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**THE CHANGING ROLE OF NEW ZEALAND POLICE WITH THE
INTRODUCTION OF NEW TECHNOLOGIES: HOW FAR SHOULD THE LAW
RESPOND?**

**LLM RESEARCH PAPER
LAWS582: MASTERS LEGAL WRITING**

FACULTY OF LAW



2017

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Abstract

The introduction of predictive policing tools, which analyse crime data and find patterns to calculate likely crime ‘hotspots’, have created controversy around the world as their implementation has ensued. The use of predictive policing technologies has raised concerns for individuals civil liberties, particularly raising in bias, prejudice and privacy issues.

This paper looks at how the traditional role of Police is changing with the introduction of new and readily available technologies, focusing particularly on predictive policing technologies, and how the law should facilitate this change in role. The paper then analyses the positive aspects of both the potential of use and the established use of these new technologies and the negative issues they have the potential to provoke. To facilitate the use of predictive policing technologies, there requires a balance of protection of the public and making this protection as economical and practical as possible, with the protection of individuals civil liberties, privacy and protection from racial bias and prejudice.

A recommendation for how New Zealand can safely and successfully implement predictive policing technologies is established at the end of the paper, with emphasis put on transparency and regulation around their use.

Word length

The text of this paper (excluding abstract, table of contents, footnotes and bibliography) comprises approximately 11121 words.

Subjects and Topics

Criminal Justice-Policing-Privacy-Data Protection.

I Introduction

The police play a vital role in the functioning of a safe society. Given this role, Police must be responsive to societal change. This presents particular challenges and opportunities when faced with rapid technological advances. The advancement of technology has included the introduction of technologies that are able to assist a police force in predicting where and when a crime is likely to occur through the analysis of data and patterns:¹

Society's architecture is slowly being changed ... Not only to prevent crime with real and metaphorical hinges and locks ... but also to better enable the detection of future crimes being planned or committed. This is a fundamental change.

A shift to proactive, preventative Policing models has been the aim for the New Zealand Police for a long time. There is a clear desire in this shift and for the police to embrace these new technologies to aid with their roles and their goals in preventing crimes from being committed. This shift is practical and preferable, with the idea of gaining the ability to prevent a crime before it occurs rather than reacting to harm caused. This shift is assisted by predictive policing technologies.

One such category of technology that can aid in this shift to a preventative model of law enforcement, is the technology that is associated with the popularly titled “Predictive Policing” technologies. Predictive Policing refers to the “application of analytical techniques – particularly quantitative techniques – to identify likely targets for police intervention and prevent crime or solve past crimes by making statistical predictions”.² By using predictive policing technologies, police can be provided with crime data that will be able to determine where and at what time crime is likely to occur. Police are then able to allocate resources and efforts where they are most likely to be needed. The positives to predictive policing technology are clear: proactive enforcement of public safety, economic benefits to the state and optimization of the police force. However, there are also negatives that come alongside this technology. Depending on the specifics of the technology, there are issues with racial bias, lack

¹ Bert-Jaap Koops “Technology and the Crime Society: Rethinking Legal Protection” (2009) 1 *Law Innovation and Technology* 93 at 113.

² Walter L Perry and others *Predictive Policing - The Role of Crime Forecasting in Law Enforcement Operations* (RAND Corporation, California, 2013) at 29.

of transparency, privacy concerns and issues with other civil liberties. This paper will further explore these concerns and the positives that surround the use of this technology.

The reality of ‘Predictive Policing’, though similar in concept, is different to the reality of ‘Intelligence-led’ Policing. Intelligence-led Policing is difficult to define for it is different per police force and even per department. For a basic definition, Jerry Ratcliffe’s definition is broad and encompassing. Intelligence-led policing is:³

Emphasizing analysis and intelligence as pivotal to an objective, decision-making framework that prioritises crime hot-spots, repeat victims, prolific offenders and criminal groups. It facilitates crime and harm reduction, disruption and prevention through strategic and tactical management, deployment, and enforcement.

Intelligence-led policing focuses on the real-time access to information to aid Police with crime reduction and prevention. Predictive policing is the use of technology to aid police with crime reduction and prevention. It harnesses the information, the analytic techniques analysing this information to find patterns and the likelihood of crimes occurring in specific areas. Both methods of Policing have the same aim, predictive policing however is focused around the analysis of patterns and trends from big data collection through the use of technology.

When this paper mentions ‘predictive policing technologies’ or ‘predictive policing tools’, it is referring to programs, tools and systems that have analytical functions that assist law enforcement in the prevention and prediction of crimes by assessing the likelihood of when and where crimes could occur. It is important to mention amidst the media accusations of Predictive Policing technologies working as “crime crystal balls”⁴, that these current technologies do not predict the future, they:⁵

Can only identify people and locations at increased risk of crime ... the most effective predictive policing approaches are elements of larger proactive strategies that build strong relationships between police departments and their communities to solve crime problems.

³ Jerry H Ratcliffe *Intelligence-led policing* (Routledge, New York, 2016) at 5.

⁴ Libby Wilson “Cop’s Crime Crystal Ball” *Stuff* (online ed, Auckland, 18 July 2014).

⁵ “Rand Research Reports” (14 October 2013) Rand Corporation
<https://www.rand.org/pubs/research_reports/RR233.html>.

Predictive policing technologies are not replacing law enforcement agencies, they are facilitating them and keeping the police up to date with this new technology will aid and assist their role, not make their role redundant. It is also important to mention this point as there is a lot of criticism surrounding this new technology, such as the lack of transparency in how the tools work and what data is being fed into them. These criticisms will be discussed and addressed further on in the paper. “Predictive policing is not meant to replace tried-and-true police techniques. It builds on the essential elements of all policing strategies for the greater good.”⁶

This paper looks at how the traditional role of Police is changing with the introduction of new and readily available technologies, focusing particularly on predictive policing technologies, and how the law should facilitate this change in role. The paper analyses the positive aspects of both the potential of use and the established use of these new technologies and the negative issues they have the potential to provoke. To facilitate predictive policing technologies use, there requires a balance of protection of the public and making this protection as economical and practical as possible, with the protection of individuals civil liberties, privacy and protection from racial bias and prejudice.

II The Role of New Zealand Police

The role of the Police in society has shifted over time from a reactive model to a preventative model. This shift over time has been influenced by the integration of new technologies into the police force and has altered how they perform their duties. To understand the effect predictive policing technologies could have on New Zealand police, the development and role as a whole should be understood. Once this is established, it can be made clear how these technologies will likely help the role of the police in their efforts.

In 2008, the Policing Act⁷ was enacted into law. This Act sets out the official role of a Police officer under section 9:⁸

The functions of the Police include—

⁶ Beth Pearsall “Predictive policing: The future of law enforcement” (2010) 266 National Institute of Justice Journal 16 at 17.

⁷ Policing Act 2008.

⁸ Policing Act 2008, s 9.

- (a) keeping the peace:
- (b) maintaining public safety:
- (c) law enforcement:
- (d) crime prevention:
- (e) community support and reassurance:
- (f) national security:
- (g) participation in policing activities outside New Zealand:
- (h) emergency management.

These functions make up the role of a New Zealand Police officer as current. Their role is broad. They do much more than enforce the law, as evidenced by section 9. To suggest they are merely enforcers of the law would be to undermine their role and take away from their community involvement and importance. This make up of functions in the current role of Police, has been adapted and influenced over time as new technologies have been introduced, from the motor vehicle, to the telephone, to predictive algorithms and big data collection.

This analysis of the changing role of police is important as understanding how the role of the police has changed highlights why the police have had to adapt to societal changes to maintain and improve their role. The police have implemented and embraced new technologies as they have become available to better their roles and to keep up with new crimes and changing needs of society. Over the decades since their establishment, the Police have either had to embrace new methods of policing and adaption to their roles, or not be qualified and equipped to fulfil their roles. Below is a discussion of the different phases and styles police have gone through and how, and why, the police have had to adapt.

A The Changing Phases and Styles of Policing

Since being established as an official agency, the role of the police has changed and adapted to the changes in society over time. This change has been accepted and encouraged, for as discussed below, the more the police are able to harness the technology available to them the easier they are able to adapt to societies developments and address their needs which is, holistically, a major element of their role. Trendle and Young identify and analyse this change in style over time and establish five phases the New Zealand police have gone through in policing style. Their breakdown aids in understanding the development of the role of police in relation to changes in society and environment, so their phases are summarised below.

Before and during the 1950s, policing was done mainly on foot and resources were mainly distributed to local police stations for there were few cars available and local populations were largely stabilised rather than mobile.⁹ The police communications network at this time was basic.¹⁰ The police therefore “depended for their effectiveness on their sound knowledge of and close contact with their community”.¹¹ This would have required particular effort by the police officers to be interacting with the community constantly which in today’s environment would be far too challenging.

In the 1960’s, a style of centralised rapid response policing emerged.¹² This style was in response to the major changes to the environment that was being policed. There was an increased rate of reporting of crimes and a desire for a 24-hour service which the 1950’s phase was just not able to cope with.¹³ New technologies were implemented into their systems, with the police radio and teleprinter networks and an extended vehicle fleet.¹⁴ By implementing new technological systems into their traditional policing methods, the police were able to respond to increased demand from society.

The 1970’s and the 80’s saw even further advances in technology, with the development of “a national police and criminal justice computer program”, which aided in refinement and development of the 1960’s style.¹⁵ By the late 80’s and early 90’s, it was recognised that by merging information with other services, the police were able to analyse the information data together to allocate their resources and efforts much more efficiently which resulted in reductions of particular crimes.¹⁶

The early 2000’s involved even further advancement in technology for the police to use. As the style of policing was pushed towards community-orientated policing and a focus on intelligence-led policing was encouraged, resources were given to develop new technologies

⁹ Warren Young and N Trendle “The Police” in J Tolmie and W Brookbanks (eds) *Criminal Justice in New Zealand* (LexisNexis, 2007) at 103.

¹⁰ At 103.

¹¹ At 103.

¹² At 103.

¹³ At 103.

¹⁴ At 104.

¹⁵ At 104.

¹⁶ At 107.

to aid the police with this shift into a new phase of policing.¹⁷ This new technology developed was the “integrated national crime information system” (INCIS).¹⁸ However, this resulted in a \$107 million dollar¹⁹ failure that lessened the enthusiasm towards analysis tools. It was realised quickly that the use and importance of having intelligence analysis tools was widespread and a requirement for law the enforcement function which the New Zealand Police continued to embrace in order to commit to their role.²⁰

Over time, the role of Police has adapted and developed around the needs of society. The 2008 Policing Act has facilitated this adaptation, including sections outlining their roles and guiding frameworks to assist them. Also Included in this role’s adaptation and development is the development and inclusion of new technologies. These technologies, from vehicles to phone networks to computer software, have been able to aid the police to efficiently respond to the needs of society. It is important that the police continue to improve their tools and technology that are available to them to aid in investigation and upkeep public safety.²¹ Technology has been and needs to continue to be harnessed in tools that will assist officers with their role.

III Predictive Policing Technologies

The technology aimed at aiding enforcement of the law is becoming more readily available, with technology not only enabling more economic and safe enforcement of the law, but also providing the potential to prevent the law from being broken in the first place by deterring criminals.²² These predictive policing technologies have a diverse range of abilities. They are able to predict when and where a crime is likely to occur, and how likely it is to occur, assess individuals’ likelihood of reoffending and even predict who is likely to be a victim of a particular type of crime. This paper focuses on the most well-established of the predictive policing technologies both being used currently and those that have proposed usage, which is the technology that predicts where and when a crime is likely to occur through data and trend analysis.

¹⁷ At 107.

¹⁸ At 107.

¹⁹ Paul Yandall “IBM keen on police project despite INCIS” *New Zealand Herald* (online ed, Auckland, 21 March 2011).

²⁰ Young and Trendle, above n 9, at 108.

²¹ At 123.

²² Sohail Inayatullah “The Future of Policing: Going Beyond the Thin Blue Line” (2013) 49 *Futures* 1.

Below is an analysis of the benefits that law enforcement, society and the state gain from use of these predictive policing technologies and this section is then followed by an analysis of the criticisms that surround them. After addressing the benefits and justifications for the use of these technologies, an overview follows of the various technologies available globally and how they are being used and regulated in their respected countries. There is, following this overview, a comparative analysis of the New Zealand police force's current use of technologies and their future aims to incorporate further technology into their current systems.

A The Benefits and Justifications of and for Predictive Policing Technology

There are great opportunities to gain from the use of predictive policing technologies. Though controversial in the public media, mostly due to the lack of transparency these technologies provide, discussed below, predictive policing technologies provide benefits both to the public and the state. At the heart of this type of technology is the aim to predict crime and notify police of when and where this crime is likely to occur.²³ The fulfilment in this aim has both micro and macro benefits for a country's law enforcement agency. The technologies may be useful for case specific analysis, i.e. focusing on resolving a troublesome individual case,²⁴ or they may be useful for the overall monitoring and prediction of crime, finding hotspots through pattern analysis. Technology can be used to support the role of police generally or have a specific function of its own where it is able to provide the police with resource allocation for example.

Predictive policing technology's greatest benefit for law enforcement, the reason why it has been invented and is being implemented, is the facilitation of enforcement of the law:²⁵

This technology aids the police with their role to protect the community and stop crime. improve understanding of crimes and crime trends, and predictive approaches may enable police forces to exercise a more coherent tactical and strategic planning and deployment of their resources.

In order for the law to keep up with a technologically advanced society is to adapt technology into its enforcement. In doing so, the Police are able to harness these technologies to aid them

²³ Perry and others, above n 2.

²⁴ Eva Schlehahn and others "Benefits and Pitfalls of Predictive Policing" (paper presented to 2015 European Intelligence and Security Informatics Conference, 1 September 2015) at 3.

²⁵ Schlehahn and others, above n 24 at 3.

in the enforcement of the law and balance this with their other functions within their role such as community involvement.

The use of new technology by law enforcement is also essential as criminals are also able to access new technologies and exploit these technologies for their benefit to commit crimes.²⁶ While police are able to benefit from the use of technologies, so too are those who commit the crimes. The police need to be able to respond and even prevent these technologically influenced crimes with the use of their own new technologies. This can occur through the use of preventative technologies that will aid in the enforcement of the law rather than the traditional reactive models of policing, which are unable to stop harm that is caused to the victim and can often result in the difficulty of finding the offender due to the technology use.

Predictive policing technology has had proven results in its effectiveness for crime reduction and prevention. In the United States of America where these technologies have been adopted and used in various states, the Los Angeles Police Department (LAPD) found a decrease in crime of 30% and a decrease in burglary of 55% in the first two months of 2014 when using predictive policing technologies.²⁷ The introduction of these new technologies are helping to fight a more systemic problem of reducing crime in the community for the use of this technology, as PredPol's (a predictive policing tool used in the United States of America) CEO states, "You are interrupting the opportunity for crime as much crime is opportunistic. Crime goes down because you have interrupted their opportunities to commit crime."²⁸ The National Institute of Justice provided funding to the Shreveport Police Department to conduct a predictive policing experiment in Louisiana 2012.²⁹ The experiment involved "three districts used a predictive policing strategy to reduce property crimes and three control group districts continued with the status quo policing approach to reduce property crimes."³⁰ The study found no evidence that the use of predictive techniques reduced crime, however, the study had several failings in the use of the technology which the report claims might explain this.³¹ The study

²⁶ Bart Custers "Technology in policing: Experiences, obstacles and police needs" (2012) 28 *Computer Law Security Review* 62 at 67.

²⁷ "How predictive policing works in the US" *BBC News* (online ed, United Kingdom, 1 April 2014).

²⁸ Kathy Marks "Predictive Policing" (2016) 64 *Law and Order* 22 at 27.

²⁹ Priscillia Hunt, Jessica Saunders and John S Hollywood *Evaluation of the Shreveport Predictive Policing Experiment* (RAND Corporation 2014) at iii.

³⁰ At iii.

³¹ At xiii.

went on to recommend further study in this area of predictive policing.³² This study also occurred back in 2012. Technology has advanced rapidly in the five years since this study was conducted. Since the 2012 study, the use of predictive policing technologies has increased in popularity and has claimed to be effective by police department statistics. This is particularly the case in America with police departments now claiming effective use of predictive policing technologies as tools for their officers to enforce the law:³³

When Santa Cruz implemented the predictive policing software in 2011, the city of nearly 60,000 was on pace to hit a record number of burglaries. But by July burglaries were down 27 percent when compared with July 2010.

There lacks a recent study done in a police force on whether predictive policing technologies are effective in their purpose of aiding the enforcement of the law. There lacks research and studies on their effectiveness and long term abilities which should be addressed before implementation and use. There is however, theoretical and indirect evidence available to suggest their use is effective to police and should be encouraged. These are discussed below.

There is criminological justification to predictive policing techniques. There is support to findings that crime is predictable and can therefore be predicted by pattern analysis:³⁴

There is a strong body of evidence to support the theory that crime is predictable (in the statistical sense)—mainly because criminals tend to operate in their comfort zone. That is, they tend to commit the type of crimes that they have committed successfully in the past, generally close to the same time and location. Although this is not universally true, it occurs with sufficient frequency to make these methods work reasonably well.

This is further supported by major theories of criminal behaviour.³⁵ These theories include routine activity theory, crime pattern theory and rational choice theory which essentially revolve around the theory that criminals and victims in their life have patterns which criminals are able to make decisions around committing their crimes taking into account of these patterns

³² At xvii.

³³ Garrett Ronnie “Predict and serve” (2013) 40 Law Enforcement Technology 18 at 19.

³⁴ Perry and others, above n 2, at 31.

³⁵ At 31.

and the risks involved.³⁶ These theories provide justification for the use of technology that analyses criminal and victim patterns.

Predictive policing tools have often been described as cost effective. There is also criticism that claims predictive policing tools are expensive in both acquiring the programs and running them. This is not the case. They are not necessarily costly:³⁷

Most police departments do not need the most expensive software packages or computers to launch a predictive policing program. Functionalities built into standard workplace software (e.g., Microsoft Office) and geographic information systems (e.g., ArcGIS) can support many predictive methods.

There are varying degrees of predictive policing technologies in regards to their costs, abilities and requirements. Depending on the needs of departments, lower costs of tools can be used to their required effective measures.³⁸ This is likely reflective of departments resource allocation budgets and departments will then be able to harness predictive technologies where required that are within their costs. There are also figures that support cost saving with the use of predictive policing tools:³⁹

A cost-benefit analysis of the program strongly supports its use. The software is relatively inexpensive and use of the program has been shown to reduce crime, even when the number of officers in the department remains constant.

As there is almost certain financial strain on New Zealand resources and overseas resources, the use of predictive policing technology is an effective way to maintain a high standard for less cost. Although the setup of these technologies will accrue costs, “it is likely that cost savings might accrue over time from the improved allocation of resources based on the use of predictive policing.”⁴⁰ The benefits of the use of the technology are likely to outweigh the costs.

³⁶ At 31.

³⁷ Walt L Perry *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations* (Rand Corporation, 2013) at xx.

³⁸ At xx.

³⁹ Jennifer Bachner *Predictive Policing: Preventing Crime with Data and Analytics* (IBM Centre for the Business of Government 2013) at 31.

⁴⁰ At 31.

The benefits of predictive policing technologies as tools are very important. They justify their use despite also having negative aspects and provide reasoning for the police to adopt them in their role as police officers. However, these benefits are not well established for there currently lacks clear and concise evidence to promote their benefits. There are gaps in both the research and knowledge of predictive policing tools that should be addressed prior to their implementation and promotion. It is also difficult therefore to determine if these predictive policing tools are truly effective and assist police officers. Due to their gaining in popularity and enthusiasm, particularly by police officers, it is more likely to be found that they have the potential to be effective by the commitment of officers to use them correctly and to harness their abilities.

This paper's analysis of the benefits of the use of predictive policing tools is a general overview of various jurisdiction's issues, including the United States of America, the United Kingdom and others, and does not focus in particular on New Zealand's use. This overview is general as it is important to look at the available evidence of benefits predictive policing has provided in other countries to provide comparative reasoning so to facilitate its use within New Zealand.

B Current Use of Predictive Policing Technology

There are various countries that have already implemented predictive policing technologies into their law enforcement agencies.

1 Internationally

(a) United States of America

The United States of America (USA) has embraced the use of predictive policing technologies with the implementation of various predictive tools in various states. Below is a short overview of the two most used technologies in the USA.

One of the first places in the world to implement predictive policing technology into their police force was in Los Angeles, California, by the Los Angeles Police Department (LAPD). The LAPD has worked with researchers over seven years from UCLA to explore predictive policing models, trialling various tools to ascertain the usefulness and practicality of the technology:⁴¹

⁴¹ Samuel Greengard "Policing the Future" (2012) 55 Communications of the ACM 19.

Since implementing the program, officers spend more time patrolling these areas, but all policing decisions are left to officers' discretion. The result? "A significant decline in crime," Malinowski says. Based on early results, a drop in crime exceeding 25% might not be beyond the realm of possibility. The project is under close scrutiny by UCLA researchers, who have established randomized, controlled field trials to better understand how officers apply the data.

It has been cautioned however, that there is the possibility for a placebo effect. That because officers have access to useful data, officers are more likely to change their behaviour and the way they police.⁴²

Since this testing phase, the use of the predictive policing technology called "PredPol"⁴³ has been fully implemented in the LAPD and the Santa Cruz Police Department.⁴⁴ The use of PredPol has largely been limited to the informing of decisions about police deployment, while other software developers are making more ambitious claims. In 2015, over 60 police departments were using PredPol,⁴⁵ and this tool is just one of many that can have differing functions. However, most centre around the idea of analysing patterns to predict where and when crime is likely to occur.

Another technology commonly used in the USA is 'HunchLab'⁴⁶. Similar to PredPol, HunchLab has the ability to:⁴⁷

Calculate the relative crime risk per unit of patrol effort for each location, as well as determine the size of the area that can be patrolled with available staff resources. This process ensures the right quantity of mission recommendations reflects organizational and societal crime priorities. The software combines advanced machine learning approaches that can incorporate the following crime patterns and theories into a single prediction of criminal risk: Baseline crime levels; Near repeat patterns; Aoristic crime analysis; Risk Terrain Modelling; Routine activity theory; Collective efficacy; Temporal cycles; Recurring temporal events (holidays, sporting events, etc.); and Weather patterns.

⁴² At 20.

⁴³ "About PredPol" (12 May 2014) PredPol <<http://www.predpol.com/about/>>.

⁴⁴ Garrett Ronnie, above n 33, at 19.

⁴⁵ Ellen Huet "Server and Protect: Predictive Policing Firm PredPol Promises to Map Crime Before it Happens" *Forbes* (online ed., USA, 11 February 2015).

⁴⁶ "HunchLab" (31 August 2016) HunchLab <<https://www.hunchlab.com/>>.

⁴⁷ "Policing in the 21st Century" (2013) *Law Enforcement Technology* 70 at 70.

This tool is currently used by the New York Police Department (NYPD) which uses public data, not personal and the implementation of the tool has been in the works for up to 7 years.⁴⁸ Though implemented fully in many states, there has been heavy research and testing involved in this implementation to make sure the software is useful rather than detrimental to the police.

Despite the common use across states, The USA currently do not have specific regulation surrounding the use of predictive policing technologies. There is a large amount of media attention surrounding their use for these technologies are lacking in transparency as to what is involved in their use. This issue is discussed further on in the paper.

(b) United Kingdom

Unlike the USA, the United Kingdom (UK) have yet to implement predictive policing technologies into their police force despite studies and research pushing for it, such as the RUSI paper:⁴⁹

This paper reiterates this pressing need, concluding that UK police forces have not taken advantage of tried-and-tested technologies that could significantly improve the efficiency of local operational activity – in particular predictive hotspot mapping. Cuts to personnel do not diminish the need for this analysis; on the contrary – predictive hotspot policing allows forces to make most efficient use of the limited resources available to them.

However, there has been funding allocated for investigation into the use of these tools and how they can be implemented into police departments.⁵⁰ The UK are involving the Universities of Oxford, Manchester and Strathclyde in research and are also working with various police departments across the UK, including the Metropolitan Police department.⁵¹

(c) Other Jurisdictions

There are various other jurisdictions who have implemented or have planned on implementing predictive policing technologies other than the United Kingdom and the USA. In Denmark, the 2015 terrorist attack in Copenhagen resulted in the Danish government presenting an action

⁴⁸ Laura Nahmias and Miranda Neubauer “NYPD Testing Crime-Forecast Software” *Politico* (online ed, New York, 7 August 2015).

⁴⁹ Alexander Babuta *Big Data and Policing: An Assessment of Law Enforcement Requirements, Expectations and Priorities* (Royal United Services Institute, United Kingdom, 2017) at 16.

⁵⁰ Hayley Dunning “Predictive Policing Research Gets a Boost From £3m Grant” *Imperial College London* (online ed, London, 21 March 2017).

⁵¹ Dunning, above n 50.

plan to strengthen the data analysis ability of the police and Danish intelligence services.⁵² In 2016, the Danish police purchased an “intelligence-led policing platform *Palantir Technologies*, a highly controversial company that specialises in big data analytics for private companies, military agencies, intelligence services and police authorities.”⁵³ This platform accesses information from various sources; existing police and intelligence databases, information exchange with other organisations and open source collection of information.⁵⁴ The platform uses this information and detects patterns and trends to essentially predict the likelihood of when and where crime will occur.⁵⁵

On the 10th of February 2017, the Danish Minister of Justice presented a draft law for the amendment of the Police Act to incorporate new data collection and analysis provisions for the processing of personal data within this new platform.⁵⁶ The new legal framework uses the Danish Data Protection Act as a reference to the use of information,⁵⁷ but angles it for the use of predictive policing technology.

Uruguay is another jurisdiction that is involving themselves in the implementation of predictive policing technologies. The technology Uruguay uses targets well-known crime hotspots and:⁵⁸

The primary goal is to dissuade people from committing crimes by patrolling the so-called hotspots, either on foot or in vehicles, always duly identified. As a starting point, 1,000 police officers were assigned to the program. In addition, a special crime-analysis unit is tasked with monitoring the results and evolution of the PADO and producing periodic reports for the police department heads.

Like the other jurisdictions discussed above, the Uruguay police aim to prevent crime and predict the likelihood of crime occurring. Uruguay are also the only country outside the USA who uses the software PredPol.⁵⁹ Uruguay claims they have had great results in the use of this

⁵² “New Legal Framework for Predictive Policing in Denmark” *EDRi* (online ed, Brussels, 22 February 2017).

⁵³ “New Legal Framework for Predictive Policing in Denmark”, above n 52.

⁵⁴ “New Legal Framework for Predictive Policing in Denmark”, above n 52.

⁵⁵ “New Legal Framework for Predictive Policing in Denmark”, above n 52.

⁵⁶ “New Legal Framework for Predictive Policing in Denmark”, above n 52.

⁵⁷ “New Legal Framework for Predictive Policing in Denmark”, above n 52.

⁵⁸ Andres Gaudin “Uruguay tries preventative policing with a high-tech twist” (2017) 26 *NotiSur - South American Political and Economic Affairs* 3 at 3.

⁵⁹ At 3.

technology with a 13.1% reduction in murder rates and 8.12% reduction in armed robbery and also claim the programme could do with improvements.⁶⁰

The use of predictive policing technologies is gaining traction globally and in popularity. Both Denmark and Uruguay have implemented predictive tools that have seen various improvements to their policing abilities.

2 New Zealand

Currently, New Zealand (NZ) has not implemented or even trialled predictive policing technology. This does not imply that there won't be a trial or an implementation. As New Zealand Police have been shifting from a reactive model of policing to a preventative model, there has been embracement of technologies over time and openness to new forms of aid to their roles. This is evidenced both in their role shifting overtime and to their implementation of their "Prevention First" programme in 2009,⁶¹ which has continued through to today, carrying the aim to prevent crime before it happens.⁶² New Zealand has been commended on their efforts to adapt to new technology.⁶³

New Zealand Police responded to the pressures of the international financial crisis, rising costs in the justice and security sector and the changing threat picture, by launching "Prevention First" in 2009. This transformation programme included the rollout of mobile technology to officers, retraining them to focus on crime prevention and to work closely with social sector agencies. The police also introduced advanced financial management practices to drive efficiency. As a result, between 2008 and 2014, New Zealand's homicide rate fell from 1.20 to 0.90 per 100,000, while the proportion of people reporting confidence in the police rose from 78 percent to 84 percent. Compared to 2008/09, by June 2014, the police had freed up 1.26 million hours for reinvestment into prevention activity and recorded crime reduced by 20.1 percent.

The 'Policing Excellence' (PE) Programme has also changed the way the police execute their roles as officers and has aided in the integration of new technologies.⁶⁴ The introduction of these programmes resulted from various circumstances, one of them being:⁶⁵

⁶⁰ At 3.

⁶¹ Mary Calam *Policing – a vision for 2025* (McKinsey & Company, January 2017) at 16.

⁶² *Prevention First: National Operating Model 2017* (New Zealand Police, 2017).

⁶³ At 16.

⁶⁴ *Policing Excellence: The Transformation of the New Zealand Police 2009 – 2014* (New Zealand Police, November 2014).

⁶⁵ At 8.

Police officers were faced with managing changing priorities and demand for their time. It became evident they were restricted by a lack of productivity-enhancing technology to support them in their work. Officers were largely in reactive mode, weighed down by having to manage outdated processes, while expected to maintain service delivery to the highest levels and standards.

There was a need for the police to modernise and to do this, they would need to incorporate and harness the technology available to them. In implementing new technology, the functions of the police facilitated, and a more efficient model of policing has been established.⁶⁶

The introduction of mobile technology has provided frontline officers with significantly enhanced access to systems at the time and place they need them. Being able to complete tasks in the field on mobile devices negates the need to return to the police station or spend undue time on the radio system to obtain information from the Communication Centres (as was the case in the past). Mobility has not only enhanced officer safety, it has also delivered significant productivity gains.

The NZ Police have various technologies they currently use to facilitate their roles as police officers. These technologies are intelligence led tools, rather than predictive. The closest technology to predictive policing technology used by the Police, is the ‘Auror’⁶⁷ software. Though not used as a predictive policing tool, it has the potential to be used this way. Currently, the software allows retailers to upload CCTV images of offenders, as well as their age, sex, ethnicity, height and vehicle details which is then sent to the police who are able to use their mobile technology to gather real-time information and neighbourhoods are alerted to suspects in the area.⁶⁸ The technology can analyse data and it “aggregates relevant data about stores, areas, and times of the day that are being targeted so that agencies can allocate resources to where they need to be”.⁶⁹ This resource is valuable to the police and what they are attempting to accomplish with their Prevention First and Policing Excellence Programmes.

There is clearly a desire within the New Zealand Police to embrace the new technologies available to facilitate their roles and their goals to prevent crime from being committed.

⁶⁶ At 68.

⁶⁷ “Auror” (24 August 2015) Auror < <https://www.auror.co/>>.

⁶⁸ Michelle Dickinson “Science & Tech: Big data on crime” *New Zealand Herald* (online ed, Auckland, 30 January 2016).

⁶⁹ “Auror” above n 67.

IV Resulting Issues with the Use of Predictive Policing Technologies

While there are many positives to this new technology that is so readily available, there are also negatives that both the law and the Police should be aware of and address when implementing them. Despite the growing interest and popularity in predictive policing technologies, there have been few official evaluations of these technology systems that have been put in place.⁷⁰ It is important not to be hasty and to consider all the potential effects the use of this technology may have on the law, the Police, society and individuals. Ultimately, it is important to remember that these predictive policing technologies are tools that are used to aid the police in their roles.⁷¹ Any tool can be misused, and some tools are more likely to result in misuse than others. Predictive policing tools, depending on how relied upon they are, have the potential to be misused. However, the fear of this misuse should not be put on the tool itself, but on the system or agency that have the potential to misuse it and this fear should be addressed accordingly so.

The following sections will analyse the issues that can arise with the use of predictive policing tools both internationally and in New Zealand. The issues this paper focuses on are those of privacy, bias and the lack of transparency the use of predictive policing tools could raise.

A Lack of Transparency

Ultimately, the issues that arise from the use of these technologies often result from the lack of transparency around these new technologies, with how they work and how they are used. Without clarity around these tools, there is less trust from the public around their use. The various issues arising out of the use of these tools need to be addressed and information should be available in how they will be addressed by law enforcement agencies to provide clarity and gain the trust of the public.

The lack of transparency issue that surrounds technology, particularly in predictive analytics, is the concept of the method of the technology itself it is not clear. It is unknown how these technologies work. Morozov uses the example of Amazon's commercial algorithms that

⁷⁰ "Evaluation of the Shreveport Predictive Policing Experiment Abstract" (1 July 2014) RAND Corporation <https://www.rand.org/pubs/research_reports/RR531.html>.

⁷¹ Greengard, above n 41 at 21.

determine which book an individual is likely to buy next, to describe the problem that results from the lack of transparency.⁷²

Here we run into the perennial problem of algorithms: their presumed objectivity and quite real lack of transparency. We can't examine Amazon's algorithms; they are completely opaque and have not been subject to outside scrutiny...If no one can examine the algorithms – which is likely the case as predictive policing software will be built by private companies – we won't know what biases and discriminatory practices are built into them.

Due to the lack of transparency around the predictive policing technologies, various issues arise such as privacy concerns and the potential for bias to be inherent within the systems. Many of the technologies discussed above are created by private companies or institutions outside of the law enforcement agencies. This gives the goal of commercialisation to these technologies and therefore the information to make the technology's inner workings transparent is unlikely for the “secrecy allows it to stay competitive”.⁷³ This commercialisation of predictive policing technologies is problematic for accessibility and it needs to be addressed in the implementation of them into law enforcement which is addressed in the ‘Steps Forward’ section below.

Below are overviews of issues that this lack of transparency within the use of predictive technologies can raise. This paper focuses on the privacy and bias issues, which are arguably the most concerning issues surrounding their use.

B Privacy Issues

A concern that often arises around the introduction of these predictive policing tools is the concern of the collection of data and information and the resulting potential to breach individuals' privacy rights. Put simply, “the very act of labelling areas and people as worthy of further law enforcement attention inherently raises concerns about civil liberties and privacy rights”.⁷⁴ This discussion around the balancing of individuals' privacy protection with the maintenance of the public safety is not a new discussion however, it has become more

⁷² Evgeny Morozov *To save everything, click here: Technology, solutionism, and the urge to fix problems that don't exist* (Penguin UK, 2013) at 304.

⁷³ At 304.

⁷⁴ Perry, above n 37 at 124.

important with the advancement in technologies that involve big data collection.⁷⁵ These discussions are likely to, and should, remain relevant for the future.

The reason privacy concerns arise, is from the idea behind predictive policing technology. These technologies collect information, often storing it within a database, and analyse trends and patterns to predict where and when crimes are most likely to take place.⁷⁶ This collection of data raises the concern. What information is being collected? Who is collecting it and how will it be used? There is a lack of transparency around these questions that can result in privacy considerations and concerns. The tools themselves are arguably abrasive to the concept of privacy:⁷⁷

The term “predictive policing” raises fears that police might engage in illicit tactics — that they will overstep their bounds and potentially use information and intelligence in a way that abridges the Constitution.

This fear would only be justified through a lack of regulation and guidance in their use, and a lack of transparency in the ways these technologies are used, which is addressed later in this paper.

Information collection and sharing between law enforcement agencies is not a new concept and is now critical in modern policing operations.⁷⁸ There are already various legislation frameworks that address the use and collection of information and big data that ensure the police’s use and collection will adhere to standards that have been put in place to protect individuals’ privacy. The issue of privacy intrusion is an issue that, in reality, extends beyond the use of predictive policing technology, for many organisations and agencies use big data collection to feed into analytical programs to find predictions and to analyse patterns and trends.

⁷⁵ Perry and others, above n 2 at 116.

⁷⁶ Greengard, above n 41 at 19.

⁷⁷ Craig D Uchida *A national discussion on predictive policing: Defining our terms and mapping successful implementation strategies* (National Institute of Justice, Los Angeles, 2009) at 3.

⁷⁸ Perry and others, above n 2 at 118.

There are various ways to both address the privacy concerns that arise with the introduction of predictive policing tools. These ways are discussed in further detail later in the paper. The best solution is to set:⁷⁹

Appropriate safeguards and procedures will need to be put in place to ensure the public that such analyses are not misused, to either undermine the privacy of individuals who are not under suspicion or undercut the due process rights of individuals who are under surveillance.

The use of predictive policing technologies raises the valid concern of intrusion into an individual's privacy rights. These issues arise from the mass collection of data and the lack of transparency in both the collection and the use of information.

C Bias Issues

Predictive policing technologies are able to predict when and where a crime is most likely to occur. This is through analysis of patterns and trends using crime data. This crime data is historical information that has been collected by the police; of past reported crimes, through emergency department calls and arrests.⁸⁰ This data could therefore be biased. This information is not always accurate as it is not technically a complete reflection on police performance:⁸¹

Criminologists have long emphasized that crime reports, and other statistics gathered by the police, are not an accurate record of all the crime that occurs in a community; instead, they are partly a record of law enforcement's responses to what happens in a community.

There are various reasons for what criminologists have found. The statistics and data collected by the police are influenced by what crimes citizens choose to report, how police decide to respond to situations and the locations police are sent to patrol.⁸² This, in turn, affects the data being fed into the predictive policing tools. Robinson and Koepke use this example to highlight the issue of the potential for biased data:⁸³

⁷⁹ Bachner, above n 39 at 24.

⁸⁰ David Robinson and Logan Koepke *Stuck in a Pattern: Early evidence on "predictive policing" and civil rights* (2016) at 3.

⁸¹ At 5.

⁸² At 5.

⁸³ At 5.

It's likely that all (or very nearly all) bank robberies are reported to police. On the other hand, marijuana possession arrests are notoriously biased, with black Americans much more likely to be arrested than whites who use the drug at similar rates. Predictive systems that incorporate these sorts of statistics may not account for the inaccuracies reflected in historical data, leading to a cycle of self-fulfilling prophecies.

These predictive tools also add problems with their lack of transparency as to the companies that make them. Morozov highlights the potential for bias within the creators of the software itself, and the resulting issues that can arise because of this bias:⁸⁴

But how do we know that the algorithms used for prediction do not reflect the biases of their authors? For example, crime tends to happen in poor and racially diverse areas. Might algorithms—with their presumed objectivity—sanction even greater racial profiling? In most democratic regimes today, police need probable cause—some evidence and not just guesswork—to stop people in the street and search them. But armed with such software, can the police simply say that the algorithms told them to do it? And if so, how will the algorithms testify in court?

It is important to note that the term “biased data” does not mean that the information gathered was done so with bad intentions, nor does it mean that the information will be used unfairly if used in a particular way – it simply means that the information that has been collected is not a true reflection of reality, that there is either underrepresentation or overrepresentation, and therefore gaps within the data.⁸⁵ It is therefore possible for bias to occur within the data fed to these tools, and hazardous to rely on data that is not a complete and holistic reflection of society and crime.

When the police choose to focus their attention and resources to one particular location or on a particular group of people, even if there is a good reason such as reoccurring violence, the police will be detecting and responding and collecting information on the crime that is occurring in those places, rather than crime occurring in other locations. This focus will distort the crime data collected and affect the relationship between this data and the reality of crime levels.⁸⁶ This distorted data will then be relied upon when using the predictive policing tools when allocating resources and deciding where to send officers and the result will be blind spots where crime is not being reduced, prevented or helped.⁸⁷ It therefore is possible that

⁸⁴ Morozov, above n 72 at 304.

⁸⁵ Robinson and Koepke, above n 80 at 6.

⁸⁶ At 7.

⁸⁷ At 7.

preventative technologies may not necessarily prevent crime and improve public safety like they claim.

This potential for biased data is a serious issue that needs to be addressed before and during the implementation of these technologies. It is important to be aware that relying on data collection of past situations can create gaps that influence the reduction and enforcement of crimes. The police should not completely rely on these tools to influence their decisions on resource allocation and other functions of their role. Traditional policing methods should also be relied on. However, these traditional methods may not be free from bias either, so will the use of this new technology be worse than traditional methods? This is something policy makers and the police should be aware of. Police should remember that “Predictive policing offers a lot of promise, but it’s important to keep it in context. Predicting behaviour is not an exact science.”⁸⁸

V Steps Forward

With the introduction of new predictive policing technologies, there has been a strong trend to implement them at a rapid pace to enhance the roles of police and their ability to protect the public and prevent crime. In the attempt to implement these new predictive technologies into the law enforcement sector, there needs to be a balance between the importance of protecting the public with the importance of protecting individuals’ civil liberties and protection from bias. To establish this balance, there should be some form of guidance or rules that will encourage standards of practice and reduce the potential for misuse:⁸⁹

Transparency, auditing and due diligence are critical to developing a process that is trustworthy, protects privacy and produces good outcomes ...Police agencies must develop policies and procedures for using the data and ensure that communities fully trust it is being put to use honestly, fairly, and in the public’s best interest.

The law should both encompass the use of predictive technologies, while also limit it in order to maintain the balance of protections and to ensure it is not misused. Below is a discussion of various techniques for implementation that ensure the issues that can arise from use are

⁸⁸ Greengard, above n 41 at 21.

⁸⁹ Pearsall, above n 6 at 10.

addressed and mitigated so the technology that is currently, and what will be, available, is able to be harnessed to its full potential. New or an extension of legislative framework with the scope of regulating the use of predictive policing technologies should be considered to provide safe implementation of new tools that are rapidly advancing to balance and address the various issues their usage raises.⁹⁰

A Possible Implementation Techniques

Due to the popularity for these technologies and the enthusiasm for their use, there is research and literature available that discusses implementation techniques and the importance for having effective implementation procedures or plans put in place around predictive policing technologies. Below is a discussion of various implementation techniques and recommendations on predictive policing software generally, followed by a more specific discussion around the potential for implementation into the New Zealand police force and a recommendation of how that should proceed if New Zealand were to adopt this technology.

1 Terminology and Public Image of the Tools

How the public view these predictive policing technologies is important. It helps build trust between the public and the police. Therefore, the tools need to be explained in simple terms, using the best possible terminology that is able to emphasise the benefits the tools have and the role they will play in aiding the police.

It is vital to not treat predictive policing tools as replacements for police officers in reducing and preventing crime, and vital to explain to the public of this. The technology will not perform the role of the police, but rather, they will enhance the role of police officers:⁹¹

Predictive policing offers a lot of promise, but it's important to keep it in context. Predicting behavior is not an exact science. Predictions should never be taken as absolute reality.

The use of these technologies will merely make the police more efficient, saving them time and effort in their roles. It is important therefore to take caution in the terminology used to promote the use of these tools, so the public are aware of the purpose of these tools. There is also the positive effect of the use of the tools on the existing policies and regulations of current

⁹⁰ Babuta, above n 49 at 35.

⁹¹ Greengard, above n 41, at 21.

policing practices. When the Santa Cruz Police Department began implementing their predictive policing software, they did so on the premise that the tools were complimentary to their current roles in reducing and preventing crime, “offering the new tools as a complement to existing resources reduced friction with existing policies and allowed time for successful adoption”.⁹² Predictive policing tools are to be used as additions to the police force, not as substitutes for traditional police practices.

2 Data Collection and Use

It is important that the information collected and put into the predictive tools is as accurate and as timely possible, for the “accuracy of predictions is driven by the completeness of input information.”⁹³ Again, predictive policing is not an exact science for there will always be gaps within the data collected and fed into the technology and the resulting information out of these tools are all about the data. It is vital then that these tools are not relied on completely when police perform their roles. They should only be used to aid their functions.

There should also be protection and limitation around the use of the data, particularly in what the tool is being given. There should be processes in place to assess data’s accuracy and processes to ensure that a holistic range of data is being collected.⁹⁴ In doing so, the data will be as accurate as possible and the less bias there is able to be prevented. This is important as the accuracy of data will ultimately aid the technology in its aim to prevent crime more efficiently.

The data collection must also be available to officers in the field, out on patrol:⁹⁵

One of the biggest advances in predictive analytics is the ability to leverage real-time data. This ability is most useful, however, if officers can access output that uses real-time data, such as maps, while out in their cars and on foot.

By making the collection of data timely, the quality of the information inputted into the predictive tools is higher as it will be more accurate. When there is a backlog of information

⁹² Bachner, above n 39 at 31.

⁹³ At 32.

⁹⁴ Schlehahn and others, above n 24, at 5.

⁹⁵ Bachner, above n 39 at 32.

waiting to be put into the tool, the predictions that rely on that information yet to be entered, suffer and therefore do not aid but hinder the officers using those predictions.⁹⁶

Both the collection and input of information into the predictive policing tool should be both encouraged to be timely and encouraged to be as accurate as possible. Protections and limitations around the information being used and collected is recommended to facilitate high quality data to be used and therefore higher quality predictions can result.

3 Leadership and Training

To effectively use predictive policing tools within a police department, there is a need for leaders with an expertise in their use and ability. Ideally, these leaders will be able to oversee the analytical methods used and provide connection and information between the police, the state and the public.⁹⁷ Various departments in the USA have successfully implemented predictive policing tools through the appointment of trained management and structure that is well informed in the use and purpose of the tools:

The Richmond Police Department attributes the success of its predictive policing program largely to the leadership and management structure of its crime analysis unit. Renee Tate crime analysis supervisor for Richmond, has designed a unique hybrid organizational structure that ensures that crime analysts regularly communicate with each other as well as officers. In the Richmond system, analysts split their on-the-job time between the crime analysis unit and their assigned precinct.

With the availability of information and training to officers at every level, officers are more likely to embrace the use of the technology and feel comfortable in its enhancement to their role.⁹⁸ Generally, training programs involve guidelines and standards that officers across the board must satisfy. The public would also be more likely to embrace the use when aware that officers have been trained and have standards to adhere to in the use of these technologies. Expertise, leadership and training will add more transparency to the use.

⁹⁶ Bachner, above n 39 at 31.

⁹⁷ At 32.

⁹⁸ At 31.

4 Community Involvement

Community involvement in the implementation and use of these technologies is imperative. As discussed briefly above, the trust of the public with the police is vital to their use:⁹⁹

The community must have confidence that law enforcement will handle information the right way... We should engage privacy advocates and community leaders from the outset to explain the program and get their ideas and input to alleviate their concerns.

In encouraging community involvement, concerns surrounding civil liberties such as privacy, bias and lack of transparency, are then able to be both addressed and assured. Community involvement also allows for the police to incorporate particular and current community needs into their use of the software.¹⁰⁰ In doing so, the police may be able to collect more data that they would unlikely be able to collect by just relying on arrests and reported crime.

5 Transparency

Ultimately, transparency is the key to making sure the tools are not misused and there remains trust from the public in their use, particularly when lacking legislation that regulates their use.¹⁰¹

Transparency is paramount. Police departments should tell the public which predictive systems they use, by what criteria they chose them and how they evaluate them... They should also publish and disseminate principles and policies on predictive policing that consider civil-rights concerns. These documents are crucial because, in the absence of legislation, a court injunction or consent decree, there is no federal mandate for municipal and state police oversight in the United States.

The encouragement of transparency around the implementation and use of these predictive technologies will address the majority of the concerns that arise. There needs to be information available to provide clarity so both the public and the police using the tools are well informed in what is occurring:¹⁰²

Transparency can be achieved by a combination of two approaches: On the one side, transparency of the system itself, whereas it is made perceivable why an algorithm produced certain results. On the other side,

⁹⁹ Pearsall, above n 6 at 18.

¹⁰⁰ Robinson and Koepke, above n 80, at 6.

¹⁰¹ Aaron Shapiro "Reform predictive policing" (2017) 541 *Nature* 458 at 460.

¹⁰² Schlehahn and others, above n 24 at 3.

transparency regarding the use of the system by making the analytical process evaluable. Both measures together enhance the verifiability and the integrity of criminal investigation and prevention procedures. This does not only benefit the concerned individuals (namely suspects, victims, witnesses, etc.), but also the police analyst by enabling a more adequate assessment of circumstances and correlations of a criminal case

Transparency needs to be given to both the tool itself that is being used by the police, and the methodology that the tool is using. This will provide the public with clarity and information to address their concerns and even alleviate them.

6 Policy

To safely and transparently implement these new technologies to harness their benefits, it is important to have policy in place to guide their implementation and use. It also:¹⁰³

Promotes the societal discussion on concrete policies - on what should be possible, and what should not be possible. And it creates a legally reliable framework for analysis to work in.

Implementing some form of policy is a way to encourage community involvement and transparency in both the tools uses and its limits. From this policy, standards can be prescribed to the use of the technology. For example, standards and protective limits can be put in place around what information is used by the technology such as tracking of where the data came from and how it was recorded and edited, or measures to protect personal information from being used or even collected, with the implementation of Privacy Enhancing Technologies (PETs) which can encrypt sensitive information and blur images.¹⁰⁴

Implementation of specific policy, or policies, around the use of predictive policing technologies that address privacy, transparency and bias concerns, will give the state control over their use and limit their potential for misuse. Police will then be able to harness the technologies benefits for the community while also mitigating the potential resulting pitfalls.

¹⁰³ At 5.

¹⁰⁴ At 5.

B Recommendation for Implementation in New Zealand

In implementing predictive policing technology, the New Zealand police should focus their techniques on transparency, for the more information that is available to the police and to the public, the more trust the public have in the police with the implementation and use of the tools. This will include importance on how the technology is built, particularly who by. These predictive policing technologies should not be created by private companies with the aim of commercialisation. They should be created with transparency in mind so the way they work is clear and explained to both the public and the state. This will also likely reduce inherent bias within the tool itself if the makers are accountable to the public.

There also should be emphasis for transparency in what information is collected and put into the tools. Though there is data protection and privacy legislation¹⁰⁵ currently in force that limits what information can be collected and how that information is to be used, there is no clear protection or guidance around the ethical use of this kind of technology and the information that is involved in its use. A policy around the limits of the use of the technology is encouraged, with guidance around privacy and bias addressing to facilitate the collection of accurate and timely data and provide protections surrounding the use and collection of data.

Ultimately, successful implementation of predictive policing technologies will revolve around transparency of the inner workings of the tools and researched policy making for their use. This policy making will encourage transparency, the public's input, official and regulated data collection methods, training and education for the policy makers and the police force who will be using the technology, and established protection of privacy aims.

There are gaps in the research around the benefits of predictive policing, with an even bigger gap in research around the use of these tools in New Zealand. There should be more attention paid to the potential use of these technologies in specific to New Zealand policing and whether the benefits outweigh the negatives of the use of the tools. Similarly, the negatives are more specific to larger countries with more complicated policing systems of states and counties, rather than the centralised policing of New Zealand and should therefore be researched for New Zealand specifically.

¹⁰⁵ The Privacy Act 1993.

The change and resulting development of the role of police overtime shows the willingness and even enthusiasm the state and the police have in implementing technologies to aid the role of police, with some technologies causing expansions in their roles when society's needs change. With the introduction of predictive policing technologies, the role of police is assisted through enabling smarter and more effective resource allocation and has adapted the role of police towards more of a preventative role than a reactive role.

More research around the effects, both positive and negative, needs to be conducted to understand the implications of the use of these predictive policing tools will have in New Zealand and within the New Zealand police. Specific policy should then be made around their effects and should address the concerns the public have around them, this can be done through public consultation, transparency in their implementation and regulation around the use of data being used. By making sure the regulations put in place around the tools address the various concerns, the benefits that, if found to be established in further research, can be harnessed by the police. This will likely result in successful and safe implementation of predictive policing technologies in New Zealand.

VI Conclusion

Predictive Policing technologies have the potential to change and enhance the role of a police officer. These tools have great benefit to the public, the state and police officers themselves, however they also have resulting downfalls that need to be addressed before they are properly implemented into New Zealand's police force. These negatives involve issues around civil liberties, particularly privacy and bias, revolving around the lack of transparency around the make-up of these tools.

Currently, predictive policing technologies are used in other countries, particularly being embraced in the United States of America. These tools have been implemented into their respective countries law enforcement agencies without extensive research into their effectiveness or their consequences. This has caused concern within the public resulting from a lack of transparency around the tools in what they are and how they work. Without transparency, the public do not understand what is involved in the tools and this results in a lack of trust from the public in the tools.

The New Zealand Police have not implemented predictive policing technologies into their roles. They are, however, encouraging intelligence-led policing methods, which embrace the use of technology to aid the transition from a reactive to preventative policing model. There is a clear enthusiasm and aim for the police to embrace new technologies and harness their benefits to better their abilities to perform their roles. It is likely, therefore, for predictive policing technologies to be implemented in New Zealand.

When these predictive policing tools are embraced in New Zealand, they need to be implemented in a safe and transparent way so to mitigate their negatives and to harness their positives. This paper discusses six implementation techniques that should be considered before being established and used by the New Zealand police. These techniques will encourage transparency and official regulations that will monitor and protect the public and the police in the use of these tools, particularly in privacy protections.

This paper has also found that there lacks sufficient research and studies done on these tools, particularly on their effectiveness. There needs to be more research done on these tools to understand them which, as a positive result, will enhance their transparency.

For successful and safe implementation in New Zealand, predictive policing tools need to be transparent, thoroughly researched and regulation for use and data collection is imperative. A balance of the importance of public safety with the protection of individuals civil liberties is imperative for a successful use of predictive policing tools. These tools are likely able to enhance the role of the police and cause an adaptation in their role for they will be able to focus their roles in specific areas of policing, such as community involvement or patrolling certain neighbourhoods that are likely crime hotspots. This paper recommends addressing the six implementation techniques when New Zealand implements predictive policing technologies and creating regulation that will mitigate concerns resulting from the technology's use while harnessing their benefits and most importantly, promoting transparency.

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