary activities in police investigations. Technologies and techniques can support each primary activity in law enforcement organizations as value shops.

Law enforcement has to do with the law, and law firms are often involved on behalf of legal parties. Therefore, we take a look at knowledge management systems in law firms towards the end of this book, in Chapter X. This extension of law enforcement into law firms is included in the book to exemplify other parts of the judicial system.

This book focuses particularly on the work of police, while only marginally addressing the work of the judicial system or the penitentiary system, which might be considered important aspects of law enforcement and that also can benefit from employing knowledge management techniques. To compensate for this shortcoming, the Chapter X on knowledge management in law firms is an important extension of this book.

Law enforcement represents a variety of tasks in society. In this book, we touch upon many tasks and aspects of policing. However, as our main focus we chose police investigation, which is one of the most knowledge intensive tasks in law enforcement.

Case studies of law enforcement knowledge work in terms of research studies of police organizations are presented in the final chapter, XI. The empirical studies presented in this chapter illustrate some important dimensions of police work.

References

Ashby, D. I., & Longley, P. A. (2005). Geocomputation, geodemographics and resource allocation for local policing. *Transactions in GIS*, *9*(1), 53-72.

Chan, J. B. L. (2003). Police and new technologies. In T. Newburn (Ed.), *Handbook of policing.* Portland, OR: Willan Publishing.

Chen, H., Schroeder, J., Hauck, R. V., Ridgeway, L., Atabakhsh, H., Gupta, H., et al. (2002). COPLINK connect: Information and knowledge management for law enforcement. *Decision Support Systems*, *34*, 271-285.

Chen, H., Zheng, D., Atabakhsh, H., Wyzga, W., & Schroeder, J. (2003). COPLINK—Managing law enforcement data and knowledge. *Communications of the ACM*, *46*(1), 28-34.

Dean, G. (1995). Police reform: Rethinking operational policing. *American Journal of Criminal Justice*, *23*(4), 337-347.

Dean, G. (2000). *The experience of investigation for detectives*. Unpublished PhD thesis, Queensland University of Technology, Brisbane, Australia.

Dean, G. (2005). *The cognitive psychology of police investigators*. Conference paper, School of Justice Studies, Faculty of Law, Queensland University of Technology, Brisbane, Australia.

Gottschalk, P. (2005). *Strategic knowledge management technology.* Hershey, PA: Idea Group Publishing.

Hauck, R. V., & Chen, H. (2005). *COPLINK: A case of intelligent analysis and knowledge management.* Draft conference paper, University of Arizona.

Hughes, V., & Jackson, P. (2004). The influence of technical, social and structural factors on the effective use of information in a policing environment. *The Electronic Journal of Knowledge Management*, *2*(1), 65-76.

Kahana, E. (2001). Mossad-CIA cooperation. *International Journal of Intelligence and CounterIntelligence*, *14*, 409-420.

Lahneman, W. J. (2004). Knowledge-sharing in the intelligence community after 9/11. *International Journal of Intelligence and Counterintelligence*, *17*, 614-633.

Luen, T. W., & Al-Hawamdeh, S. (2001). Knowledge management in the public sector: Principles and practices in police work. *Journal of Information Science*, *27*(5), 311-318.

Manning, P. K. (2003). *Policing contingencies*. Chicago: The University of Chicago Press.

Manwani, S. (2005). The future of the IT organisation. *ComputerWeekly.* Retrieved October 28, 2005, from http://www.computerweekly.com

Pendleton, M. R., & Chávez, T. D. (2004). *Creating an innovation-centric police department: Guidelines for knowledge management in policing*. Seattle, WA: Seattle Police Department.

Sambamurthy, V., & Subramani, M. (2005). Special issue on information technologies and knowledge management. *MIS Quarterly*, *29*(1), 1-7; and *29*(2), 193-195.

Van de Ven, A. H. (2005). Running in packs to develop knowledge-intensive technologies. *MIS Quarterly*, *29*(2), 365-378.