



Department of Justice
Canada

Ministère de la Justice
Canada

Predicting Crime: A Review of the Research

Summary Report

Department of Justice Canada

PREDICTING CRIME: A REVIEW OF THE RESEARCH

Summary Report

rr2002-7e

Stephen Schneider, Ph.D.
Adjunct Professor
School of Justice Studies
Ryerson University



Research and
Statistics Division

2002

The views expressed in this report are those of the authors and do not necessarily reflect the views of the Department of Justice Canada.

Biography

Stephen Schneider, Ph.D.

Dr. Schneider is an Adjunct Professor in the School of Justice Studies at Ryerson University, a Research Associate with the Nathanson Centre for the Study of Organized Crime and Corruption (York University) and an independent consultant specializing in criminal justice issues. He has researched a broad array of criminal justice issues, including organized crime, economic crime, technological crime, youth crime and policing and law enforcement (including community policing, organized crime enforcement, criminal intelligence, private policing). His research and consulting work includes a number of studies examining money laundering in Canada, the evaluation of various crime prevention projects, proceeds of crime enforcement, smuggling enforcement, international use of alternative approaches to combat transnational crime, and the impact of fraud on business.

For further information, please contact the project manager at the Department of Justice:

Valerie Howe
Senior Research Officer
Research and Statistics Division
Policy, Integration and Coordination Section
(613) 957-9597

Table of Contents

1.0 EXECUTIVE SUMMARY

2.0 INTRODUCTION

3.0 RESEARCH OBJECTIVES

4.0 RESEARCH DESIGN

5.0 SUMMARY OF RESEARCH FINDINGS

5.1 Factors Driving Future Crime Trends

5.1.1 Demographic Variables

5.1.2 Macro-Economic Factors

5.1.3 Technology

5.1.4 Globalization

5.1.5 Criminal Justice Responses

5.2 The Future Scope and Nature of Crime

5.2.1 The Future Scope of Crime

5.2.2 The Nature of Property Crime in the Future

5.2.3 Emerging Crime Trends that will Grow in the Future

5.3 Future Offenders and Victims

5.3.1 The Future Impact of Crime

6.0 DISCUSSION AND ANALYSIS

6.1 Summary and Analysis: Methodological Design

6.2 Accuracy of Past Crime Predictions

6.3 International Comparative Analysis

6.4 Replication of Foreign Research in Canada

7.0 RECOMMENDED FUTURE RESEARCH

7.1 Overview

7.2 Conceptual Policy Research Framework

8.0 LIST OF REFERENCES



1.0 EXECUTIVE SUMMARY

The objective of this research is to identify and examine studies and organizations that have developed predictions of crime, focusing on forecasts for the first two decades of the 21st Century. The research methods for this study involved a review of electronic and printed literature as well as structured interviews with relevant organizations and researchers.

Crime predictions can be developed through both qualitative and quantitative methods. Qualitative approaches to forecasting crime, such as environmental scanning, scenario writing, or Delphi groups, are particularly useful in identifying the future *nature* of criminal activity. In contrast, quantitative methods are used to predict the future *scope* of crime, and more specifically, crime rates. A common quantitative method for developing forecasts is to extrapolate annual crime rate trends developed through time series models. This approach also involves correlating past crime trends with factors that will influence the future scope of crime, in particular demographic and macro-economic variables.

Demographic factors have been cited as the strongest determinants of crime rates and hence have been central to crime predictions. The key demographic variable appears to be the size of the male population within the crime-prone years of 15 to 25. In those societies with large proportions of young males, there tends to be higher crime rate. A number of studies have shown that crime rates are also closely tied to the strength of the economy; during economic recessions, property crime rates are inclined to grow rapidly, whereas during more economically favourable periods, they have a tendency to fall.

Based primarily on demographic and macro-economic trends, there appears to be a consensus among predictions for the United Kingdom and the United States, that until 2010, the overall crime rate is expected to equal the average crime rate over the past 10 to 15 years. This means that there will be a low to moderate annual increase in the overall crime rate in these countries, beginning in the early years of the 21st Century. Similar patterns should be expected in other developed countries.

The most significant changes over the next few decades will not be in the scope of crime, but rather, in the nature or complexion of crime. Property crime will continue to target physical consumer goods. However, theft will also increasingly target intangible property, such as electronic services, information, knowledge, and even personal identities. Physical hardware, such as digital television sets, computers, or cellular phones, will be targeted for theft to facilitate access to valuable electronic services. Crime will also become more organized and transnational in scope; increasingly, offenders will be located in one or more countries while their victims may reside in countries located on the other side of the globe.

The one variable that research suggests will have the most significant influence on the future complexion of crime is technology. New technology will provide individual offenders and criminal groups with easier access to systems, premises, goods, and information; remove geographical obstacles to crime; increase the scale of the bounty from criminal offences; maximize anonymity, and enhance the ability of offenders to avoid detection. Traditional crimes such as theft, counterfeiting, child pornography, stalking, money laundering, and fraud will continue, albeit facilitated by advanced technological tools. The Internet will be a central vehicle through which traditional and new forms of crimes will be perpetrated. In short, the computer, digital, and cellular age will bring about changes in how old forms of crime are conducted, while ushering in new, high-value services that will be targeted.

What is consistent throughout most crime predictions is the assumption that the largest offending demographic group will continue to be young males between 15 and 25 years of age.

Of most concern will be the technologically-astute young offender who commits complex electronic and computer-based crimes, such as stealing electronic signals, counterfeiting digital products, or hacking into computer networks for the purposes of vandalism or profit. The future may also hold a greater degree of offending by legitimate and illegitimate companies; the Internet has given rise to the *virtual firm*, which makes it easier for unscrupulous offenders to commit fraud and theft while avoiding detection.

As far as the future victims of crime are concerned, households, businesses, and governments will continue to be victimized by a wide range of organized and unorganized physical, electronic, and intellectual crime. The general public will continue to be a principal target of property crime, especially as the consumption of high-value, portable consumer electronic products continues to grow. Demographic trends point to a significant rise in the aging population over the next 20 years. This will produce a senior citizen population that may be at greater risk of criminal attack. The greatest crime and delinquency threats to businesses may come from attempts to steal or sabotage intangibles, particularly information and knowledge. As global competition intensifies in the knowledge era, rival businesses may increasingly try to steal intellectual property through industrial espionage to maintain an edge.

While there is little reason to believe that the crime rate will grow dramatically in the first decade of the 21st Century, given the anticipated increases in the globalization, sophistication, and organization of crime, one may conclude that the impact of crime on Western societies will be more severe than the one witnessed under a similar rate of crime in the past. In particular, advanced telecommunications technology such as the Internet, will allow offenders to reach a greater number of victims. There are also fears that the ongoing organization, sophistication, and globalization of crime may pose a greater threat to financial markets, economic stability, and even the national security of some countries.



An international comparative analysis shows that most crime forecasting has been conducted in the United States and Great Britain. This research did not identify any Canadian studies in the past decade that involved forecasting crime into the 21st Century. A cursory knowledge of Canadian data sources indicates that there are no real obstacles to replicating in this country the organizations and models developed elsewhere. Within Statistics Canada there exists the expertise, resources, instruments, and experience in conducting national statistical estimates of criminal incidents, including time series analyses. Moreover, Statistics Canada collects quantitative data on those factors that influence crime and hence can be correlated with crime-related data to conduct time series forecasts and impact assessments.

The principal recommendation of this study is that a dedicated funding stream be provided for an integrated research program that examines crime trends, forecasts future crime rates and patterns, and estimates the impact (costs) of crime for both the present and the future. This funding should emphasize applied research that can be used to develop policies and programs that anticipate future crime trends and attempt to minimize their impact on Canadian society. The Federal Government should convene a multi-disciplinary and multi-sectoral working group to coordinate and/or undertake this research. Future research should assess the wider impact of new technology on crime and the criminal justice system. Funding should be provided to focus scientific and technological attention to crime reduction, especially computer-based crime. These initiatives must be placed in the context of an emphasis on incorporating crime reduction into the mainstream of public policy, private sector, and household planning and decision-making.

2.0 INTRODUCTION

In almost every period of western civilization, the inexorable increase in crime has been lamented in the corridors of power, the media, and the public. Haunted by recollections of a previous golden age, pundits have used crime statistics, research, and the almost daily barrage of media stories as a basis to conjecture about the changing nature and scope of crime, including dire predictions for the future.

However, unlike the last forty years, the most significant and frequently discussed crime trend for the 1990s has been the drop in the recorded crime rate throughout North America. Statistics Canada reported that in 1999, the national crime rate was at a 20-year low. The overall crime rate for the year fell 5% from 1998. In addition, the rate of violent crime fell 2.4%, the seventh consecutive annual drop. Homicides decreased by 4.7% in 1998 and reached the lowest rate since 1967 (Statistics Canada, 2000, 9). Throughout the United States, property and violent crime offences reported to law enforcement agencies decreased 7% in 1999, in relation to the previous year. This marked the seventh consecutive year that property and violent crime has fallen in the U.S. (Federal Bureau of Investigation, 1999).

There are a number of factors that drive current crime trends although there is no definitive explanation as to why the crime rate has dropped so precipitously in the last few years or why it began to dramatically increase in the 1960s. Some criminologists argue that the most significant variable is demographics: the aging population of the 1990s meant that there were less people in the crime-prone age group of 15 to 25 years. During the 1960s and early 1970s, just the opposite occurred: a large portion of the baby boom generation was in that age bracket. Based purely on demographics, the implication for the future is that the numbers of those most likely to commit offences (i.e., the offspring of the baby boom generation) will rise for most of the first decade of the 21st Century and then gradually decline. Other significant factors that have and will continue to influence the nature and scope of crime are macro-economic factors, technology, globalization, work and lifestyle choices, the organization of crime, and criminal justice resources and responses.

The use of crime trend analysis, as well as other quantitative models and qualitative analyses, to predict the future of crime has been used by some criminologists, futurists and criminal justice policy makers as a means to anticipate future crime trends, in part so that the scope and impact of crime can be lessened and even prevented in the coming years.



However, there is currently a lack of synthesized knowledge of the research and organizations that have undertaken crime forecasting. The purpose of this study is to make a modest contribution to addressing this void by providing some initial empirical inquiries into the literature, research, and analytical tools, as well as the individuals and organizations that have developed forecasts of crime for the 21st Century.

3.0 RESEARCH OBJECTIVES

The objectives of the research that is summarized in this report are to:

- 1) Identify and examine research and other literature that addresses the future of crime, with a focus on the first two decades of the 21st Century;
- 2) Identify individuals and organizations in Canada and abroad that have developed crime predictions, examine their mandate, the nature of their research, and the methods, instruments, and analytical tools they used;
- 3) Analyze the strengths and weaknesses of the existing research and forecasts;
- 4) Examine research and organizations in Canada in order to comparatively analyze the current capacities and practices in Canada against other countries;
- 5) Provide recommendations to the Department of Justice on future research to be undertaken in Canada and the potential replication of relevant foreign organizations and research methods in this country; and
- 6) Document the research findings, analysis, and recommendations, in draft and final reports to be submitted to the Department of Justice.



4.0 RESEARCH DESIGN

Qualitative research methods were employed to gather both secondary and primary data. This study combined a broad survey of the subject area with a case study approach that facilitated an in-depth examination of relevant organizations and conceptual and applied research methods and analytical models. Specifically, the research methods used for this study were a review of electronic and printed literature as well as structured interviews with relevant organizations and researchers.

The geographic scope of the international research is restricted to Canada, the United States, the United Kingdom, and Australia. Due to the lack of research in Canada on crime in the 21st Century, much of the focus in this summary report is research and organizations from the United States and the United Kingdom.

5.0 SUMMARY OF RESEARCH FINDINGS

This section summarizes and examines the literature and organizations that have developed predictions of crime for the initial years of the 21st Century. Also, particular emphasis has been placed on how the scope and nature of crime will change: Crime is expected to change in both quantitative and qualitative terms. While this summary analyses how future crime rates may differ from those in the past, much of it focuses on how the nature or complexion of crime is expected to change in the future.

This section begins by summarizing the key factors that research indicates will influence the scope and nature of crime in the future in particular demographic, macro-economic, and technological factors. A synopsis of research that has made specific predictions on future crime rates is then presented. This is followed by a review of predictions concerning the nature of crime, with a particular focus on future trends and anticipated developments that will distinguish crime in the 21st Century. This review identifies products and services that will be targeted by offenders in the future, specific types of emerging crimes that are expected to increase, the extent to which crime in the future will impact society, and a profile of victims and offenders of the future.

5.1 Factors Driving Future Crime Trends

There are a number of factors that influence the scope of crime, although there is no definitive explanation as to why the crime rate has fallen in the last few years or why it began to dramatically increase in the 1960s. Regardless, the two most significant variables that have influenced crime rates in the past and are expected to be highly influential on future rates are macro-economic factors (e.g., strength of the economy, unemployment rates, consumer spending levels) and demographic factors, (in particular the number of males in the crime-prone age group. The one factor that may have had the most significant impact on crime rates in recent years is technology. It will, in all probability, continue to greatly influence the nature of crime.

5.1.1 Demographic Variables

Demographic variables have been cited as the strongest determinants of crime rates and hence have been central to predictions about the future of crime (Fox, 1978; Bennett, 1987; Pyle and Deadman, 1994; Britt, 1995; Field, 1998; Dhiri, Brand, Harries, & Price, 1999; Deadman, 2000; Foresight Directorate, 2000b). In particular, the demographic variable that appears to most influence crime is the size of the male population within the crime-prone years of 15 to 25. As such, it has been argued that the age structure of a society has the most influential effect on the level of crime in a society. In those societies with large proportions of young males, there tends to be a higher crime rate. Conversely, in societies with an aging population, the crime rate tends to be lower. The aging population of the 1990s has meant that there is proportionately fewer people in this



crime-prone age group—which may explain the startling drop in crime throughout much of this decade—compared to the late 1960s through to the early 1980s when a large portion of the male population was in that age bracket. Time series models that explore the relationship between the size of the crime-prone age population and crime rates generally indicate that both the property and violent crime rates are greatly influenced by whether the number of young men in a society is rising or falling (Fox; Pyle & Deadman; Field; Dhiri et al., Snyder & Sickmund, 1999; Deadman).

5.1.2 Macro-Economic Factors

The idea that crime may be related to macro-economic factors has been explored, especially in research from the United Kingdom. A number of studies suggest that crime rates, and property crime rates in particular, are closely tied to the strength of the economy, although the direction of this relationship is the subject of much debate. One argument is that during economic recessions, property crime tends to grow rapidly, whereas during more economically favourable periods, it is apt to fall. It is hypothesized that during economically robust times, more people are employed and/or earn better wages, and as such, are less likely to be attracted to crime. In contrast, economic recessions result in greater unemployment and poverty, which, in turn, drives more people toward criminal behaviour. The antithetical argument is that booming economies produce increased wealth, which, in turn, bolsters conspicuous spending on consumer commodities. The increase in the number of commodities in society increases opportunities for theft, thereby pushing up property crime rates.

Field (1990; 1998) concludes that macro-economic factors correlate most strongly with crime trends. In particular, he argues that the escalation of the property crime rate in the United Kingdom is closely tied to economic growth, and more specifically to consumer spending. When the economy is strong and consumption of consumer goods and services is growing, property crime growth tends to slow down or reverse. The opposite is true during periods of economic recession. Following an analysis of data on crime and macro-economic cycles in England and Wales between 1946 and 1991, Pyle and Deadman (1994) found that the number of recorded burglaries, robberies, and thefts rose which coincided with the ever-expanding economy and the rise in consumer spending.

The historical correlation between the economy and crime rates may also help to explain why the crime rate began to significantly increase during the 1960s and 1970s. This explanation hinges on how the increased wealth of developed countries was spent and the implications that these changing spending patterns had on opportunities for crime. Field (1990) hypothesizes that prior to and immediately following the Second World War, increases in national income were heavily invested in improvements in the basic necessities of life, such as food and housing, heating, lighting, public transport, and social welfare programs. Increased expenditure in these areas did little to affect the opportunities for crime. It was during the 1950s that the accumulating wealth was

increasingly devoted to more consumer commodities vulnerable to theft, such as cars and electronic goods.

5.1.3 Technology

While demographic and macro-economic factors are central to forecasting the future scope of crime, another variable that is seen to greatly influence both the nature and scope of current and future crime is technology. The influence of technology on the future of crime can be demarcated into three broad categories: (a) advances in technology will continue to provide criminals with the tools to facilitate the commission of traditional crimes (e.g., fraud, theft, money laundering, and counterfeiting), (b) technology itself will be the target of criminal offences (e.g., theft of telecommunications services and the spread of viruses), and (c) new technology will be used to prevent or deter criminal attack (Association of British Insurers, 2000).

One of the principal reasons for the increase in counterfeiting in recent years is the advance made in such technologies as personal computers, scanners, colour laser printing, photocopiers and desktop publishing software. The commercial availability as well as the decreasing costs of these technologies have increased their accessibility, which in turn has provided a greater number of people—amateurs and professionals alike—with the opportunity to commit a number of fraud-related crimes, which were once the domain of highly skilled forgers or counterfeiters who required specialized equipment and expertise (Schneider & Cotter, 2000).

The domination of and changes brought about by Information Communications Technology (ICT) will have profound effects on crime in the future, particularly the potential for its increased speed and scale. Crimes such as electronic theft and fraud will occur more quickly, reducing the likelihood of offenders being caught in the act. As the automation of financial transactions increases, so will the opportunities for online theft and fraud (Cole, 1995). According to the Foresight Directorate, which was launched in 1994 as part of the British Department of Trade and Industry, the Internet will facilitate the ability of offenders to take advantage of their relative anonymity to strike quickly and without trace against targets at both a national and international level. Indeed, ICT will allow people to group together more easily, overcoming geographical limitations. The Internet in particular will ensure that information about how to compromise the data systems of companies and government agencies will be available more quickly and to more people. ICT also facilitates the sophisticated use of cryptography and stenography to conceal illegal transactions. Developments in miniaturization and *nanotechnology* will mean even smaller, more portable products that will be easier to steal and conceal by offenders (Foresight Directorate, 2000b).

In short, technological innovation, particularly in the convergence of computers, communications, and information, will be an increasingly important facilitator of criminal activity. New technology will allow individuals and small groups to commit



crimes previously beyond their means, while minimizing the risks inherent in offending. It will provide easier access to systems, premises, goods, and information; remove geographical obstacles to crime; heighten the scale of potential rewards; and increase anonymity and enhance the ability of offenders to avoid detection. The problem is compounded by the fact that new technology is introduced without consideration of the crime consequences. (Association of British Insurers, 2000; Foresight Directorate, 2000b).

5.1.4 Globalization

The advances in telecommunications along with other factors, such as increased international trade, travel, and immigration, have resulted in the growing irrelevance of national borders, at least as far as crime is concerned (Foresight Directorate, 2000b).

As indicated above, the Internet has been a boon particularly for transnational crime, allowing offenders from different countries to group together more easily by overcoming geographical limitations. More offences can be committed without the perpetrator ever having entered the jurisdiction where the crime has occurred.

Ever expanding volumes of trade will heighten the opportunities for, and decrease the risks involved in, organized illicit smuggling (Foresight Directorate, 2000b). Indeed, according to Wardlaw (1999), when looking at the key forces driving change and influencing the criminal environment, one must place considerable emphasis on the globalization of markets and commerce, which has opened up opportunities to sophisticated criminals and transnational crime groups.

Significant increases in international migration, as well as the ongoing ability and desire for domestic and international mobility of individuals, families, and larger groupings of people, will continue to fuel crimes related to illegal immigration, in particular migrant smuggling.

Transnational crime groups also take advantage of the inherently local and national nature of law enforcement.

5.1.5 Criminal Justice Responses

Although there is a vociferous debate over the ability of law enforcement and the criminal justice system to influence crime rates, some have argued that such factors as criminal justice expenditures, the use of technology by law enforcement agencies, more effective policing and correctional facilities, and a greater role of the public and private sector in crime prevention, will impact crime (Muraskin & Roberts, 1996; Scott, 1996; Gordon, 1999). Therefore, predictions about the future scope and nature of crime should take into consideration the governmental and societal responses.

According to Muraskin and Roberts (1996), technological developments offer much promise for the future of law enforcement in combating crime. Some of the most promising technological advances include biosensors, lasers, and thermal neutron analysis, which facilitate the search for missing persons or toxic wastes, drugs, and explosives; bionic eyes and eardrums which aid in police surveillance; digital technology in automated fingerprinting; and the use of deoxyribonucleic acid (DNA) for use in cases of personal identification.

One of the greatest challenges for governments and police in the future will be dealing with the internationalization of crime. Some have speculated that law enforcement agencies will not be able to keep up with the speed and globalization of criminal innovation. Unlike businesses and criminal organizations, it is difficult for local and national law enforcement bodies to have strong presences outside their jurisdictions (Foresight Directorate, 2000). However, Gordon (1999) optimistically predicts that one of the most profound changes in international law enforcement will be the tendency for jurisdictions to become interlinked in response to transnational crime. For Gordon, change is likely to take place on at least four fronts:

1. the erosion of individual police jurisdictions by the increased use of international conventions, which will in turn be reflected in domestic law;
2. the increased salience of regional and international policing organisations such as Interpol, Europol, and Aseanapol;
3. the forging of key bilateral and multilateral strategic alliances in affected jurisdictions; and
4. the increasing criminal justice aid and assistance provided to developing countries as an extension of government policy.

5.2 The Future Scope and Nature of Crime

5.2.1 The Future Scope of Crime

Views about the future scope of crime in developed countries are noteworthy for their diversity. While one time series analysis predicts a rise in property crime in the U.K. in the immediate future (Dhiri et al., 1999), a similar model using the same data predicts a slight decline (Deadman, 2000). The anticipated ballooning of the crime-prone age population has some predicting a tidal wave of youth crime and violence in the United States (Youth Policy Institute, 1996), while others believe that past trends and future predictions of an escalating rate of youth violence are exaggerated (Zimring, 1998; Donohue, 1998).

There appears to be somewhat of a consensus among those brave enough to formulate specific predictions for the United Kingdom and the United States: from now until 2010, the overall crime rate is expected to equal the average crime rate over the past 10 to 15 years. This means that there will be a low to moderate annual increase in the overall



crime rate beginning in the early years of the 21st Century in these two countries (Britt, 1995; Steffensmeier & Harer, 1999; Pyle & Deadman, 2000; LaFree, Bursik, Short, & Taylor, 2000). Based on current trends, there is little evidence to suggest that property or violent crime will increase dramatically over the next two decades. While the juvenile crime rate is expected to increase due to a swelling of the crime-prone age group, the anticipated size of this group is not so large as to have a significant impact on overall crime rates. This estimate certainly does not come close to the size of the baby boom population that sparked the rapid increase in crime in the 1960s and 1970s. What seems to be the safest prediction, according to LaFree et al. (p. 20), is that the declining crime rate of the 1990s is unlikely to continue to the point where it will return to the low level witnessed in the 1950s and early 1960s.

For many countries, the property crime rate (break and enter, theft of vehicle, theft from vehicle, and some personal crime) serves as a barometer for the scope of crime in general. Crime rates in North America and the U.K. suggest that the property crime began to escalate in the 1960s, peaked during the late 1970s, levelled out in the 1980s, and then declined beginning in the early 1990s. Some analysts predict the property crime rate will increase in the future. The Foresight Directorate suggests that the proliferation of expensive technology in homes may result in increased targeting of domestic premises by burglars (Foresight Directorate, 2000b; Association of British Insurers, 2000). Time series analyses that correlate historical property crime trends with demographic and economic forecasts indicate an upward pressure on property crime in the future as a result of current increases in consumption expenditures and some increases in the number of young males (Field, 1998; Dhiri et al., 1999). In contrast, Deadman (2000), using the same forecast values for the consumer consumption, and unemployment variables as Dhiri et al., predicts a slight decline in residential burglaries in the first few years of the 21st Century in the United Kingdom. Based on his analysis of past trends of the American property crime rate, Britt (1995) argues that the level of property crime in 2010 will be approximately the same as that during the late 1980s, which translates into a low to moderate increase in relation to the current rate.

5.2.2 The Nature of Property Crime in the Future

As noted by the Foresight Directorate (2000b), crime in the future is likely to occur on two levels: (a) the continuation of traditional, age-old “physical crime”; and (b) the new form of *electronic crime*. The types of household property that will increasingly be targeted by physical crimes are high-value, high-tech electronic and computer products. In the future, traditional physical crime will be equalled, and perhaps surpassed, in scope and social impact by the theft from consumers and businesses of intangible property, in particular electronic services, knowledge, and even identities. These types of thefts will increasingly be committed via computer-based telecommunications vehicles, such as the Internet. It is the theft of intangible products and services, through traditional physical

means, and more significantly, by way of computer-aided vehicles, that represents the most dramatic change in the complexion of property crime of the future.

As indicated in the previous section, the factor that will most influence the complexion of crime in the future is technology. Traditional crimes, such as theft, counterfeiting, child pornography and fraud will continue, albeit with new electronic targets and facilitated by advanced technological tools. Electronic targets include both physical consumer products, such as digital entertainment systems or portable computers, and intangible electronic services and property, such as the electronic transfer of information (e.g., credit card numbers, personal financial data), programming codes, cellular phone services, satellite signals, copyright information, or personal identification information. ICT will facilitate such electronic crimes as credit card fraud, network hacking, distribution of digital child pornographic images, and money laundering. High technology tools will also be used to further traditional physical crime. Two examples are laser cutters, which can be used to penetrate physical barriers, and video and audio devices that can gather counterintelligence on law enforcement operations (Reno, 1998).

Future 'Hot Products' Targeted by Physical Crime

While crime will increasingly target intangible services and property, there will no doubt be a persistence of traditional physical property crime that targets tangible goods. Ongoing developments in electronics, materials, chemicals, and communication technology will continue to produce high-tech, high-value, portable products desired by consumers and criminals alike. The trend toward increased miniaturization—the ability to integrate a number of different functions in one product without a significant gain in size or weight—of electronic consumer goods and the development of lightweight casings will potentially contribute to an increase in property theft. Another result of miniaturization will be thieves' heightened attraction to consumer electronics. In short, some have predicted that property crime may increase due to the opportunities presented by the greater availability of small, high-value electronic products in households and businesses. Such products will be highly vulnerable to theft due to their value and the relative ease with which they can be stolen, transported, and fenced (Foresight Directorate, 2000b; Association of British Insurers, 2000).

An important predictor of the types of products and services that will be targeted for theft is the extent to which a product is desired. Products attractive to both consumers and criminals are sometimes called *hot products*. The U.K. Home Office has identified 15 characteristics of goods that will make them highly vulnerable to theft. These are summarized in the acronym CRAVED (defining products which are Concealable, Removable, Available, Valuable, Enjoyable, and Disposable) (Foresight Directorate, 2000a). Based on this threat assessment, some examples of hot products that may be targeted by offenders in the future include portable digital virtual disk (DVD) players, the



wearable personal computer, automobile digital stereo systems, lap top computers, and handheld personal computers.

Future 'Hot Services' Targeted by Physical Crime

Information and entertainment is increasingly delivered as a service, usually in the form of an electronic signal (i.e., cellular, digital, and satellite signals). Television sets, cellular phones, and computers are all vehicles through which an electronic service is delivered. As such, the hardware is increasingly nothing more than the access point to highly desired services. New forms of crime will increasingly exploit this new electronic world. The electronic signals used to access such desirable entertainment and information services as digital television, the Internet, or cellular telephone services, will become targets in themselves, while the physical hardware, such as television sets, computers, or cellular phones, will be stolen to facilitate access to these services (Foresight Directorate, 2000b).

The Foresight Directorate (2000b, 8) sought to replicate CRAVED for electronic services under the acronym EVADED. This identifies a *hot service* as one that is:

- Enduring: once appropriated it can continue to be used and not be terminated by the legitimate supplier;
- Valuable;
- Available: goes to the heart of the security around such services;
- Distributable: the thief is able to make this service available to others;
- Easy to use: the easier the service is to use, the more potential recipients there will be; and
- Desirable: given the range of electronic services in the entertainment sphere, something may be desirable to a thief without necessarily having a high monetary value.

These hot services are not limited to current signal-based entertainment. The uploading and downloading of digital material from the Internet (e.g., music, movies, and games) will also be an area of immense growth.

5.2.3 Emerging Crime Trends that will Grow in the Future

Computer-based Crimes

Computers, especially when used as information communication devices, will increasingly be central to a vast array of electronic crimes. As previously mentioned, the Internet in particular will be a popular vehicle through which traditional and new forms of computer-based crimes will be perpetrated. The scope and impact of Internet-based crimes are likely to continue to grow in the future.

The Internet will provide computer-literate offenders with new opportunities to commit crimes directly related to networked systems. E-mail abuse, viruses, and hacking are expected to grow in prominence in the future (Daniels, 1995). Companies are likely to face Internet attack from both within (viz., by employees) as well as externally (e.g., by “hackers for hire”). Ever-increasing volumes of valuable and sensitive information will be stored electronically by the commercial, government and domestic sectors en masse in data warehouses. These facilities will be vulnerable to electronic vandalism, and theft and the potential for loss of or damage to such data can be immense (Association of British Insurers, 2000; Foresight Directorate, 2000b).

While offenders find new areas of value to pursue in the electric, digital, and computerized world, many old forms of crime will be translated to the electronic world and increasingly conducted through new electronic mediums. The Internet will enable criminals to perpetrate traditional crimes such as fraud, theft, embezzlement, gambling, drug trafficking, and pornography on a much wider scale (Reno, 1998). The Internet will not invent new forms of frauds; however, “electronic variations of traditional frauds will be carried out with greater efficiency and effectiveness, will have potentially greater impact and will be more difficult to investigate” (Wardlaw, 1999, 8). The Internet will help to feed the growth of fraud and theft, especially in relation to credit and debit cards, telemarketing, multi-level marketing, on-line auctions, personal identity, intellectual property, and stock markets.

According to Moore (1994), criminal organizations are becoming more knowledgeable and sophisticated in their use of new technologies, and in the future, will be heavily involved in computer-related crimes, especially in crimes against financial institutions. For Johnstone and Haines (1999), extensive use of the Internet as a means of commerce, and more specifically, of electronic payment, will increase its attractiveness for exploitation by offenders.

Telemarketing fraud and stock market manipulation through the Internet are also expected to increase. There is a growing fear that well-organized criminals will launder their ill-gotten gains through e-commerce transactions, sending electronic cash to cyber-accounts located all over the world. With vast wealth at their disposal, criminal organizations can buy almost any kind of technological resource or expertise. The Hell’s Angels, for example, are known to have their own Internet service provider; this is an effective way to block attempts to monitor their activity on the Internet (Schneider, 2000).

Knowledge and Information Crimes

Information and knowledge are viewed as the key to future economies. In the knowledge-based economy, it is the conception of new designs, patents, and intellectual property that has an extremely high value. In short, information increasingly has financial value in its own right.



The theft of information and intellectual property will increase as the importance of the knowledge-based economy grows. Intellectual property offences—including copyright infringement, product counterfeiting, and breach of confidence—are already one of the fastest growing categories of crime and a matter of international concern. There is much speculation that economic espionage between companies will continue to increase as international competitiveness in the knowledge arena intensifies.

Copyright fraud is expected to greatly increase in the future. In particular, the illegal uploading and downloading of copyrighted materials from the Internet, such as music, movies, and games, etc.) will be an area of immense growth (Association of British Insurers, 2000). This is accompanied by more traditional forms of piracy, such as the illegal copying of software, videos, and computer games. Traditional and Internet-based forms of product piracy are problematic because both are so widespread, hard to detect, and difficult to police. (Association of British Insurers, 2000, 22)

Identity Theft

One of the most personally intrusive of crimes that has emerged in recent years is where an offender pieces together the private information of individuals to impersonate them for fraudulent purposes (Smith, 1999). While identity fraud is a serious crime in itself, it is significant because of the role it plays in facilitating other types of crimes, such as cheque or credit card fraud, bank loan fraud, fraudulent purchase agreements, government assistance fraud, and illegal immigration. It has been estimated that 95 percent of financial crimes in the United States involve stolen identities; while financial losses related to such crimes nearly doubled in the two years preceding 1998 (Kyl, 1998). As such, an individual's identity, in whatever form it takes, will have greater value and hence be highly attractive for theft in the future, especially as its centrality to other crimes increases and as public information on individuals becomes more sought after by criminals. The large amount of information that companies now maintain on consumers, combined with increased access to such information through commercial services or the Internet, will contribute to an increase in identity-related crimes in the future.

Increased Organization of Crime

As crime becomes more sophisticated, international, and technological, it will also become more organized (i.e., committed through ongoing conspiracies involving two or more people). In recent years, there has been an increase in the organization of traditionally “unorganized” predatory crimes, including the entry of Asian, Italian, and Eastern European crime groups, into auto theft, burglaries, home invasions, and fraud, to name just a few. According to Moore (1994), theft will be much more highly organized, sophisticated, and specialized in the future.

In addition, many of the crimes that will be highly profitable in the future, such as illegal waste disposal, trafficking in arms and nuclear materials, migrant smuggling, and trafficking in humans, will demand some form of organization (Moore, 1994). Certain economic crimes, such as telemarketing fraud, counterfeiting, and credit card fraud, are already highly organized. Corporate crime, which historically has been committed by employees acting alone, will increasingly be perpetrated by groups external to companies. This includes both traditional crime groups, which are organized around common ethnic or cultural ties, and the emerging non-traditional economic crime groups or networks, which have, as their sole common bond, the profit motive.

As with crime in general, technology is a critical factor in the proliferation, globalization, and reach of criminal organizations, and will play a defining role in the nature and scope of organized crime in the forthcoming years. Future technological crimes (e.g., hacking, viruses, theft of electronic services), which were traditionally committed largely by individuals (e.g., teenagers hacking into external networks through a computer modem in their bedroom), may be replaced with groups or loose networks of like-minded individuals. Information and communication systems will be subject to sophisticated and well-organized hackers. Criminal organizations will be tied into larger networks that will use technology and communications to operate more efficiently and with greater impunity (Moore, 1994). Organized crime groups will continue to explore the possibilities of new technology and will reach out to individuals with specific technological skills (Criminal Intelligence Service Canada, 2000).

Growing Transnational Nature of Crime

The future of crime will increasingly be one without boundaries. The role that telecommunications technology, and the Internet in particular, will play in globalization, will ensure that crimes become more transnational in scope (Foresight Directorate, 2000b). Sophisticated criminals have capitalized on the global integration of commerce and communications, while taking advantage of the limitations of local and national regulatory and enforcement regimes (Wardlaw, 1999; Criminal Intelligence Service Canada, 2000). Information communications technology will allow people from different countries to group together more easily, overcoming geographical limitations. Through the use of technology such as the Internet, offenders can be located in one country while the victims reside in countries scattered all over the globe.

5.3 Future Offenders and Victims

This section is concerned with the characteristics of future offenders and victims of crime and how these characteristics may diverge from the past.

What is constant among most crime predictions is the assumption that the largest offending demographic group will continue to be young males between 15 and 25 years



of age. The young offenders of the future can be divided into two groups: (a) those who rely on traditional property crimes, and (b) those that commit more advanced electronic and computer-based crimes.

The first group will not be very different from traditional young offenders. They will largely be of lower socio-economic status, the product of dysfunctional environments, with learning disabilities and a history of crime and delinquency. This group will largely be responsible for rudimentary property crimes, such as break and enter, theft from autos, and theft of autos. According to Cole (1995: 13), advancing technology and the new knowledge-based economy may result in a disproportionate impact on less skilled, lower socio-economic groups. Certain groups may be excluded from new technology for financial or geographic reasons. This may create black markets for stolen goods or feelings of social exclusion, both resulting in an increase in crime among disenfranchised populations (Association of British Insurers, 2000).

The second category of young offenders will be dominated by educated, middle-class youth, who are technologically-astute and use their knowledge of computers and networked systems to steal electronic signals, counterfeit digital products, or hack into networks for vandalism or profit. In future years, analysts predict that the average individual will know more and more how to use technology, but understand less and less about how it works. As such, society may one day be at the mercy of a small, technologically-knowledgeable elite of computer experts who fall within the crime-prone years. With greater access to information, including sensitive information, low level agents may be capable of creating crime and havoc of a severity previously limited to organized or career criminals (Foresight Directorate, 2000b).

Another concern—although there is little evidence of this as yet—might be the effects of social exclusion leading to more crime committed by members of the aging population. As people live longer, and possibly retire earlier, the perception that this group lacks a constructive role in society might develop. As with any other socially excluded group, this might lead to crime. In such a case, the motivation might also be supported by extensive knowledge of financial and commercial institutions and markets. With time on their hands, there is no reason why offenders might not come from the aging population (Foresight Directorate, 2000a, 5). As Bennett (1987) predicts, traditional criminals (i.e., young, male, poor, and uneducated) will be increasingly displaced by older, more upscale offenders. Indeed, sophisticated types of fraud, which have been on the rise in recent years, are generally committed by older offenders.

The future may also hold a greater degree of offending by legitimate and illegitimate “companies.” The Internet has given rise to the *virtual firm*, which facilitates the ability of unscrupulous offenders in committing such widespread crimes as Internet auction fraud. (Association of British Insurers, 2000: v) Indeed, according to Daniels (1995), bogus goods or services are more likely to be sold over the Internet through individuals or organizations posing as legitimate companies. Customers may find they have ordered

goods from a company that does not exist, gained a qualification from an unrecognized distance learning college, or received a service from a professional with a bogus qualification (Association of British Insurers, 2000, 17). The anonymity of the Internet creates new opportunities for companies to conduct fraud because those perpetrators will be harder to trace, being hidden behind the veil of an electronic organization (Daniels, 1995, 11).

Traditional organized crime groups will continue to claim their fair share of victims through traditional predatory crimes such as extortion, as well as via more sophisticated and profitable economic crimes, including fraud, counterfeiting, and product piracy. The future may also witness the proliferation of non-traditional criminal organizations and networks, whose members are not affiliated by ethnic or cultural ties, but by interest in specific types of economic or financial crime, such as credit card fraud, deceitful telemarketing, or securities fraud (Schneider, 2000).

As for the future victims of crime, households, businesses, and governments will continue to be targeted by a wide range of organized and unorganized physical, electronic, and intellectual crime. The general public will also be victimized by property crime, especially as the consumption of high-value, consumer electronic products grows.

Demographic trends point to a significant rise in the aging population over the next 20 years, which will produce a senior citizen population that may be at greater risk to criminal attack (Froom, 1996). While the victimization rate of the elderly is low relative to their population size, the sizeable and vocal baby boom population that is entering their advanced years will ensure that crime against the elderly will remain a central public policy issue (Walker, n.d.).

Businesses will continue to be the victims of traditional property crime, as well as internal theft and corporate fraud. In the future however, the greatest crime threats to businesses may come from attempts to steal or sabotage intangibles, in particular information and knowledge. As global competition intensifies in the knowledge era, businesses may increasingly target intellectual property of rivals through industrial espionage to maintain a competitive edge. This industrial espionage will take place primarily between competing companies, but may also involve individuals, organizations, and companies that are hired explicitly to conduct these covert operations. Other types of knowledge crimes, including copyright infringement, counterfeiting and product piracy, are also anticipated to grow and consequently impose a considerable cost to manufacturers, especially in the computer software and entertainment industries.



5.3.1 The Future Impact of Crime

While, there is little reason to believe that the crime rate will increase dramatically in the first decade of the 21st Century, given the anticipated increases in the globalization, sophistication, and organization of crime, one may conclude that the impact of crime on Western societies may be more severe than the one witnessed under a similar rate of crime in the past.

It is perhaps the growing role of technology in criminal activities that will be most responsible for this increased impact. For it is technology, in particular telecommunications technology, that will provide offenders with greater access to valuable information and services at both the household and commercial levels. Telecommunications technologies will also further the reach of offenders, in geographical terms; the number of potential victims; the amount of assets that can be stolen; or the degree of damage inflicted.

Technology such as the Internet has allowed traditional fraud schemes to be directed towards thousands of people, in comparison to the dozens or hundreds that could realistically be reached through traditional mediums, such as the telephone or postal service. The advent of desktop publishing, colour printers, and photocopiers means that currency counterfeiting is no longer the exclusive domain of lithograph experts with expensive offset printers. As such, a greater number of amateurs can produce larger numbers of bogus bills. The widespread availability of compact disc writers greatly facilitates the illegal copying of software, music, and other forms of digital entertainment. The ability of hackers or viruses to penetrate the internal networks of companies can potentially result in the type and scope of damage that would have been impossible before the rise of the Internet.

The increased organization of crime may also intensify the impact of crime on society. The organization of traditionally unorganized crimes, such as fraud or auto theft, means that greater numbers of victims can be targeted for more assets. Illegal immigration has dramatically changed in recent years through well-organized migrant smuggling operations. The smuggling of migrants by organized crime groups will result in a larger number of individuals illegally entering Western countries, which will negatively impact on the recipient societies as well as the migrants themselves, who are forced to work as indentured labourers or prostitutes to pay off their transport fees.

The combination of technology, the integration of international markets, and the increased organization of crime mean that economic and financial crimes can be committed on a much larger scale than in the past. The result is that there may be a greater negative impact on the financial markets and on some countries' entire economies. This can lead to the destabilization of global commerce, financial markets, and investor confidence.

The growing power of transnational crime groups may also pose threats to the national security of some developing and transitional countries (Canadian Security Intelligence Service, 1998; United States Department of State, 2000; MI5, <http://www.mi5.gov.uk/>).



6.0 DISCUSSION AND ANALYSIS

6.1 Summary and Analysis: Methodological Design

This section summarizes the research and analytical methodologies used to develop crime trend series and make predictions about the future of crime. This analysis includes a discussion of the strengths and weaknesses of the research methods, findings, and predictions themselves.

Predicting the future of crime is growing in popularity, as can be seen when one compares the amount of literature dedicated to the future of crime that was published during the 1990s with that available in previous decades. However, despite the continual refinement of the increasingly scientific forecasting methods, it is likely to continue to prove extremely difficult to generate accurate, long-term forecasts of the nature and scope of crime.

Although all uncertainty cannot be removed, it is still possible to systematically formulate a range of possibilities using established methods and analytical tools. The tools of the disciplined futurists, according to Cole (1995), are a sound methodology, a sense of history and theory, knowledge of key factual data, and the ability to examine crime in the contexts of broader social, political, technological, and economic trends. The data sources and methods used to guide forecasting include crime statistics; surveys of experts, practitioners, and the general public; literature reviews; scenario writing; and statistical (time series) models that extrapolate crime trends into the future.

Following the adage “the best predictor of the future is the past” is a common method of developing crime forecasts: extrapolating historical and contemporary trends into the future. Mathematical models that describe the behaviour of observed past values can be used to forecast future crime trends by projecting a time series analysis of crime trends into the future. In general, the source of quantitative time-series forecasting is police- and victim-reported crime statistics. *Modelling* consists of describing the causal sequence of variables and the prediction of their interactions. Any predictive model endeavours to show a relationship between certain independent (predictor) variables and a dependent variable (i.e., the criterion to be predicted).

It is universally acknowledged that simply to extrapolate past trends is an unsatisfactory predictor of the future; to maximize the validity of crime predictions, time series models must take into consideration the broader context within which crime exists (Britt, 1995). In other words, these models must account for the broader social, economic, political, and technological factors that produce crime. As such, to ensure greater accuracy, these models must identify and predict the scope and nature of a number of factors that will influence crime and victimization in the future. Indeed, many of the time series models identified in this research are based on correlating crime trends with trends in major

predictive variables, most commonly the strength of the economy and demographics, particularly the size of the crime-prone population.

The principal strength of quantitative models, in relation to qualitative forecasts, is that descriptions of future crime rates are much more specific and precise, although not necessarily more accurate. By extrapolating crime trends and adjusting them according to influencing variables, predictions can be made with greater empirical validity than by relying exclusively on qualitative methods.

The most significant weakness of the predictive aspects of these models is the difficulty of identifying, anticipating, and factoring in the impact of the variables expected to influence future crime trends. The quantitative models identified in this research did not, and probably could not, factor in the vast array of variables that may influence crime; most of the time series models used to predict future crime rates only took into consideration one or two key influential (demographic and macro-economic) variables. While there is substantial evidence of the impact that these variables have on the crime rate, a key reason they are used in crime forecasts is that their trends can also be quantitatively documented, and hence, forecasted into the future. What is absent from these mathematical models is the integration of influential variables that are more difficult to quantify through historical time series data such as technology, life-style changes, criminal justice responses, and the level of private security and crime prevention efforts undertaken by the public.

Finally, quantitative models suffer from the inability to anticipate unpredictable future events, including unforeseen technological advances, economic vicissitudes, social trends, and advances made in law enforcement and private security technology. The problem inherent in correlating crime with influencing factors is that the future movement of these extraneous factors must also be subject to tenuous predictions in order to gauge how their future direction will influence crime. Despite these problems, an extrapolation of past trends is still informative as it describes some of the underlying pressures on crime, and with careful interpretation, can provide a useful baseline for developing forecasts (Dhiri et al., 1999). Ideally, time series forecasting should develop a range of predictions based on various optional models of how extraneous variables will move in the future and the impact of each of these on crime.

The predictions reviewed in this research offer various forecasts that range from a decrease to an increase in crime. They are generally based on differing assumptions and the margins of error inherent in mathematical modeling. For example, the mathematical model of Dhiri et al. (1999) offers substantially differing crime predictions. At one extreme lies their prediction that the number of recorded burglaries and thefts in 1999 and 2000 will increase by approximately 40 percent when compared to 1997. Alternatively, they project that burglary might fall below the 1997 level. Abrahamse (1996) projects homicide arrest rates in California until 2021 using pessimistic, nominal, and optimistic assumptions. Under the pessimistic assumption, by 2021 homicide arrest rates will



nearly double the 1994 rate; under the nominal assumption, homicide arrest rates will be about 28 percent higher in 2021 than in 1994; and under the optimistic assumption, homicide arrest rates in 2021 will be about 14 percent below 1994 levels.

Crime trend analysis and statistical modelling may provide one means of estimating future crime rates. However, there is a need for a rational identification of new targets for criminal activity that keeps pace with changes in social mores and technological innovation. This type of prediction is best accomplished through qualitative methods. The principal weakness of qualitative models is that they are often restricted to generalities; any attempt at predictions of actual crime rates simply involves educated guesses by experts.

Below are some of the qualitative methods that have been used to forecast crime:

Environmental Scanning— In the context of developing predictions, environmental scanning represents a systematic effort to identify future developments (i.e., trends or events) that could plausibly occur over the time horizon of interest and whose occurrence could alter a particular environment in important ways. Such developments may come from a number of domains, including economic conditions, demographic shifts, government policies and enforcement resources, international events, social attitudes, technological advances, and so on. In essence, the scanning process is concerned with identifying future conditions that could emerge and how they affect the phenomenon that is the focus of the forecast. Future researchers are particularly interested in identifying those developments—whether of low or high likelihood of materialization—that are capable of producing the most significant changes in the character of the issue that is the subject of the forecast. Two methods are most frequently used in environmental scanning: reviewing and synthesizing the literature in disciplines relevant to the issue at hand and gathering the opinions of experts through techniques such as Delphi Groups (Cole, 1995, 7).

Nominal Group and Delphi Technique— Surveying the opinions and judgments of experts about future developments has been used in environmental scanning, as well as for providing direct predictions about the future. Various techniques, including questionnaires, telephone conferences, and face-to-face group meetings, can be utilized to capture expert opinions and encourage discussion and consensus. The Delphi process is frequently used for this purpose. Delphi—which takes its name from the ancient Greek oracle—is a technique by which a panel of experts is convened to examine and debate the probable impacts of a series of possible future developments. The Foresight program (2000b) relied heavily on the responses to a Delphi questionnaire that was designed to solicit information examining the links between future technology and criminal activity. Eighty experts in a number of relevant fields—including law enforcement, insurance, loss adjustment, academia, science, and the computer industry—were asked to complete two questionnaires about the probability of future innovations eliciting criminal activity. For example, experts were asked: “What is the probability of some companies defrauding

customers whilst selling goods over the Internet? – Definitely Not, Unlikely, Likely, Very Likely, Definitely.” Interviews were also conducted with selected experts to obtain more detailed information throughout the Delphi exercise.

Scenario Writing– Scenario writing attempts to describe how current conditions may evolve in the future. It is a mechanism through which the influences of possible future developments, identified by the scanning process, on the issue of interest can be examined. Many different outcomes are feasible, and good scenario writing strives to identify the range of possible conditions that might emerge, given the variety of forces and events deemed feasible. Scenarios are not forecasts per se; they are descriptions and portrayals of events and trends as they could evolve. Different scenarios can be developed to illustrate the consequences of varying assumptions about the trends and events that will occur and their timing and impacts. Crime forecasts, for example, might involve constructing several scenarios that differ in their assumptions about birthrates, population, economic conditions, technological innovation, etc. When a set of scenarios is prepared, each treats the same variables, but the resulting outcomes will vary according to the dynamic interactions that are formulated. Changing one or several key assumptions can, in turn, generate different sets of scenarios. For example, the assumed economic growth might be low in one scenario, moderate in another, and high in a third (Cole, 1995, 7-11). Each scenario will result, potentially, in a different prediction of future crime rates.

In sum, there are a number of different quantitative and qualitative methods that can be used to develop crime forecasts. One of the significant gaps in the methodological designs of the studies reviewed for this report is the lack of a combined use of quantitative and qualitative analysis. Most, if not all of the studies, used quantitative modeling or qualitative research, but not both. This is a significant weakness, because, as the above analysis insinuates, quantitative and qualitative approaches are quite complementary. While a quantitative analysis is useful for extrapolating crime trends, qualitative methods, such as environmental scanning or scenario writing, are useful in identifying variables that will influence crime rates. This process includes the identification of different potential movements of these variables, which can then be used to develop a range of options for quantitative modeling.

6.2 Accuracy of Past Crime Predictions

Of course, any prediction of future events will suffer from inevitable inaccuracies. This is no different with respect to crime, and a review of past predictions of future crime rates does reveal problems with accuracy.

The results of the time series model developed by Fox (1978) indicate a general reduction in the upward trend in crime rates during the 1980s and an increase during the 1990s. Fox also predicted that the violent crime rate would decline in the 1980s before



increasing once again in the 1990s. Fox accurately predicted the levelling out of the crime rate in the 1980s, but was incorrect in his predictions of an increase in the 1990s.

The time series models developed by Field (1990; 1998), which correlate macro-economic expansion and consumer expenditures with a growth in property crime in the U.K., anticipates an increase in crime rates in 1999 through 2003. However, this rise is not borne out by either police- or victim-reported crime rates for 1999 and 2000, both of which indicate that crime continued to decline in the U.K. during these years, while the economy expanded.

The problems with developing accurate crime forecasts are also reflected in greatly divergent predictions, despite the use of the same data and analytical models. For example, while the same data and statistical modeling procedures were used by Dhiri et al. (1999) and Deadman (2000), the former predicted a rise in the U.K. crime rate while the latter predicted a decline. This difference stemmed not from the data used for the predictions, but from the use of different analytical techniques.

6.3 International Comparative Analysis

In the context of an international comparative analysis, with Canada at the core of this comparison, the most significant gap in the field of crime forecasting is the lack of research that has been conducted in this country.

As would be expected, much of the crime forecasting has come from the United States and Great Britain, and to a lesser extent, Australia. In recent years, the British government has been the most active of these in directly funding research into crime trend forecasting. This has led to financing of at least three studies by the Home Office using econometric modelling (Field, 1990; Field, 1998; Dhiri et al., 1999). In addition, the British government created within the Department of Trade and Industry, the Foresight Directorate to anticipate future trends, including trends in crime and crime prevention. The initiatives undertaken by these two separate government departments are complementary, at least from a methodological perspective, through the use of quantitative and qualitative methods respectively. These governmental initiatives are joined by private sector efforts—in particular by the British Insurers Association—that have also funded original research to develop crime predictions. Accordingly, of the countries studied for this report, the Great Britain has the most impressive body of knowledge on the future of crime. Particularly promising is the emphasis placed by the Home Office on the continual refinement of time series models that are used to correlate crime trends with the movement of predictor variables. These models are impressive for their identification of factors influencing crime, the use of rigorous modelling techniques, and their ability to develop a range of crime predictions based on different future movements of the predictor variables. The Foresight Programme is also impressive for its ambitious attempts to map the future, its widespread consultations with experts and the public, and

with respect to crime specifically, its attempts to simultaneously examine both the future of crime and crime control.

In contrast, this research did not identify any Canadian studies in the past decade that involved forecasting crime into the 21st Century. In fact, this study turned up little Canadian research from the past three decades that attempts to construct any predictive models of crime. This void stems in part from the smaller criminological community in Canada, relative to Great Britain or the U.S., as well as minimal government demand or funding for this type of research. In contrast, the Australian Government, and the Australian Institute of Criminology in particular, has funded research into the future of crime in that country.

Although largely beyond the scope of this paper, most of the attempts at criminal justice forecasting in Canada have been developed around the future of policing (Leighton & Normandeau, 1990; Rossmo & Saville, 1991; Bayley, 1991; RCMP, 1998; Police Futures Group¹) and future prison populations in federal correctional facilities (Canadian Corrections Service, 1982). While it makes sense that predictions of the future of policing or prison populations would be premised on future crime trends and rates, none of the above-cited organizations or publications seem to take these factors into consideration.

6.4 Replication of Foreign Research in Canada

This section conjectures about whether foreign organizations and analytical models examined in this review could be replicated in Canada. Particular emphasis is placed on determining if there is available data in this country, as this will largely dictate the ability to conduct such research (although this is not to discount other important determinants, such as adequate research funding or existing expertise).

Data for quantitative modelling of future crime trends can be demarcated into two categories: basic crime statistics and statistical data on predictor variables, in particular economic output, consumer spending, and demographic characteristics of the Canadian population (with an emphasis on the size of certain age populations).

A cursory knowledge of Canadian data sources indicates that there are no real obstacles to replicating in this country the organizations and models developed elsewhere. Basic quantitative data exists on most property and violent criminal incidents. In particular, within Statistics Canada, there exists the expertise, resources, methodologies, and more than 40 years of experience in conducting national quantitative estimates of criminal

¹ <http://www.policefutures.org/>



incidents, which include national and historical police-reported crime statistics as well as the results of national victimization surveys. Relying on over four decades of uniform crime reporting, Statistics Canada also conducts historical time series analyses, the results of which are published on an annual basis. The extent of information on criminal incidents contained in police-reported crime statistics has been greatly improved with the implementation of the UCR2 survey, an incident-based reporting system.² Like most other countries however, there is a substantial lack of national quantitative data on other significant (organized) criminal incidents such as fraud, money laundering, drug trafficking, etc.

Statistics Canada also collects data on “prime environmental factors” that influence crime and which can be correlated with crime-related data to conduct time series analyses, forecasts, and impact assessments. Relevant statistics include the unemployment rate for young males (Labour Force Survey); Gross Domestic Product (National Accounts); the number of individuals, families and children with incomes below low-income cut-offs (Census, Survey of Consumer Finances); and age group populations (Census).

However, while Statistics Canada has collected and analyzed quantitative data in historical time series analysis, and despite the fact that this agency also collects data on relevant environmental factors, this study did not identify any attempts by Statistics Canada or other organizations or individuals to use this data to project future crime trends. Regardless of the inherent problems with such crime forecasting, this void should be considered a significant weakness in applied research and analysis of crime in this country. There has been little concerted effort by the criminal justice researchers or the academic community to anticipate future crime trends, let alone develop policies and programs to minimize the impact of future crime. This lack of foresight will continue to hamper the ability of the criminal justice system and society at large to counter the increasingly sophisticated, technological, and organized nature of crime that will take place in the future.

² In incident-based reporting systems, law enforcement agencies maintain details (in databases and occurrence reports) of criminal incidents that are reported to them. Such details may include the location of the criminal incident, and basic information on the offender(s), victim(s), property, etc.

RECOMMENDED FUTURE RESEARCH

7.1 Overview

Based on the preceding analysis, the following recommendations for future crime research and forecasting in Canada are made:

1. A dedicated funding stream should be provided for an integrated research program that examines and maps crime trends, forecasts future crime rates and patterns, and estimates the impact of crime (i.e., costs) for both the present and the future.
2. The Federal Government should convene a multi-sectoral working group to coordinate and/or undertake this research. The mandate of this group should be to (a) promote, conduct, and/or coordinate systematic research that anticipates the nature and scope of crime and its impact on Canadian society over the next 20 to 30 years; and (b) develop policy and program recommendations to be implemented in the present and future to minimize the impact of future crime trends on Canadian society. This group should also promote ongoing research programs to encourage “horizon scanning” to identify and prepare for future crime trends and threats.
3. This working group should be multi-sectoral, including representatives from governmental, academic, and private organizations. Criminal justice agencies (e.g., Justice, Solicitor General, and the RCMP) as well as Statistics Canada should assume the lead on this committee. Representatives from Statistics Canada should be drawn from CCJS as well as other relevant disciplines (e.g., economics, demographics). The participating academic and consulting community should be multidisciplinary and include criminologists (with different areas of specialization, such as youth, violence, property crime, economic crime, organized crime, etc.), economists, and econometricians. Participants from the private sector should include those from such industries as computers, telecommunications industry and the Internet industry in particular (e.g., the Canadian Association of Internet Providers), insurance, and private security, and forensic accounting.
4. The Federal Government, in consultation with or through this working group, should enact mechanisms to continually assess the wider impact of new technology on crime and the criminal justice system. This should include a program that would address crime at all stages of a product’s life cycle, and involve working with manufacturers, retailers, and customers in developing secure products. This research should lead to concrete measures to minimize the use of new technology for criminal purposes. These initiatives should also be promoted at the international level, given that much of the new technology introduced into Canada originates from abroad.
5. Funding should be provided to focus scientific and technological attention towards crime reduction, especially in regards to telecommunications-based crime.



-
6. These initiatives must be placed in the context of an increased emphasis on incorporating crime reduction into the mainstream of public policy and private sector decision-making.

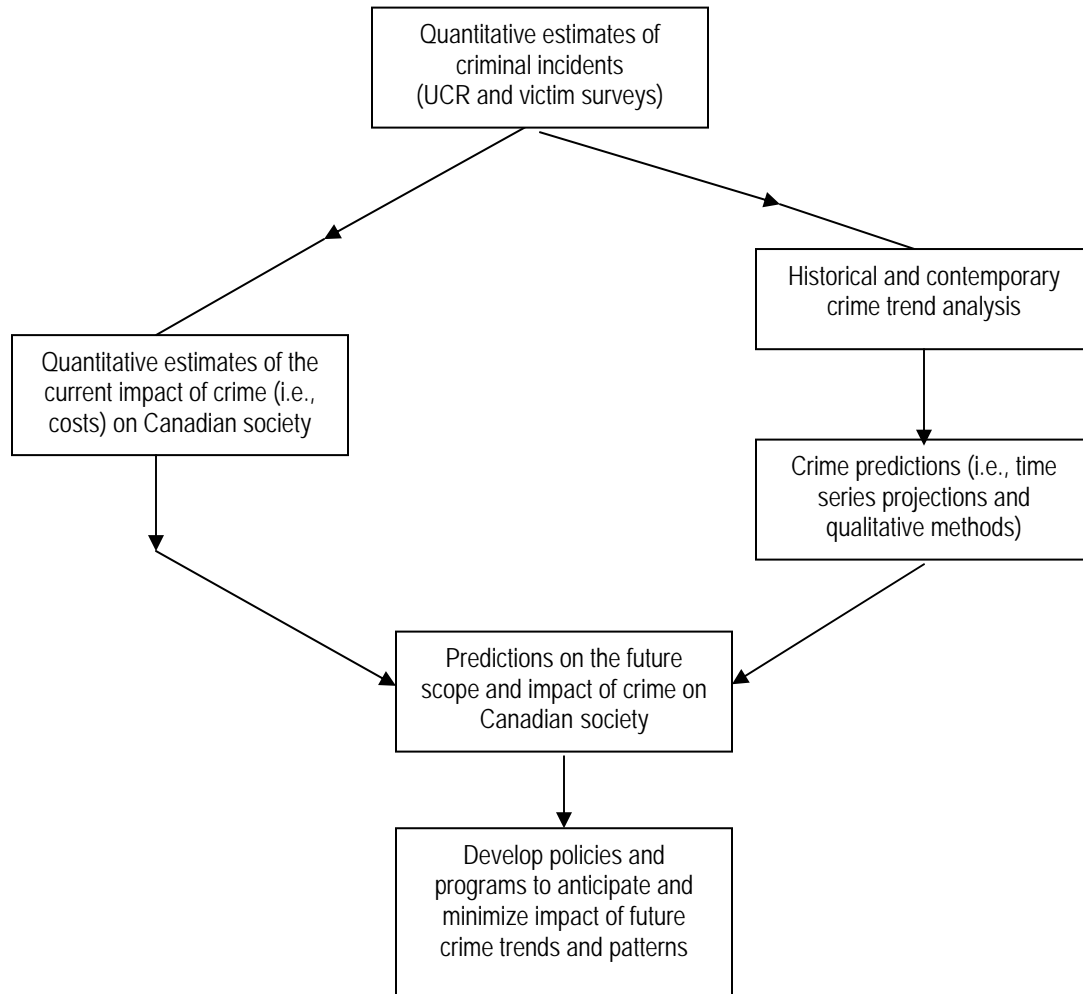
7.2 Conceptual Policy Research Framework

One of the lessons from this research is that greater emphasis should be placed on anticipating and responding to future crime cycles. In turn, this will require the development and implementation of more rigorous and integrated research methods that can predict more accurately the scope, and as importantly, the nature of future crime cycles. Crime trend analysis and statistical modelling should be combined with qualitative research that identifies new targets for criminal activity as well as how criminality will evolve and impact society.

While the accuracy of crime predictions and impact assessments will always be scrutinized, research in this area can be useful for (criminal justice) policy and programs. Future crime trends and their impact on Canadian society should be anticipated in order to develop policies and programs that anticipate and minimize those crime trends that will have the greatest negative impact on society. In short, the utility of this integrated research program is to predict alternative scenarios of future crime patterns and trends, as well as those factors that drive crime, so that they can be addressed in the present, subsequently minimizing their future impact.

Below is a graphical depiction of a conceptual framework for a comprehensive, integrated, and systematic policy research program that would develop forward-thinking policies and programs aimed at minimizing the future scope and impact of crime.

Figure 1. Conceptual framework for integrated policy research into the future impact of crime.





8.0 LIST OF REFERENCES

- Abbate, G. (1999, October 19). Five arrested in credit-card scam that police say 'touches every citizen'. *Globe and Mail*.
- Abrahamse, A. F. (1996). Coming wave of violence in California. In P.K. Lattimore & C. A. Nahabedian (Eds.) *Nature of homicide: Trends and changes - Proceedings of the 1996 meeting of the homicide research working group* (pp. 40-51). Santa Monica, CA. Washington: National Institute of Justice.
- Albanese, J. S. (1989). *Organized crime in America*. Cincinnati, OH: Anderson.
- Association of British Insurers (2000). *Future crime trends in the United Kingdom*. London: Association of British Insurers.
http://projects.bre.co.uk/frsdiv/crimetrends/Crime_Trends_Report.pdf
- Bayley, D. H. (1991). *Managing the future: Prospective issues in Canadian policing*. Ottawa, ON: Canada Solicitor General.
- Bennett, G. (1987). *Crimewarps: The future of crime in America*. New York: Anchor Press.
- Blumstein, A., & Rosenfeld, R. (1988). Explaining trends in U.S. homicide rates. *Journal of Criminal Law and Criminology*, 88, 1175–1216.
- Bratton, W. J. & Knobler, P. (1998). *Turnaround: How America's top cop reversed the crime epidemic*. New York: Random House.
- Britt, Chester L. (1995). The nature of common crime in the year 2010. In J. Klofas & S. Stojkovic (Eds.), *Crime and justice in the year 2010* (pp. 86-101). Belmont, CA: Wadsworth Publishing Co.
- Butler, O. (1993). *Parable of the sower*. New York: Time Warner.
- Canadian Corrections Service. Policy, Planning and Administration Branch. (1982, December). *Offender population forecasts: Summary report*. Ottawa: Correctional Service Canada.
- Canadian Security Intelligence Service. (1998). *Transnational criminal activity*. Ottawa: Canadian Security Intelligence Service. November.
<http://www.csis-scrc.gc.ca/eng/backgrnd/back10e.html>
- Cole, G. (1995). Criminal justice in the 21st century. In J. Klofas & S. Stojkovic (Eds.) *Crime and justice in the year 2010* (pp. 4-17). Belmont, CA: Wadsworth Publishing Co.

- Criminal Intelligence Service Canada. (2000). *Annual organized crime report*. Ottawa: Criminal Intelligence Service Canada. <http://www.cisc.gc.ca>
- Daniels, R. (1995). *Progress through partnerships: 6 - Communications*. London, England: Foresight: Information, Communications and Media.
- Deadman, D. (2000). *Forecasting residential burglary*. Unpublished paper.
- Dhiri, S., Brand S., Harries R., & Price R. (1999). *Modelling and predicting property crime trends in England and Wales*. Research Study 198. London: Home Office, Research Development and Statistics Directorate. <http://www.homeoffice.gov.uk/rds/pdfs/hors198.pdf>
- Donohue, J. J. (1998). Understanding the time path of crime. *Journal of Criminal Law and Criminology*, 88, 1423–1451.
- Fagan, J., Zimring, F.E., & Kim, J. (1998). Declining homicide in New York City: A tale of two trends. *Journal of Criminal Law and Criminology*, 88, 1277–1323.
- Fernandez, A., McBride B., & Lizotte, A. J. (1997). Future trends of weapons on campus. *Campus Law Enforcement Journal*, 27(5), 31-32, 40.
- Field, S. (1990). *Trends in crime and their interpretation: A study of recorded crime in post-war England and Wales* (Home Office Research Study No. 119). London, England: Home Office.
- Field, S. (1998). *Trends in crime revisited*. Home Office Research Study 195 London, England: Home Office. <http://www.homeoffice.gov.uk/rds/pdfs/hors195.pdf>
- Foresight Directorate, Crime Prevention Panel (2000a). *Just around the corner*. London, England: Department of Trade and Technology.
- Foresight Directorate, Crime Prevention Panel (2000b). *Turning the corner*. London, England: Department of Trade and Technology.
- Fox, J.A. (1978). *Forecasting crime data*. Lexington, MA: Lexington Books.
- Freed, D.A. (1999, May 31). Warning sounded on credit card fraud: Losses climbed ‘dramatically’ to \$147 million last year, report says; Credit card fraud climbs. *The Toronto Star*,
- Hann, R.C. (1973). *The costs of crime: A modest survey and some immodest proposals*. Report to the National Institute of Law Enforcement and Criminal Justice. Washington, DC:



- Janhevich, D.E. (1998). The changing nature of fraud in Canada. *Juristat*, 18(4), .
- Johnstone, P., & Haines, J. (1999). Future trends in financial crime. *Journal of Financial Crime*, 6(3), 269-275.
- Kates, D., & Kleck, G. (1997). *The great American gun debate*. San Francisco, CA: Pacific Research Institute for Public Policy.
- Klaus, P. (1994). *Costs of crime to victims*. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics.
- Klofas, J., & Stojkovic, S. (Eds.). (1995). *Crime and justice in the year 2010*. Belmont, CA: Wadsworth Publishing Co.
- Kong, R. (1998). Canadian crime statistics, 1997. *Juristat*, 18(11), 1-21.
- Kyl, J. O. (1998, May 20). *Section 512, Identity Theft*. Opening statement presented at the Senate Judiciary Subcommittee on Terrorism and Technology. Retrieved from <http://www.senate.gov/~kyl/sidftf.htm>
- LaFree, G. (1998). Social institutions and the crime “bust” of the 1990s. *Journal of Criminal Law and Criminology*, 88, 1325–1368.
- LaFree, G., Bursik, Sr., R.J., Short, J. & Taylor, R.B. (2000). The nature of crime: continuity and change. *Criminal Justice 2000*, 1, 261-308.
- Leblanc, D. (1999, May 6). Credit-card forgers sharpen their skills. Canada catching up to Asia, RCMP say [Electronic version]. *Globe and Mail*.
- Lee, G.W. (1983). *Are crime rates increasing? A study of the impact of demographic shifts on crime rates in Canada*. Edmonton, AB: Centre for Criminological Research.
- Leighton, B., & Normandeau, A. (1990). *A vision of the future of policing in Canada: Police-challenge 2000*. Ottawa, ON: Supply and Services Canada.
- Loftin, C., Heumann, M., & McDowall, D. (1983). Mandatory sentencing and firearms violence: Evaluating an alternative to gun control. *Law & Society Review*, 17, 288–317.
- Lupsha, P. (1997). Transnational organized crime versus the nation state. *Transnational Organized Crime Journal*, 2.1.
- Moore Jr., R. H. (1994). Wiseguys: Smarter criminals and smarter crime in the 21st century. *Futurist*, 28(5), 33-37.

- Polsby, D.D., & Kates, D.B. (1998). Causes and correlates of lethal violence in America. *University of Colorado Law Review*, 69, 969-987.
- Pyle, D. J., & Deadman, D. F. (1994). Crime and the business cycle in post-war Britain. *British Journal of Criminology*, 34(3), 339-357.
- Reno, J. (1998). Justice and public safety in the twenty-first century. *McGeorge Law Review*, 30(1), 5-8.
- Rossmo, K., & Saville, G.J. (1991). Policing challenge 2000: Riding the winds of change. *Canadian Journal of Criminology*, 33, 543-549.
- Schneider, S. (2000). Transnational organized crime and the business community. *Canadian International Lawyer*, 4(2), 95-99.
- Schneider, S., & Cotter, W. (2000, March). *An analysis of check and document fraud in North America*. Paper presented at the conference of Document counterfeiting protection, Orlando, FL.
- Smith, R. (1999, September.). *Identity-related economic crime: Risks and countermeasures*. Paper presented at the Trends and Issues in Crime and Criminal Justice, Australian Institute of Criminology Series, Canberra, Australia.
- Snyder, H.N. & Sickmund, M. (1999). *Juvenile offenders and victims: 1999 national report*. Washington, DC: Office of Juvenile Justice and Delinquency Prevention.
- Statistics Canada. Canadian Centre for Justice Statistics. (1990) Future of crime statistics from the UCR survey. *Juristat Service Bulletin*, 10(10), July.
- Statistics Canada: Canadian Centre for Justice Statistics (2000). *Canadian crime statistics, 1999*. Ottawa, ON: Minister of Industry.
- Steffensmeier, D., & Harer, M.D. (1999). Making sense of recent U.S. crime trends, 1980 to 1996/1998: Age composition effects and other explanations. *Journal of Research in Crime and Delinquency*, 36(3), 235-274.
- Stephens, G. (1995). Crime in cyberspace. *Futuris*, 29, 24-31.
- Sterling, C. (1994). *Thieves' world: The threat of the new global network of organized crime*. New York: Simon & Shuster.
- Sutton, M., & Mann, R. (1998). Crime and the criminal justice at the turn of the century. *Annals of the American Academy of Political and Social Science*, 408, 13-29.



-
- Vernick, J.S., & Teret, S.P. (1993). Firearms and health: The right to be armed with accurate information about the second amendment. *American Journal of Public Health*, 83, 1773-1777.
- United States Department of State, The Bureau for International Narcotics and Law Enforcement Affairs. (2000). *International narcotics control strategy report, 1999*. Washington, DC: United States Department of State.
- Walker, J. (n.d.). *Never underestimate the complexity of crime trends interpretation*. <http://www.ozemail.com.au/~born1820/screwth1.htm>
- Walker, J. (n.d.). *Some conclusions and forecasts about crime in Australia*. <http://www.ozemail.com.au/~born1820/auscjs.htm>
- Wardlaw, G. (1999, March). *The future and crime: Challenges for law enforcement*. Paper presented at the Third National Outlook Symposium on Crime in Australia, Mapping the Boundaries of Australia's Criminal Justice System, convened by the Australian Institute of Criminology, Canberra, Australia.
- Weisheit, Ralph A., & Wells, L. E. (1999). Future of crime in rural America. *Journal of Crime & Justice*, 22(1), 1-26.
- Wintemute, G. (1998). *Predicting criminal behavior among authorized purchasers of handguns*. Washington, DC: U.S. Department of Justice, National Institute of Justice & U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- Youth Policy Institute. (1996). Unprecedented surge in future youth crime predicted. *Youth Record*, 8(6), 1, 12-14.
- Zedlewski, E. W. (1985). When have we punished enough? *Public Administration Review*, 45 (November), 771-779.
- Zimring, F.E. (1998). The youth violence epidemic: Myth or reality? *Wake Forest Law Review*, 33, 727-744.