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**TECHNOLOGICAL SOLUTION FOR THE
REDUCTION OF POLICE PURSUITS:
IMPLICATIONS FOR INCREASED INVESTMENT**

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**NAVAL
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MONTEREY, CALIFORNIA

THESIS

**TECHNOLOGICAL SOLUTION FOR THE REDUCTION
OF POLICE PURSUITS: IMPLICATIONS
FOR INCREASED INVESTMENT**

by

Ian Troxell

September 2019

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**TECHNOLOGICAL SOLUTION FOR THE REDUCTION OF POLICE
PURSUITS: IMPLICATIONS FOR INCREASED INVESTMENT**

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Lieutenant, California Highway Patrol
BS, Trident University International, 2011

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
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ABSTRACT

The Department of Justice (DOJ) is the primary federal funding source for state, local, and tribal law enforcement departments throughout the United States. In recent years, there has been a call to address the risks associated with traditional vehicle pursuit methods. The adoption of pursuit management technology has been identified as an effective and beneficial alternative to established kinetic methods. The established methods are defined by contact with the pursued vehicle that does result in a greater risk for collateral damage. By acting in its role as a major funding source, the DOJ can provide the necessary framework for the acquisition of pursuit management technology by state, local, and tribal departments. This thesis evaluates the sources relating to pursuit management technology, DOJ funding activities, departmental pursuit policy, and DOJ policy reform efforts. Policy prescriptions are provided based on the information presented in the evaluation. It is recommended that the DOJ redirect more funds toward the acquisition of pursuit management technology to improve departmental efficiency and strategic efficacy.

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LIST OF ACRONYMS AND ABBREVIATIONS

BAR	Browning automatic rifle
BJA	Bureau of Justice Assistance
COPS	Community Oriented Policing Services
DOJ	Department of Justice
GPS	Global Positioning System
HPEMS	high-power electromagnetic system
JAG	Judge Advocate General
LEAA	Law Enforcement Assistance Administration
MADD	Mothers Against Drunk Driving
NIJ	National Institute of Justice
NLECTC	National Law Enforcement and Corrections Technology Center
OJP	Office of Justice Programs
OLEA	Office of Law Enforcement Assistance
OMB	Office of Management and Budget
OVW	Violence against Women
TIPS	Technology Innovation for Public Safety

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EXECUTIVE SUMMARY

The research presented herein is the result of efforts to integrate multiple categories of analysis into the formulation of a discussion platform concerning the Department of Justice’s (DOJ’s) funding efforts and the acquisition of pursuit management technology at the departmental level. This thesis recognizes the neglect of this issue in the academic literature to date. Rather than simply relying on a scholarly analysis of the issue, the critical evaluation expands the scope of analysis to integrate industry and government reports, as well as existing academic research, into a clear description of the conditions currently impacting the acquisition of pursuit management technology.

This thesis includes a literature review that directly addresses many of the concerns associated with “vehicular pursuit” in the traditional sense. Traditional vehicular pursuit practices have yielded many negative outcomes.¹ To reduce the risks associated with traditional pursuit practices, both public and private interests have pursued development in new forms of pursuit management technology.² Key to these management systems is the utilization of sophisticated technological approaches to reduce the danger officers are exposed to during a pursuit incident.

Traditional pursuits are a source of major cost for many departments throughout the United States. For example, a small department in Independence, MO recently became involved in a chase that led to the serious injury of multiple bystanders and the death of one bystander.³ A settlement was eventually reached with a payout of \$767,500 to the victims of this specific pursuit incident.⁴ To offset costs associated with pursuit, some

¹ Samuel E. Walker and Carol A. Archbold, *The New World of Police Accountability* (Thousand Oaks, CA: Sage Publications, 2018), 110.

² Philip Brey, “Theorizing Technology and its Role in Crime and Law Enforcement,” in *The Routledge Handbook of Technology, Crime and Justice* (Abingdon-on-Thames, UK: Routledge, 2017), 43–60.

³ Cat Reid, “The Price of Pursuit: Police Chases Can Lead to Lawsuits, Property Damage,” KSHB, accessed May 16, 2019, <https://www.kshb.com/news/local-news/the-price-of-pursuit-police-chases-can-lead-to-lawsuits-property-damage>.

⁴ Reid.

departments have created highly restrictive pursuit policies.⁵ Still, some departments have developed virtually no pursuit policies.⁶ The result is a highly mixed environment in which no single policy philosophy dominates the treatment of pursuit strategy. This study examines how pursuit policy and the acquisition of pursuit management technology may overlap in directly influencing the DOJ's investment decisions. Namely, the variation in the policy environment within the United States may influence the DOJ to attempt to standardize pursuit practices through the implementation of new technology-based strategies.

To frame the concepts presented in the literature to allow for a confluence of ideas within the evaluation, a background analysis was developed. This historical examination of key factors impacting DOJ investment and departmental utilization of technology is offered as a supplementary discussion for the evaluation presented within the critical analysis. A full description of the critical evaluation process is also offered in this research, with a focus on allowing for ease of replication.

Due to the limited source material relevant to the issue at hand, the evaluation focuses on more comprehensive studies. The goal is to emphasize the quality of the material analyzed rather than the quantity. Accordingly, many of the sources analyzed are taken directly from DOJ research reports and projects. These comprehensive reports are supplemented with a scholarly analysis in the key areas of departmental and DOJ policy identified in the literature review.

The systematic analysis presented contributes to the development of key policy prescriptions. These policy prescriptions are offered as general guidelines for the alignment of DOJ funding and department pursuit policy with the body of research examined in this study. The purpose of the study is not to craft a specific policy for immediate adoption, but to identify a general policy trend that may be embraced to ensure the long-term efficacy of the DOJ's funding of pursuit management programs at the state, local, and tribal level.

⁵ Esther Seoanes, "Pursuit Policy Types: Restrictive, Discretionary, or Discouraging," PursuitSafety, accessed May 16, 2019, <https://www.pursuitsafety.org/pursuit-policy-types-restrictive-discretionary-or-discouraging/>.

⁶ Seoanes.

The findings in this study show that the DOJ and certain departments have identified pursuit management technology as an effective means of improving pursuit practices and mitigating risk. The reconsideration of traditional pursuit strategy as both a financial and safety threat must inform efforts to improve the community profile of departments throughout the United States. The DOJ has found great success in the promotion of crime prevention and policing improvement programs through the organization's Community Oriented Policing Services (COPS) Office and other affiliate organizations.⁷ Through such organizations, the DOJ will be able to promote the adoption of pursuit management technology throughout the United States. The COPS Office could achieve this adoption through additional funding, as well as the direct promotion of technology investment.

⁷ Philip J. Cook et al., *The Effects of COPS Office Funding on Sworn Force Levels, Crime, and Arrests: Evidence from a Regression Discontinuity Design* (Washington, DC: Office of Community Oriented Policing Services, 2017), 13.

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I. INTRODUCTION

What may be considered “proper” action within the realm of criminal justice may change as society evolves and new philosophies of justice are adopted. Oftentimes, one of the critical forces shaping the public’s perception of law enforcement’s proper functional role is the issue of safety.¹ In the United States—as in the rest of the developed world—law enforcement officers must walk a fine line between stopping criminal activity and doing what is considered safe and acceptable from a social standpoint. One area in which the nation’s law enforcement departments have struggled to find a proper balance between safety and effective action is in the area of pursuit. As revealed in this thesis, modern pursuit practices have proven to be deadly.

As shown in this chapter, the number of injuries and deaths associated with traditional vehicular pursuit tactics is a significant problem potentially made worse by advancements in engineering that have improved the range of speed and reliability of commercial automobiles. This problem has attracted significant public attention and private companies have worked diligently to develop new forms of police technology that may allow for risk mitigation related to high-speed pursuit.² Technological devices, such as StarChase, offer new and innovative ways to ensure fleeing suspects are apprehended without exposing the public and officers to undue danger.³

Although these devices offer promise as a pursuit alternative, many departments are unable to make the technological expenditure required to outfit their forces with pursuit management technology.⁴ As explained in the evaluation, economic downturns following

¹ Elizabeth A. Mumford, Bruce G. Taylor, and Bruce Kubu, “Law Enforcement Officer Safety and Wellness,” *Police Quarterly* 18, no. 2 (2015): 111–133.

² Robert Sykora, “The Future of Autonomous Vehicle Technology as a Public Safety Tool,” *Minnesota Journal of Law, Science & Technology* 16, no. 2 (2015): 811.

³ Thomas Grose, “Low-Speed Chase,” *ASEE Prism* 23, no. 4 (2013): 14. StarChase is a vehicle mounted Global Positioning System (GPS) launcher that allows for the “tagging” of vehicles to facilitate remote tracking and reduce the need for further contact with the fleeing vehicle.

⁴ Geoffrey P. Alpert and Cynthia Lum, “The Future of Police Pursuits Research and Policy,” in *Police Pursuit Driving* (New York: Springer, 2014), 53–60.

the 2008 financial crisis led to a reassessment of budgetary practices within law enforcement.⁵ Consequently, this downturn shifted the investment focus away from new and relatively untested technology.⁶ Departments began to double-down on a personnel-centric approach to budgeting. No effective means were available to stem the tide of financial chaos that had impacted American law enforcement's operational function.

Following the 2008 financial crisis, the Department of Justice (DOJ) began to increase the level of assistance to law enforcement departments throughout the country.⁷ Such assistance was primarily channeled through the Office of Community Oriented Policing Services (COPS Office) and the Office of Justice Programs (OJP). Although efforts were made to change departments' investment philosophies, budgetary reform underwent little change.

The many departments that received increased assistance simply utilized these funds to increase efficiency through personnel force multiplication rather than expanding the use of experimental alternatives to dangerous pursuit strategies.⁸ The long-term impact of the financial downturn for law enforcement has been more serious than most members of the general public understand. Recent calls for an increase in community policing efforts, as well as investment in new forms of crime prevention and detection technology, have failed to account for most departments simply trying to remain operationally sound from a financial perspective. A change in such philosophy will require major policy steps to be taken by the DOJ to ensure that new funds reach the project types that will enable reductions in the use of traditional pursuit strategies.

⁵ Mathie Deflem, *Economic Crisis and Crime* (Bingley, UK: Emerald Group Publishing, 2011), 207.

⁶ Deflem, 207.

⁷ Garth J. den Heyer et al., *An Assessment of Cost Reduction Strategies in a New Economy: Technical Report and Survey Monograph* (Washington, DC: COPS Office, 2017), 24.

⁸ Police Executive Research Forum, *Policing and the Economic Downturn: Striving for Efficiency Is the New Normal* (Washington, DC: Critical Issues in Policing Series, 2013), 2.

A. RESEARCH QUESTION AND SUB-TOPICS

This thesis presents a systematic evaluation of multiple data categories to arrive at effective policy prescriptions regarding the use of DOJ funds. The purpose of the policy prescriptions is to increase access to pursuit management technology, such as StarChase and similar systems. The central research question of the thesis concerns the viability of the DOJ as a source for funding and promotion of vehicular pursuit management technology and the departmental level throughout the United States. The literature review presented in this thesis endeavors to establish a strong platform for the discussion of the research results. This review examines recent trends in the literature regarding the DOJ's funding tactics, the impact of poor economic conditions on department policy, the efficacy of pursuit management technology, and the degree of difficulty associated with accessing said technology.

The policy prescriptions provided in this thesis should be understood in the context of the multiple examination criteria outlined. A comprehensive understanding of the present problem can only be gained through recognizing the impact of each component of the problem. The DOJ's funding activities must be adapted to ensure the necessary expenditures are made by departments throughout the United States to obtain effective and efficient pursuit management technology. This argument is based on a critical analysis of field reports, industry data, government documents, and the scholarly analysis of DOJ and departmental policy over the past few decades. Policy prescriptions are provided for the development of a more effective DOJ funding strategy in the later chapters of this thesis.

B. OVERVIEW OF CHAPTERS

Chapter I serves as an introductory chapter, which provides a general outline of the thesis and presents the literature review. The literature review draws from some of the more recently published sources concerning pursuit policy to highlight the general development of policies, technologies, and procedures in relation to pursuit. The literature review, therefore, can be viewed as a supplement to this evaluation in that it lays the groundwork for the later, more in-depth analysis of the identified problem. Chapter I concludes with a

brief discussion of the methodology employed in the development of the research undertaken in this thesis to address the core research question of how the DOJ may employ its funding system to facilitate the adoption of pursuit technology and thereby improve departmental efficiency and strategic efficacy.

Chapter II presents a background analysis of the institutional forces that have led to the continued use of pursuit as a common strategy, as well as explanations for the lack of the widespread adoption of pursuit management technology by law enforcement agencies. In this chapter, special attention is paid to the economic and social forces that laid the groundwork for the present problem. This information is presented as additional supplemental information to help explain the arguments presented within the discussion of the evaluation.

The purpose of Chapter III is to introduce transparency into the research process and allow research to be replicated if deemed necessary. A step-by-step outline of the review process as it has occurred is presented. The theoretical foundations underpinning the evaluation in this research are also explored.

Chapters IV and V discuss the findings of the evaluation and the information provided within the chapter forms the bulk of it. Rather than simply presenting the results of the critical assessment, these chapters offer a discussion of each component to build a clear picture of the present conditions impacting the employment of pursuit management technology and the funding efforts of the DOJ's special service organizations. Finally, Chapters IV and V discuss the barriers identified in the study.

Chapter VI offers policy prescriptions based on the results of the evaluation presented in the discussion. The policy prescriptions presented herein are addressed not only to the federal departments associated with the DOJ but also to law enforcement departments throughout the United States. The purpose of the policy prescriptions presented is to align financial and strategic policy with the body of data identified in the evaluation. The ultimate goal of the policy prescriptions is to improve safety and security for the public of the United States. Chapter VI also provides the final conclusion for the thesis where a summative statement on the information contained within the thesis is

offered. Additionally, Chapter VI provides recommendations for future research based on the evaluation, literature review, and historical background analysis.

C. LITERATURE REVIEW

To address the study's research questions effectively, a variety of topics must be examined to inform the basis of the funding system implemented by the DOJ. The sub-questions identified in the "research question" section inform the literature review given for this proposal. Special focus is placed on field test reports, statistical data on pursuit policies, economic data relevant to funding challenges, and data concerning the current funding strategy of the DOJ grant system.

1. Safety and Risk

Before examining pursuit alternative technology, the problem of pursuit as a public safety concern must be established. In 1997, the DOJ published a comprehensive report on the issues of police pursuit policy and activity.⁹ The report analyzed pursuit practices used by various departments throughout the United States. The DOJ determined that changing pursuit policy would improve the safety of such practices.¹⁰

At the time that the DOJ report was published, the technological alternatives to pursuit were quite limited. Due to the lack of apparent alternatives to high-speed pursuit practice, the DOJ simply recommended law enforcement officers undergo more extensive training to ensure adherence to the utmost safety standards in such pursuits.¹¹

In the contemporary environment, existing pursuit alternative technologies have drastically increased the number of options available to U.S. police departments. The development of these new technologies has led some researchers to question the use of high-speed pursuit. Accordingly, some have argued that improved pursuit methods are not

⁹ Geoffrey P. Alpert, *Police Pursuit: Policies and Training* (Washington, DC: National Institute of Justice, 1997), 6.

¹⁰ Alpert, 6.

¹¹ Alpert, 6.

a sufficient means of ensuring the safety of the general public.¹² Instead, pursuit should be outlawed in favor of technological solutions that can eliminate many of the dangers associated with traditional pursuit methods.¹³

Changing attitudes regarding the value of traditional pursuit methods over the past few decades has led to the need for a review of the role of pursuit practices in the context of effective policing. This change requires a working definition of “pursuit” relevant to the conditions that can be examined in contemporary analysis of pursuit practices. In terms of the academic description of pursuit practices, no singular source referred to offers a comprehensive definition. Instead, multiple sources must be used to create a cumulative description of what constitutes a pursuit. Pate offers a comprehensive discussion of the history of pursuit in the United States from the 1960s to the 2010s.¹⁴ His study describes the problem of public danger posed by traditional pursuit tactics throughout the second half of the 20th century and into the beginning of the 21st.

Pate argues for the inclusion of public danger as an essential element of a police pursuit. The data referenced by Wyllie in his work on the viability of various police pursuit alternatives further supports this idea. Wyllie notes that since 1979, over 5,000 bystanders have been killed as a result of a police pursuit.¹⁵ The California Highway Patrol alone was involved in the pursuit of 14,628 motorists between 2007 and 2014, which resulted in a total of 4,052 traffic collisions, 2,198 injuries, and 103 deaths.¹⁶ Public danger is clearly

¹² Robert E. Crew and Robert A. Hart, “Assessing the Value of Police Pursuit,” *Policing: An International Journal of Police Strategies & Management* 22, no. 1 (1999): 73.

¹³ Wendy L. Hicks, “Police Vehicular Pursuits: A Descriptive Analysis of Stage Agencies’ Written Policy,” *Policing: An International Journal of Police Strategies & Management* 29, no. 1 (2006): 122.

¹⁴ Matthew Pate, “Vehicular Police Pursuits,” in *Police and Law Enforcement*, ed. William J. Chambliss (Thousand Oaks, CA: SAGE Publications Inc., 2011), 225–238.

¹⁵ Doug Wyllie, “This Technology Could Prevent Police Pursuit-Related Deaths,” *PoliceOne*, July 15, 2016, <https://www.policeone.com/police-products/Pursuit-Management-Technology/articles/199611006-This-technology-could-prevent-police-pursuit-related-deaths/>.

¹⁶ Thomas Frank, “High-Speed Police Chases Have Killed Thousands of Innocent Bystanders,” *USA Today*, July 30, 2015, <https://www.usatoday.com/story/news/2015/07/30/police-pursuits-fatal-injuries/30187827/>.

an important element in the description of police pursuit; however, it is not the only element that should be considered.

Necessity is another element of pursuit that must be considered. Police officers can find themselves in situations that require pursuit to prevent a suspect's escape. For example, out of 63,500 pursuits in 2002–2014 in California, the data reveal that 5% of pursuits involved a suspect fleeing from a violent crime.¹⁷ Pursuit is necessary in these situations regardless of the inherent dangers associated with the practice. Dees notes that various factors inform an officer's decision to pursue a suspect.¹⁸ Of the many factors that must be considered, arguably the most important is time.

If an officer has sufficient time to determine an alternative to pursuit, that officer may forgo the traditional pursuit method and consider a safer strategy.¹⁹ However, if a decision must be made quickly, the officer will be less likely to contemplate an alternative.²⁰ Considering the time constraints faced by officers when devising an appropriate response to a fleeing suspect, the establishment of a clear protocol is paramount in the use of pursuit tactics. By developing a protocol that emphasizes safety, it may be possible to reduce the likelihood of pursuit-related injuries.

Dees notes that departmental policy regarding the proper steps to be taken in the development of a pursuit is generally lacking in substance.²¹ Some departments lack any type of pursuit policy at all.²² Therefore, ambiguity in departmental policy is another defining element of the pursuit process. The lack of clear policy may be regarded as a

¹⁷ Frank.

¹⁸ Tim Dees, "Deciding to Pursue or Not to: The Implications of Pursuit Policy for the Officer, Department, and Community," Pursuit Response, accessed May 17, 2019, <https://www.pursuitresponse.org/deciding-to-pursue-or-not-to/>.

¹⁹ Geoffrey Alpert and Roger Dunham, *Police Pursuit Driving* (New York: Greenwood Press, 1990), 1–15.

²⁰ Alpert and Dunham, 1–15.

²¹ Dees, "Deciding to Pursue or Not to."

²² Dees.

barrier to the effective response to a fleeing suspect. If departments wish to improve safety in pursuit tactics, it is necessary for them to establish clear and easily applied standards.

This literature review has examined pursuit from the pursuer's perspective, but the perspective of the pursued is just as important. Dunham et al. conducted an exploratory analysis of the defining characteristics of suspects involved in police pursuits in three separate American cities.²³ Based on their findings, most of the suspects involved in high-speed pursuits were white males in their mid-20s, and over 50% of the sample population reported the fear of police use of excessive force as the primary reason for fleeing.²⁴

The very act of pursuing a suspect may provide the catalyst for increased speed, tension, and erratic driving. These elements set the stage for a higher degree of danger. Consider the thoughts and emotions the officer may experience when the safety of pursuit is not guaranteed. The ever-present threat of a collision, as well as the potential to injure an innocent bystander exists. Such a threat adds pressure to an already tense situation.

Those pursued by the police often attempt to escape through reckless means, such as driving at excessively high speeds and attempting to perform dangerous maneuvers to throw off their pursuers.²⁵ The potential for an increase in danger resulting from pursuit has led researchers, such as Crockett, to argue for the banning of traditional pursuit methods.²⁶ The banning of traditional pursuit may address the problem of public damage during pursuit, but would limit the number of tactical options on the table for officers in the field. Furthermore, this solution does not address the damage caused by the suspect in the commission of the crime.

²³ Roger G. Dunham et al., "High-Speed Pursuit: The Offenders' Perspective," *Criminal Justice and Behavior* 25, no. 1 (March 1998): 30–45.

²⁴ Dunham et al., 43.

²⁵ Zachary Crockett, "The Case for Banning High-Speed Police Chases," *Priceonomics*, accessed July 22, 2015, <https://priceonomics.com/the-case-for-banning-high-speed-police-chases/>.

²⁶ Crockett.

2. Alternative Technology

As an alternative to traditional pursuit methods, Crockett recommends using alternative technology, such as StarChase.²⁷ Kozlowski also suggests it as a potential alternative to the traditional methods of pursuit.²⁸ Kozlowski notes that people driving under the influence and vehicular theft caused many of the pursuits reported.²⁹ These particular offenses have a strong link to pursuit, and the presence of either an impaired suspect or a suspect who has committed a serious offense (e.g., vehicular theft) adds another element of danger to the already perilous practice of high-speed pursuit.

Clearly, pursuit policy could benefit from an expansion of tactical and technological options. Rather than simply relying on traditional methods of pursuit or minor modifications to traditional pursuit policy, some departments have begun to embrace the radical alternatives offered by devices and systems, such as StarChase, the Fiore microwave system, the Eureka Aerospace electromagnetic radiation device, Road Sentry, and RoadSpike.³⁰ All these devices received field-test funding through the National Institute of Justice (NIJ).³¹ This field testing was conducted as part of a concerted effort by the NIJ to identify pursuit alternative technology that could be considered ready for employment throughout the nation.

StarChase is a vehicle-mounted GPS launcher that allows for remote tracking of fleeing vehicles. The Fiore microwave system utilizes microwaves to disable essential engine components and halt fleeing vehicles without the need for physical contact. Eureka Aerospace's electromagnetic radiation device is another example of a non-contact device that disables key engine components. Road Sentry employs an electromagnetic discharge

²⁷ Crockett.

²⁸ Jonathan Kozlowski, "Slowing the Pursuit," *Vehicles Technology* 34, no. 1 (January 2007): 95.

²⁹ Kozlowski, 96.

³⁰ "Technology for Pursuit Management," National Institute of Justice, accessed July 10, 2017, <https://www.nij.gov/topics/law-enforcement/operations/traffic/Pages/technology-developments.aspx>. Of the devices listed, the Fiore microwave system and the Eureka Aerospace electromagnetic radiation device remain in the developmental phase.

³¹ National Institute of Justice.

device to disengage vehicles. Finally, RoadSpike is a commercially available remote discharge spike strip system intended to puncture the tires of a fleeing vehicle and allow for the capture of the suspect.

All the devices highlighted in this literature review were shown to be highly effective in their application, albeit in the confines of the NIJ field-testing program.³² Various departments throughout the United States have since adopted StarChase, Road Sentry, and RoadSpike, such as in Pittsburg, CA and Methuen, MA.³³ The Fiore and Eureka Aerospace systems remain too costly for wide adoption, and they also carry certain collateral risks that have yet to be eliminated from the design of the systems.³⁴ Examples of collateral risk include the disabling of civilian vehicles and the potential for the triggering of traffic collisions resulting from the sudden halting of the fleeing vehicle.

The NIJ's extensive funding of field tests for the development of anti-pursuit technology is a positive step toward the national policy creation for the expansion of pursuit alternatives. Field testing represents progress in terms of improvements to public safety and an increase in the public's trust of departments throughout the United States. As valuable as these tests are in addressing public safety concerns associated with pursuit, the critical issue of funding for the acquisition of anti-pursuit technology remains.

This literature review identifies a need for adjustment in the national approach to pursuit. The traditional standards of pursuit policy have failed to offer an acceptable level of safety for the public, the pursuer, and the pursued. The literature review also highlights that departments are willing to adopt pursuit management technology if they are provided with the necessary funding to do so. Field tests supported through funds offered by the NIJ have confirmed the viability of multiple forms of anti-pursuit technology; however, the devices and systems analyzed through the NIJ field tests remain expensive.

³² National Institute of Justice.

³³ Bambi Majumda, "Law Enforcement Agencies Look to Invest in Pursuit Management Technology," StarChase, accessed September 11, 2018, <http://news.starchase.com/2018/09/11/law-enforcement-agencies-look-to-invest-in-pursuit-management-technology/>.

³⁴ National Institute of Justice, "Technology for Pursuit Management."

3. Economic and Financial Issues

The question now becomes that of what conditions have prevented the widespread adoption of pursuit alternative technology in the United States? To answer this question, the economic factors contributing to declines in technology investment within law enforcement departments are considered. To understand the current conditions impacting technology investment fully within law enforcement, the 2008 financial crisis and its relevance to law enforcement must be examined.

The 2008 financial crisis had far-reaching implications for the entire criminal justice system. The necessity of certain governmental relief programs as a means of stabilizing the economy led to the need for a reduction in spending in various sectors of the public sphere.³⁵ The criminal justice sector was one sector that experienced heavy cuts. Consequently, the previous funding channel available through the DOJ grant system was reduced.³⁶ This reduction created a major challenge for law enforcement agencies throughout the nation. Unfortunately, the tightening of the DOJ budget came when investment in policing technology stood at a crucial junction point.³⁷

By failing to invest in new forms of policing technology, departments would effectively act as barriers to research and development that might have allowed expansion in the police technology market. Following the 2008 financial crisis, department managers were forced to determine the necessity of investment in pursuit alternatives and other forms of policing technology.³⁸ The American criminal justice system tends to operate on a platform of strong investment in personnel.³⁹ The heavy personnel requirements of law enforcement departments create a funding gap in critical areas. One such area is technology

³⁵ Brian A. Jackson et al., *Police Department Investments in Information Technology Systems: Challenges Assessing Their Payoff* (Santa Monica, CA: RAND, 2014), 5.

³⁶ Jackson et al., 5.

³⁷ den Heyer et al., *An Assessment of Cost Reduction Strategies in a New Economy*, 5.

³⁸ Jackson et al., *Police Department Investments in Information Technology Systems*, 4.

³⁹ Jackson et al., 5.

integration.⁴⁰ Many department managers recognize the necessity of technology integration; however, institutional pressures demand increased investment in personnel.

The strategic value of any technology can be defined as the benefit of a given piece of technology in comparison with its cost. To fill the investment gap in the expansion of technology within the criminal justice system, the DOJ has offered various grants designed to facilitate the adoption of technological systems and devices that may provide a high degree of strategic value. However, in the wake of the 2008 financial crisis, grant opportunities were reduced to focus funding efforts towards the securing of adequate levels of mission personnel.⁴¹

In recent years, improved economic conditions have allowed the DOJ to expand its technological grant funding efforts through its various funding agencies. Most notably, the DOJ has expanded technology funding through the OJP, the Bureau of Justice Assistance (BJA), and the NIJ.⁴² Although increased access to funding has permitted a number of departments to access vital anti-pursuit technology, a widespread lack of funding remains for such expansion in smaller departments, as well as departments where personnel expansion efforts continue as a barrier to technology acquisition. The expansion of the grant opportunities offered to departments has been identified by developers of leading pursuit alternative technological systems as an effective means of expanding the equipment available for deployment.⁴³

StarChase offers a grant-funding aid service through its website to link departments with available funds.⁴⁴ The BJA is referenced by StarChase as one of the three major funding outlets recommended for solicitation by interested departments.⁴⁵ The BJA and other funding avenues operating under the umbrella of the DOJ clearly play an important

⁴⁰ Jackson et al., 1.

⁴¹ Jackson et al., 2.

⁴² “Grants,” Department of Justice, accessed March 23, 2018, <https://www.justice.gov/grants>.

⁴³ “Grants,” StarChase, accessed May 17, 2019, <https://www.starchase.com/grants.php>.

⁴⁴ StarChase.

⁴⁵ StarChase.

role in connecting law enforcement agencies with the capital necessary to allow for the implementation of pursuit alternatives. If these funding opportunities expand, then more departments will embrace the pursuit alternatives that have been developed.

4. Community Relations

The literature review examines one last important concern, which is the value of pursuit alternatives as a means of improving community relations in the context of law enforcement. Researchers have identified growing disconnect in recent years between police pursuit policy and the public's perception of the value of these policies. Members of the general population have continually expressed a desire for stronger oversight in regards to law enforcement's general policing strategy.⁴⁶ Much of the disconnect between the public and law enforcement agencies throughout the nation is the result of various scandals involving misconduct, such as racial profiling in Ferguson, MO, as well as the infamous Philando Castile case.⁴⁷ When the public is exposed to misconduct through the media or through personal interactions with law enforcement, a negative view of police practices tends to develop.⁴⁸

5. Summary

This literature review has examined various sub-questions that must be addressed to establish a foundation for the critical evaluation to be conducted in the final thesis. A consensus in the literature states that traditional methods of pursuit represent a dangerous and often counterproductive means of apprehending fleeing suspects. Law enforcement agencies have begun to move away from traditional pursuit methods; however, the economic crisis of 2008 presented a major challenge to those departments interested in the acquisition of pursuit alternatives. Field-test funding for various pursuit management

⁴⁶ Julian Roberts, *Public Opinion, Crime, and Criminal Justice* (Abingdon-on-Thames, UK: Routledge, 2018), 37.

⁴⁷ Treva B. Linsey, "Post-Ferguson: A "Herstorical" Approach to Black Violability," *Feminist Studies* 41, no. 1 (2015): 232–237; Sirry Allang et al., "Police Brutality and Black Health: Setting the Agenda for Public Health Scholars," *American Journal of Public Health* 107, no. 5 (2017): 662–665.

⁴⁸ Roberts, *Public Opinion, Crime, and Criminal Justice*, 40.

devices and systems has confirmed the value of these systems, and improvements in the health of the American economy have increased grant opportunities through the DOJ and its affiliate organizations. However, many departments continue to struggle with the process of balancing personnel investment and technology acquisition. To improve public relations through the reduction of traditional pursuit, the range of funding options must be expanded for interested departments. The DOJ will play a significant role in determining the future viability of pursuit management technology and, therefore, it is necessary to examine the relationship between DOJ funding schemes and technology acquisition moving forward.

D. METHODOLOGY

The research presented herein consists of an evaluation of the extant literature, field studies, and other reports on the investment activities of the DOJ as they pertain to the funding of pursuit alternative technology acquisition projects in law enforcement departments throughout the United States. The study seeks to identify management factors that may impact the future health of an organization.⁴⁹ One such factor is the employment of resources toward the achievement of an established goal.⁵⁰ In addition to the exploratory analysis of DOJ funding policy, the evaluation presents an examination of the efficacy of pursuit alternatives.

The research draws heavily from field test reports concerning the deployment of various pursuit management technologies. Beyond the analysis of field test reports, the efficacy of various pursuit alternative devices is also examined, whereby attention is paid to the financial issues that may prevent or facilitate effective deployment. Following a review of the information and a comprehensive discussion of the findings, policy prescriptions are offered based on the findings of the critical evaluation. The focus of the

⁴⁹ David Transfield, David Denyer, and Palminder Smart, "Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Critical Analysis," *British Journal of Management* 14, no. 3 (2003): 215.

⁵⁰ Transfield, Denyer, and Smart, 207–210.

policy prescriptions is on the relationship between the DOJ and the acquisition of pursuit alternative technology by departments throughout the United States.

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II. BACKGROUND

A. INTRODUCTION

Rather than assume law enforcement's current state of policy regarding the use of traditional pursuit tactics exists independently of certain developmental forces, it is necessary to examine the historical background of those economic and social factors that have led to the current situation. By examining how the present system arose through a process of economic and social development, it is possible to identify those elements of policy development that have proven to be critical to effective system building. This information can act as supplemental material informing the policy prescriptions presented herein. To maximize the relevancy of the present discussion, three categories of historical analysis have been identified as particularly relevant to the study. Those categories include the historical issue of public safety, the relationship between technology and law enforcement, and the employment of the DOJ as a departmental funding source. At the close of this chapter, a concluding statement is offered that summarizes the general themes identified within the analytic structure of the historical discussion.

B. HISTORICAL ISSUE OF PUBLIC SAFETY

Central to the present discussion is the issue of public safety. The employment of traditional pursuit methods in the apprehension of fleeing suspects remains one of the most dangerous aspects of law enforcement.⁵¹ Unlike the vast majority of traditional policing tactics, traditional vehicular pursuit places the public directly in harm's way.⁵² In the past, other forms of policing have presented similar threats to public safety. Many of these dangerous practices have been phased out to improve the overall quality of policing in the United States.

⁵¹ Cynthia Lum and George Fachner, *Police Pursuits in an Age of Innovation and Reform* (Alexandria, VA: International Association of Chiefs of Police, 2008), 3.

⁵² Lum and Fachner, 3.

To understand the present role of traditional pursuit policy in the creation of an unsafe environment for both law enforcement and the general public, it is necessary to examine past examples of policies that have presented a similar challenge to public safety. By developing an understanding around how and why these policies were phased out, it is possible to establish a foundation for discussion of the eventual replacement of traditional pursuit methods with alternative technology. Indeed, it is important to frame the present discussion in such terms so that future policy prescriptions may reference the successes and failures of the past in the context of national policy reform.

One of the more prominently examined policing tactics of the modern era is the chokehold. In the past, the chokehold was widely employed, often with the aid of a club.⁵³ This method of restraint was utilized as a means of subduing non-compliant individuals. While the chokehold is a highly effective method of restraint, it also places the suspect at risk of death or serious injury. This particular method is now widely restricted throughout the United States, and it is expected that fewer departments will employ chokeholds in the future. The decline in the popularity of this particular method may be considered the result of high-profile departments banning chokeholds and the subsequent growth in the popularity of alternative restraint technologies and skills.

While the chokehold may be considered a prominent example of a practice that has fallen out of favor due to the danger it poses to the suspect, such a tactic does not threaten the safety of the general public. With regard to historical restrictions on policing tactics, a general trend has developed toward the loosening of restraint and the militarization of police.⁵⁴ Rather than placing additional limits on the scope of law enforcement tactics in the United States, the federal government has routinely pursued policies that have enabled local departments to gain access to military-grade equipment and to employ military-style assault tactics.

⁵³ Cynthia Lee, "But I thought He Had a Gun-Race and Police Use of a Deadly Force," *Hastings Race & Poverty Law Journal* 2, no. 1 (2004): 1.

⁵⁴ Peter B. Kraska, "Militarization and Policing—Its Relevance to 21st Century Police," *Policing: A Journal of Policy and Practice* 1, no. 4 (2007): 501–513.

The militarization of police departments has led to numerous examples of avoidable deaths of innocent bystanders. In some examples of military-style police assaults, suspects and their family members have been killed without presenting any identifiable threat to officer safety.⁵⁵ During the Obama presidency, the continued public outcry against the militarization of police led to multiple restrictions on the sale and use of certain military equipment to local departments. The Obama administration and certain local governments moved to reduce the interaction between law enforcement organizations and military training programs. Although the Trump administration has attempted to eliminate many of the regulations imposed by the Obama administration, de-militarization continues at the local level.⁵⁶ The DOJ has also been heavily involved in the reduction of unsafe military-style policing tactics since the 1990s.⁵⁷

The progressive development of police practices throughout the 20th century was defined by a combination of policy and technology. For example, changing patrol policies in urban environments was introduced as a means of addressing new enforcement challenges while successfully implementing emerging technology. In the contemporary setting, the role of policy and technology is just as relevant as in the past. One significant difference, however, is the increased reliance upon technology to meet the needs of contemporary policing.

C. RELATIONSHIP OF TECHNOLOGY AND LAW ENFORCEMENT

The relationship between technology and law enforcement is one of the more critical discussion points addressed in this chapter. Technology has arguably acted as the most important driver of policing strategy formulation within the United States. The introduction of new forms of policing technology has allowed for the development of tactics that reduce the danger faced by officers and the public alike. Conversely, certain

⁵⁵ Kraska, 501–513.

⁵⁶ Henry A. Giroux, “White Nationalism, Armed Culture and State Violence in the Age of Donald Trump,” *Philosophy & Social Criticism* 43, no. 9 (2017): 887–910.

⁵⁷ Sam Bieler, “Police Militarization in the USA: The State of the Field,” *Policing: An International Journal of Police Strategies & Management* 39, no. 4 (2016): 586–600.

forms of technology have also placed a higher degree of power in the hands of law enforcement. With the provision of such power comes the possibility of abuse, as well as the placement of members of the public in harm's way.

Much of the technological development that has occurred within law enforcement has come about as a response to technological advancement in the criminal underworld. The road bandits of the 1930s are perhaps the most relevant example of a technological response by law enforcement to a growing threat. During the first half of the 1930s, the widespread availability of relatively fast automobiles and the development of high-powered machine guns, such as the Browning automatic rifle (BAR) created a recipe for an explosion of criminal activity. It was during this era that the high-speed pursuit became a commonly employed tactic.⁵⁸

Infamous road bandits like Bonnie and Clyde were known for hit-and-run tactics (made possible by the use of automobiles) that allowed them to commit successful robberies and flee the scene without the possibility of capture by local law enforcement. Officers were forced to give chase, oftentimes leading to dangerous pursuits. To respond to these new threats to public safety, law enforcement began to employ significant and drastic strategic measures, as well as new forms of policing technology.⁵⁹

Since the 1930s, a sort of arms race has occurred between law enforcement and the criminal underworld. The widespread availability of automobiles capable of achieving high-speeds has led to the employment of these automobiles by criminals and law enforcement officers alike. In the past, the threat of vehicular pursuit to public safety was limited due to the slower general speed of vehicles, as well as the relatively low density of traffic. In the contemporary age, vehicular pursuit is considered a far more relevant public safety threat, which has led to calls for yet another technological response to improve strategic safety measures.

⁵⁸ Chris McNab, *Deadly Force: Firearms and American Law Enforcement: from the Wild West to the Streets of Today* (Oxford, UK: Osprey Publishing, 2009), 13.

⁵⁹ McNab, 15.

Technological responses may be effective, but they are also expensive. To ensure that departments throughout the United States are able to advance to a minimum degree of technological efficacy, it has become necessary for a federal response. In regards to technological integration, the DOJ has emerged as the primary federal organization driving technological investment in law enforcement.

D. THE DOJ AS A FUNDING SOURCE

The DOJ has exhibited a long history of direct involvement in the funding and planning of law enforcement reforms at the local and state level. Many departments now regard assistance provided by the DOJ to be an essential component of operational success. To understand fully the role of the DOJ as a funding source for local departments, it is important to consider those historical aspects of DOJ operations that have stood as essential elements of the policy environment concerning the financial aspects of program development and adoption.

The modern funding practices of the DOJ can be traced back to the Office of Law Enforcement Assistance (OLEA). The OLEA existed from 1965 to 1968. This organization established many of the foundational funding outlets that helped to shape changing policing strategies in the second half of the 20th century.⁶⁰ The Law Enforcement Assistance Administration (LEAA) eventually replaced the OLEA. The LEAA was more explicitly involved in the direct provision of funds for the achievement of certain federal standards of excellence in law enforcement.⁶¹

Funds provided by the LEAA were utilized to both acquire new technology and implement training programs that would allow for the successful utilization of said technology. Successive organizations have taken the place of the LEAA as the primary funding outlet of the DOJ. The current chief funding organizations of the DOJ include the

⁶⁰ Malcolm Feeley and Austin Sarat, *The Policy Dilemma: Federal Crime Policy and the Law Enforcement Assistance Administration, 1968–1978* (Minneapolis, MN: University of Minnesota Press, 1980), 12.

⁶¹ Jay N. Varon, “A Reexamination of the Law Enforcement Assistance Administration,” *Stanford Law Review* 27, no. 5 (1974): 1303.

COPS Office and the OJP. The OJP offers a variety of grant programs targeting certain aspects of policing, such as community relations, as well as the development of new policing methods that emphasize public safety.

Central to the funding activities of the OJP is the policy wing of the organization known as the BJA. The BJA provides directed guidance to law enforcement agencies throughout the United States. This guidance comes in the form of strategic initiatives that help to shape the general policy environment of the nation's law enforcement organizations. The BJA has been instrumental in the strategic shift toward many new forms of policing technology, such as body cameras and other smart policing devices.⁶²

E. CONCLUSION

This chapter has examined some of the historical aspects of policing relevant to the present discussion. Significant historical developments have contributed to the current climate regarding strategies employed by departments throughout the United States in the furtherance of public safety. Notably, through the development of new skill sets and technology, the use of certain dangerous tactics by law enforcement departments has been reduced. As this discussion advances, special attention is paid to the funding activities of the DOJ and its affiliate organizations in relation to the strategic policies adopted by law enforcement organizations at the state and local level. Not only has the DOJ provided a strong funding platform for law enforcement agencies throughout the United States, but the organization has also pursued certain agendas through the training programs that have accompanied the provision of funds. Therefore, it is crucial to frame the discussion of pursuit management technology in the context of the strategic practice initiatives employed by the DOJ and its affiliates in the federal funding system.

⁶² Dru S. Letourneau, "Police Body Cameras: Implementation with Caution, Forethought, and Policy," *University of Richmond Law Review* 50 (2015): 471.

III. CRITICAL EVALUATION PROCESS

A. INTRODUCTION

The evaluation presented in this thesis draws from multiple academic, professional, and governmental sources to develop a clear perspective on the present state of pursuit management technology and the DOJ's funding of technology acquisition projects. This chapter provides an examination of the critical assessment process as it has been executed. The ultimate goal of this chapter is to establish transparency to allow for the replication of the research. The chapter provides an overview of some of the general trends that have been identified within the data. Central to the critical evaluation process is the careful examination of each of the documents identified as relevant to the present discussion. In Chapter IV, a full exploratory analysis of the data is provided. Chapter III, therefore, can be considered an introduction to the concepts more fully described in Chapter IV.

B. CRITICAL EVALUATION PROCESS

To describe the critical evaluation process employed in the development of this thesis effectively, it is first important to provide a basic outline of the process, followed by a close examination of each element. An outline for the evaluation process employed in the research is given as follows:

- Construction of review framework
- Initial search
- Revision of framework
- Establishment of improved inclusion criteria
- Second search
- Final selection of resources

- Individualized inspection of each resource and identification of relevant information
- Organization of data
- Final critical evaluation

The construction of the review framework was the first step in the development of the thesis. To develop an effective critical evaluation, it is necessary to identify at the onset of development those concepts that may potentially be relevant to the research. At this point in the process, it is critical that the framework remains flexible enough to allow for exploration of a wide array of concepts relating to the central research problem. Those concepts identified inform the development of the initial inclusion criteria.

In this evaluation, the initial inclusion criteria comprised academic reports, government documents, industry reports, financial data, and media reports. Media reports were identified as necessary for the initial literature search because these reports may allow for more reliable information that may have been overlooked while searching scholarly databases. Once the initial inclusion criteria were developed, a formal list of key search words was created. The initial list of keywords included the following:

Pursuit management technology, pursuit danger, high-speed pursuit risk, high-alternative technology, department of speed pursuit danger, law enforcement justice funding, department of justice pursuit fatalities, law enforcement pursuit grant, JAG grant funding, office of deaths, law enforcement pursuit reform, community-oriented policing services, police pursuit reform, law enforcement office of justice programs, economic crisis pursuit policy, police pursuit policy, law enforcement, 2008 financial crisis law department of justice pursuit reform, enforcement, StarChase, MobileSpike, department of justice pursuit policy. vehicular pursuit risk, vehicular pursuit

These search words were utilized within multiple digital scholarly databases including ProQuest, JSTOR, Scopus, and Google Scholar. Additionally, searches were made using the basic search function of Google, as well as the search function of multiple government websites. An initial 56 sources were identified after the first search. As per the initial inclusion criteria development, any resource mentioning the funding activities of the DOJ, police pursuit strategy and policy, law enforcement technology adoption, and the use of pursuit management technology was selected for inclusion. Following the initial search, an examination of the resources was conducted to identify potential trends or overarching concepts. This brief examination informed the revision of the review framework and also allowed for the identification of 15 additional resources for inclusion.

Upon revising the review framework and establishing a narrower set of inclusion criteria, a secondary search of the 71 sources was conducted. This secondary search removed media sources from inclusion in the critical evaluation. Furthermore, for inclusion in the final review, it was determined the source would deal directly with at least one of the fundamental concepts informing the research. Those concepts include employment of pursuit management technology, DOJ funding activities, law enforcement pursuit policy, and DOJ and departmental policy reform initiatives. Those resources that contained relevant background information were retained to be utilized in the literature review, as well as the historical background components of the thesis.

At the end of the secondary selection process, 39 resources were identified as meeting the inclusion criteria. Once the final selection of resources was made, an examination of each of the resources was conducted. Each resource was analyzed for the identification of any relevant information that might inform the discussion and policy prescriptions presented herein. Any information pertaining to the identified categories of analysis was included in four separate documents, each addressing one of the four central concepts: employment of pursuit management technology, DOJ funding activities, law enforcement pursuit policy, and DOJ and departmental policy reform initiatives.

After an initial examination of each of the resources, the four categorical documents were examined separately to identify any relevant trends in the data. Reoccurring concepts

were highlighted, and the information included in the four documents was further organized to allow for a clear presentation of identified trends. Once these trends were identified, a detailed study of each of the resources was conducted. The full evaluation as it was conducted is included in Chapter IV of this thesis.

C. OVERVIEW OF FINDINGS

For those trends identified in the critical evaluation, certain concepts emerged as being particularly relevant to the research problem. Each category of analysis developed for the evaluation provided access to separate trends. Within the trends identified, a great deal of overlap was identified in the context of policy formation and the adoption of pursuit management technology.

Within the first category of analysis, employment of pursuit management technology, two major trends were identified. First, the field testing and departmental deployment of pursuit technology led to improvements in suspect apprehension capability, as well as a reduction in incidences of suspect, bystander, or officer injury. As detailed within the following chapter, multiple DOJ technology testing reports were examined in the context of the review and these reports each revealed substantive improvements in strategic apprehension capability through the deployment of pursuit management technology. The industry reports that are also detailed in the following chapter have provided multiple examples of the successful deployment of pursuit tech. For example, StarChase was shown to be effective in multiple units within a four testbed field study.⁶³

The data also points to a lack of department funding needed to purchase effective pursuit management technology. In this analytical category, it is clear the DOJ has played an important role in the provision of necessary funds for the continued operations of local departments. Much of this funding activity has been routed through the affiliate organizations of the COPS Office and the OJP. Additionally, Judge Advocate General (JAG) grants were identified as an important source of funding for many departments. This

⁶³ Trevor A. Fischbach, Keo Hadsdy, and Amanda McCall, *Pursuit Management: Fleeing Vehicle Tagging and Tracking Technology* (Washington, DC: Department of Justice, 2015), 6.

funding has provided an impetus for the adoption of new forms of policing technology in the past thanks to the policy development efforts of the COPS Office. However, it is important to note the COPS Office has only been an effective arbiter of policy change so long as the economic climate has allowed departments to operate beyond basic efficiency. Ultimately, individual departments must have the money to spend on the technology.

The third category of analysis, law enforcement pursuit policy, provided an interesting insight into the operational strategy employed by law enforcement and the impact on greater society. The analysis revealed that traditional pursuit policy has been identified across the board as a major public safety threat. Researchers and departmental managers alike recognize the importance of reducing the use of traditional pursuit methods to improve community-policing efforts and more effectively protect officers, suspects, and the general public. Furthermore, it was noted that traditional pursuit methods often lead to escalation, which reduces the likelihood of safe apprehension of the suspect.

For the final category of analysis, DOJ and departmental policy reform initiatives, a great deal of overlap was identified between the policy reform efforts of the DOJ and the general policy environment observed in departments throughout the United States. The DOJ has managed to oversee multiple widespread policy initiatives through a combined strategy of fund provision and training programs. A major example of this type of policy initiative promoted by the DOJ is the adoption of body cameras by police officers. It was noted in the analysis that the DOJ might act as an effective platform for the widespread promotion of policy initiatives in pursuit policy and the wide scale adoption of pursuit management technology.

D. CONCLUSION

This chapter examined the general progression of the evaluation through its various steps, which were systematically applied to construct the data set. The outline of the evaluation as described in this chapter offers a clear, step-by-step account of those research activities conducted to arrive at the final policy prescriptions offered in Chapter V of this thesis. Notably, the assessment, as well as the brief statements on the findings of the review

outlined at the beginning of this chapter, is not intended to be fully representative of the research, as it has been conducted. In the following chapter (Chapter IV), a discussion of the resources selected for the evaluation provides an overview of the information contained within said resources. The discussion forms the bulk of the evaluation. By first providing an overview of the review process and the results, this chapter offers a guideline for the navigation of the discussion presented in Chapter IV, as well as the policy prescriptions presented in Chapter V.

IV. CRITICAL DISCUSSION OF TECHNOLOGY

A. INTRODUCTION

This chapter offers a detailed discussion of the problem at hand. Rather than simply provide a basic overview of some of the general themes uncovered in the data, this chapter explores each of the resources identified as relevant to the present discussion. As noted in the literature review, this topic has received limited discussion within academia. Sufficient scholarly analysis, industry reports, and government reviews have been conducted on the subject to warrant a full systematic evaluation to inform the development of policy prescriptions based on the best available data. This chapter offers a wealth of evidence to provide for the necessity of those policy prescriptions offered in Chapter VI. The focus of this chapter concerns the technological issues involved in pursuit management. Chapter V expands upon this critical discussion by focusing specifically on policy.

B. EMPLOYMENT OF PURSUIT MANAGEMENT TECHNOLOGY

To analyze the use of pursuit management technology effectively within contemporary law enforcement activities, reports issued by industry field reporters, government officials, and representatives from law enforcement departments throughout the United States must be considered. The majority of information in this category of analysis was collected from these three primary data sources. Each of those resources identified as valuable to the effective description of pursuit management technology is examined in this chapter.

In recent years, the DOJ has provided funding to certain projects intended to create new options for pursuit management. For example, the DOJ funded the high-power compact microwave source for vehicle immobilization, a project developed by Eureka Aerospace.⁶⁴ To be eligible for DOJ funding, Eureka Aerospace was required to keep a detailed account of those development activities that led to the creation of its pursuit

⁶⁴ Eureka Aerospace, *High-Power Compact Microwave Source for Vehicle Immobilization, Final Report* (Washington, DC: Department of Justice, 2011), 3.

management technology. The report, developed in accordance with DOJ's funding standards, provides an excellent insight into the efficacy of this technology and its potential use as a pursuit management option in U.S. departments.

The device developed by Eureka Aerospace is referred to as a high-power electromagnetic system (HPEMS).⁶⁵ This device is compact in design and allows the immobilization of vehicles through the delivering of microwave energy to the electronic control module and microprocessor of an engine. This device effectively renders the fleeing vehicle immobile by eliminating the essential functions of the engine's core components. The HPEMS developed by Eureka Aerospace is the first microwave-based pursuit management technology that has received DOJ funding support.

By analyzing the results of the field test applied in the development of the HPEMS, the viability of this particular pursuit management device for wide application can be established. Notably, the report developed by Eureka Aerospace provided information regarding the testing of the device in a laboratory setting. In laboratory tests, the HPEMS was shown to be effective, with an impressive range of 30 feet.⁶⁶ The device was tested on a wide range of cars with great success. Unfortunately, the applicability of the HPEMS remains limited due to the risk of collateral damage associated with the inability to narrow the scope of the beam. Cars surrounding a fleeing vehicle may be disabled due to the beam, potentially leading to collisions and other unintended consequences that may put the general public at risk. Furthermore, criminals could easily exploit this device due to its portability to disable vehicles. Therefore, a potential for abuse exists relating to the potential black-market sales of the HPEMS.

Although the HPEMS has yet to be crafted into a device that can safely be deployed in the field, the DOJ has committed funds to similar developmental programs that have led to the production of more viable devices. Take, for example, the strategic potential offered by the Radio Frequency Engine Stopper system. Much like the HPEMS, the Radio

⁶⁵ Eureka Aerospace, 4.

⁶⁶ Eureka Aerospace, 46.

Frequency Engine Stopper received funding and testing direction courtesy of the federal government. The engine stopper was reviewed in a laboratory setting and shown to be effective in initial tests.⁶⁷ However, much like the HPEMS system, the engine stopper was identified as requiring additional rounds of field testing to ensure the device's efficacy when deployed against a wider selection of automobile types.⁶⁸ For a device like the HPEMS to clear DOJ field-testing requirements, it is necessary for the device to be shown to be both effective and deployable in the field. Efficacy in this area includes not only the ability of the device to produce the desired result but also the ability to be deployed safely in the relevant environment.

Perhaps the most promising of the pursuit management systems developed to date is the StarChase system. StarChase is a mobile tracking system that allows officers to fire a small device from their cruiser that then attaches to a fleeing vehicle and allows active GPS tracking of the movement of said vehicle. StarChase, unlike other forms of pursuit management technology, has received a great deal of field testing in law enforcement deployment. It has also received attention from the DOJ, with the technology selected for additional funding and testing through the same program, which aided the development of the HPEMS, as well as the Radio Frequency Engine Stopper.

Fischbach, Hadsdy, and McCall authored a comprehensive report detailing the deployment and development of StarChase at the behest of the DOJ. This report provides a wealth of information regarding the nature of StarChase and its potential application in mitigating dangerous pursuit practices in favor of a safe and effective alternative strategy. To understand the value of StarChase within the contemporary law enforcement environment, it is important this document be analyzed fully from a critical perspective.

The applicability of StarChase within the law enforcement environment was determined using four test beds containing 10 units.⁶⁹ These test beds consisted of both

⁶⁷ Dion Smith, Hank Trujillo, and Hector Del Aguila, *Effects Research Test Report for the National Institute of Justice (NIJ) Engine Stopper Program* (Washington, DC: Department of Justice, 2011), 4.

⁶⁸ Smith, Trujillo, and Del Aguila, 17.

⁶⁹ Fischbach, Hadsdy, and McCall, *Pursuit Management*, 6.

urban and rural law enforcement agencies operating within the United States. The variety in testing environments lent additional credibility to the testing. In addition to urban and rural environments, weather variations were also accounted for in the testing. Specifically, the researchers focused on test beds with heavy rain and desert conditions.⁷⁰

Prior to receiving DOJ funding for additional testing, StarChase had previously been deployed as a commercial product made available to law enforcement departments throughout the United States. During this initial deployment, the manufacturers of StarChase were able to gain access to a wide set of data points regarding the performance of the device. This data informed focused developments from the second generation of the device to the version of StarChase tested within the DOJ research period.⁷¹

The prior success of StarChase, which occurred before the DOJ testing period, is another element of the system that sets it apart from the competition. Although pursuit management technology has received substantial attention from a research perspective within the DOJ and local departments, few of these devices have been deployed in the field. StarChase represents a potential breakthrough from a commercial perspective, and therefore, may be identified as a top priority for potential increases in investment.

Dr. Geoff Alpert played a significant role in developing the research parameters through a joint effort of StarChase manufacturers and the NIJ.⁷² Alpert is an important and recognized researcher within the realm of pursuit management. Alpert has practiced in this area for over 20 years.⁷³ Alpert's expertise in this area makes StarChase a prime candidate for research development of pursuit management technology. His presence in the research design of StarChase lends greater credibility to the development process.

Alpert was responsible for focused research on the application of StarChase as a means of influencing positive improvements in the progression of pursuit strategy. His

⁷⁰ Fischbach, Hadsdy, and McCall, 6.

⁷¹ Fischbach, Hadsdy, and McCall, 6.

⁷² Fischbach, Hadsdy, and McCall, 6.

⁷³ Fischbach, Hadsdy, and McCall, 6.

analysis of the deployment of StarChase by multiple law enforcement agencies revealed that fleeing suspects tagged by StarChase typically slowed to within 10 mph of the posted speed limited once tagged by the device.⁷⁴ Furthermore, no injuries or property damage was reported in those pursuits in which StarChase was deployed.⁷⁵ Finally, it must be noted that the deployment of StarChase allowed for an 80%+ improvement in apprehension rates.⁷⁶

Throughout the developmental process recorded in the NIJ report, the StarChase researchers provided multiple examples of effective changes instituted because of the information gathered throughout the research process. These improvements greatly enhanced the ability to deploy the StarChase system. Examples include air compression design, revamped adhesives, and a tone system for alerting officers of the range of the fleeing vehicle.⁷⁷ Systematic enhancements based on the research conducted have allowed StarChase to develop its overall profile as a major focus of future investment.

Much of the research effort undertaken by StarChase was the result of the increased interest and solicitation in pursuit management technology projects by the NIJ. Similar solicitations also led to the development of additional devices or improvements to existing devices. For example, calls for technological devices by the NIJ and the OJP led Non-Lethal Technologies Inc. to develop improvements to its Road Sentry system. The Road Sentry system experienced considerable improvement as a result of this partnership.

The president of Non-Lethal Technologies, Bradley Boyer, developed a report based on the testing activities orchestrated in accordance with the federal funding opportunity afforded by the NIJ and OJP as a developmental strategy.⁷⁸ This report provides an excellent overview of the strengths and potential weaknesses of the Road

⁷⁴ Fischbach, Hadsdy, and McCall, 6.

⁷⁵ Fischbach, Hadsdy, and McCall, 6.

⁷⁶ Fischbach, Hadsdy, and McCall, 6.

⁷⁷ Fischbach, Hadsdy, and McCall, 8.

⁷⁸ Bradley Boyer, *Project Final Report (Award Number 2002LTBXK009) Non-Lethal Technologies Inc. Road Sentry Improvement* (Washington, DC: National Institute of Justice, 2004), 4.

Sentry system. Throughout the 1990s and early 2000s, the Road Sentry system saw marked improvements that allowed the safe application of the device in the field.⁷⁹ These improvements earned the developers of Road Sentry an award for the increased development of the system.

The deployment of Road Sentry may be achieved through the single placement of the device in the path of a fleeing suspect. Once the device has been placed, it may be triggered remotely. Remote triggering typically occurs just before the fleeing vehicle passes over Road Sentry. Once this occurs, the Road Sentry device sends out a pulse disabling the essential components of the engine. This disabling, in turn, leads to a slowing of the suspect for a safe end to the pursuit. Significant developments to Road Sentry have allowed for increased responsiveness, as well as improved deployment systems.⁸⁰ These developments were completed because of direct funding through the NIJ's initiative to create new platforms for safety improvements in law enforcement departments throughout the United States.

C. CONCLUSION

In conclusion, this chapter has examined the technological developments in the area of vehicular pursuit management within the United States. It has been noted that the federal government has worked to promote the development of pursuit technology for immediate application within law enforcement. Some of this technology has been shown to be effective. Moving forward, it is necessary to consider how the more effective devices may be promoted for integration into the general framework of pursuit management throughout the United States.

⁷⁹ Boyer, 5.

⁸⁰ Boyer, 7.

V. CRITICAL DISCUSSION OF DOJ FUNDING ACTIVITIES

A. INTRODUCTION

This chapter expands the critical discussion that began in Chapter IV. The focus of this chapter is on the DOJ funding activities relevant to the expansion of pursuit technology integration throughout the United States. Although the availability of pursuit management technology has expanded exponentially in recent years through focused efforts by federal departments to support research, the economic situation that led to the tightening of law enforcement budgets has inhibited the adoption new pursuit tech systems. In understanding the DOJ's role in establishing the present conditions regarding technology acquisition and implementation, it is necessary to examine the DOJ's funding activities. By conducting this analysis, it is possible to establish a baseline understanding of the funding framework employed by the DOJ. It is within this framework that the policy prescriptions regarding pursuit tech funding must be presented.

To establish a basic understanding of DOJ budget conditions at the time of the development of this research, it is helpful to examine the 2019 budget summary recently published by the DOJ. The budget summary provides an outline of the funding requests issued by the DOJ. By examining the proposed direction of funds in the summary, the likelihood of existing budget expansion toward more robust support for the adoption of pursuit management technology in the United States can be determined.

According to the 2019 request, the DOJ's 2018 fiscal year continuing resolution totaled \$28.1 billion with 108,333 personnel positions.⁸¹ At the beginning of the 2019 fiscal year, the DOJ reported a reduction of personnel to 107,552 positions with a total budget request of \$28 billion.⁸² The DOJ has seen a slow decline in funding since 2017, although

⁸¹ Department of Justice, *2019 Budget* (Washington, DC: Department of Justice, 2018), 1, <https://www.justice.gov/jmd/page/file/1033086/download>.

⁸² Department of Justice, 2.

a general pattern of fluctuation seems to prevent the DOJ from maintaining a long-term budgetary decline.

Of the 2019 budget, approximately \$1.7 billion has been requested towards the allotment of funds to state and local assistance.⁸³ Grant programs remain a small component of this budgetary allotment. The 2019 budget outline provides a breakdown of the program categories in line to receive additional assistance throughout the fiscal year. Significant expansions in state and local aid have been requested in the category of opioid abuse response. A total budgetary expansion of \$295 million has been requested to combat the opioid epidemic throughout the United States.⁸⁴ In addition to the \$295 million allotments to opioid response strategies, the DOJ has requested an additional \$4.6 million to combat drug trafficking organizations.

The DOJ has also devoted many of its funding activities in providing assistance to immigration enforcement efforts at the state and local level. A total of \$65.9 million has been requested for the extension of immigration law enforcement efforts.⁸⁵ In addition to the opioid epidemic response program and the immigration enforcement efforts highlighted in the 2019 budgetary report, the DOJ has also set aside a total of \$3.9 billion in discretionary and mandatory funding at the state and local level.⁸⁶ For the mandatory funding that has been highlighted, the DOJ has specifically focused on the promotion of community policing through guided training programs involving expansions to community-oriented law enforcement infrastructure.⁸⁷

The streamlining strategy put forth by the current administration as a central component of the DOJ's future operations is one of the most important policy foundations for the 2019 budget. An attempt has been made to reduce the overall size of personnel in

⁸³ Department of Justice, 3.

⁸⁴ Department of Justice, 2.

⁸⁵ Department of Justice, 2.

⁸⁶ Department of Justice, 2.

⁸⁷ Department of Justice, 2.

the DOJ and the amount of spending across the board.⁸⁸ This reduction has forced the DOJ's budgetary directors to reassess the importance of the programs that have received special funding in the past.

In addition to the 2019 budgetary report, the DOJ has also developed a comprehensive guidebook to address any questions or concerns that arise throughout the grant application and approval process. This guide also provides critical information pertaining to the general structure of the DOJ's funding system. To more effectively understand the DOJ's funding structure in the contemporary political climate, it is necessary to analyze this guide.

The DOJ's financial guide identifies three core organizations as major funding outlets: OJP, Office on Violence against Women (OVW), and Community Oriented Policing Services (COPS).⁸⁹ Of the three organizations mentioned, only the OJP and COPS Office are relevant to the present discussion. While the OVW provides a wealth of resources to female victims of abuse, this organization provides no avenues of funding for the type of technology acquisition that is the concern of the present research.

In regard to the OJP, the guidebook notes that this particular office is directly involved with the promotion of policy initiatives driven by the DOJ's reform efforts. In addition to the provision of mandatory and discretionary funding for material and personnel acquisition, the OJP also provides training based on practice standards established by the DOJ and other federal law enforcement agencies.⁹⁰ The OJP, therefore, may be regarded as the major policy promotion wing of the DOJ's funding efforts.

The COPS Office fulfills a similar function to the OJP by operating as a platform for policy promotion in state, local, and tribal departments throughout the United States. The major difference between the COPS Office and the OJP is a general focus on

⁸⁸ Department of Justice, 4.

⁸⁹ Department of Justice, *DOJ Financial Guide* (Washington, DC: Department of Justice, 2017), 3, <https://www.justice.gov/ovw/file/1030311/download>.

⁹⁰ Department of Justice, 3.

community policing measures within the COPS Office.⁹¹ The COPS Office provides both funding and training in programs designed to strengthen the link between law enforcement and the community on all those fronts identified as critical to effective community policing strategies.

Importantly, the DOJ funding guidebook was constructed within the framework of the recently developed Office of Management and Budget (OMB) standards regarding federal funding programs.⁹² These standards provide basic guidance for the formulation of funding structures compliant with the general practice standards adopted across the board at the federal level. The majority of these OMB standards deal with questions of ethical conduct throughout the funding process, as well as the necessary steps to be followed to ensure all financial data is reported properly.

In terms of the category of rewards afforded by the DOJ, applicants may apply for block, formula, and discretionary awards.⁹³ All three categories of rewards are made available to law enforcement departments at the state and local level. Thus, the DOJ's funding platform is flexible enough to provide the necessary routes to funding that may allow for wide access to the awards.

Registration for most DOJ funding opportunities has been digitized. In other words, many departments may easily access funding submission materials without the need for paper documents. By expanding the reach of the funding platform through offering digital proposal submissions, the DOJ has taken an important step toward building a stronger link between state and local departments and the federal funding system. The removal of barriers to access provides evidence of the DOJ's willingness to open the funding process to all departments in need of aid.

Although the DOJ has attempted to open the funding process to as many applicants as possible, the financial guidebook clearly states all applicants must be examined for risk

⁹¹ Department of Justice, 4.

⁹² Department of Justice, 7.

⁹³ Department of Justice, 8.

prior to the approval of the final submission.⁹⁴ Risk is specifically analyzed to determine the likelihood of success around a given project upon the dispersal of funds. If an organization has exhibited a variety of traits deemed representative of a high level of risk, then it is unlikely said organization will be permitted a submission.

Risk factors identified by the financial guidebook include poor financial performance, failure to complete previously funded projects, failure to adhere to funding standards, and a general lack of responsibility.⁹⁵ These risk factors will typically only be applied against those organizations that have received DOJ funding in the past. The financial performance of any given department, however, may be weighed in the formulation of any decision regarding the acceptance of a proposal.⁹⁶ Importantly, those departments designated as high-risk may still receive funding; however, such funding will be more closely monitored to ensure proper utilization of awarded funds.⁹⁷ The calculation of risk by the DOJ is important to discuss because this calculation process may prevent certain departments from gaining access to much-needed funding.

One of the first major application steps outlined in the DOJ guidebook is the financial analysis process. All those interested in DOJ funding must conduct a comprehensive financial analysis of the project under proposal to ensure it meets the funding standards established. The financial analysis process is quite precise, and all applicants are required to provide proof of the stability of the accounting system used in the project proposal.⁹⁸ Proposals that do not include evidence of an effective accounting system will be rejected outright. This particular policy is evidence of the DOJ's dedication to maintaining fiscal responsibility within its funding system.

Organizations that receive approval for a submission must abide by the expenditure standards established by the DOJ. Disbursed funds must be liquidated within a 90-day

⁹⁴ Department of Justice, 12.

⁹⁵ Department of Justice, 12.

⁹⁶ Department of Justice, 12.

⁹⁷ Department of Justice, 12.

⁹⁸ Department of Justice, 11.

period.⁹⁹ Therefore, in the event a department has received an award for the acquisition of pursuit management technology, said award must be applied within the designated time period. The DOJ's established time periods for expenditure would not act as a barrier for the acquisition of most existing forms of pursuit management technology.

Not unlike many federal funding systems, the DOJ's funding platform often requires matching funds to be provided by either the organization filing the application or a third-party acting on behalf of the filing organization.¹⁰⁰ An established standard does not exist to match the percentage to be expected within any given DOJ funding opportunity. Some funding opportunities may not require matching funds, while others may only require matching funds if certain conditions are met.

When determining whether a DOJ funding opportunity may provide a sufficiently strong platform for the acquisition of pursuit management technology on a national scale, it is important to consider the procurement standards established by the DOJ. The financial guidebook provides a clear description of these standards. Any organization seeking funding must provide a rationale for the selection of a specific contract or service agreement.¹⁰¹ If an adequate rationale cannot be provided for the selection of a specific contract, then funding may be halted. It is important to consider the availability of evidence for the strategic applicability of pursuit management technology. Furthermore, a relative lack of competition amongst firms developing this form of technology is an issue. Therefore, it may be difficult to provide adequate justification for the selection of a specific provider under DOJ standards. Still, certain firms, such as the manufacturers of StarChase, which have accumulated a wealth of data, may be utilized to ensure procurement standards are met.

An evaluation of the DOJ funding standards outlined in the financial guidebook provides evidence that DOJ funding is an accessible route for most state and local

⁹⁹ Department of Justice, 34.

¹⁰⁰ Department of Justice, 38.

¹⁰¹ Department of Justice, 64.

departments throughout the United States. Importantly, however, certain barriers that may prevent access to the DOJ funds on offer should be recognized.¹⁰² These barriers must be addressed to ensure future funding activities are conducted in such a way as to limit the negative impact of these barriers.

Of the various barriers to pursuit management technology funding that may be addressed, perhaps the most relevant is the economic downturn that has impacted departmental spending. In 2011, with the aid of the COPS Office, the DOJ conducted a comprehensive report on the impact of the 2008 financial crisis on law enforcement departments throughout the United States.¹⁰³ This particular report remains the most comprehensive examination of the impact of the financial crisis on the budgetary practices of state and local departments.

Although the information contained in the 2011 report is a bit dated, it is important to analyze this report to understand the initial impact of the economic downturn on funding activities and the efforts to address the downturn. The information contained in this report may be compared to contemporary reports to determine whether the trends highlighted by the DOJ have continued to impact the operational capabilities of law enforcement agencies negatively at every level.

The 2011 report begins with the recognition that expectations regarding the quality of policing services will not decline alongside the economy.¹⁰⁴ This recognition is important, as it concerns the expectations of service held by the public and the potential impact on perceptions of the general credibility of law enforcement. To maintain a positive image and strong community relations, it is necessary for law enforcement departments to

¹⁰² For example, during the research for this thesis, the U.S. government experienced the longest government shutdown in American history. This government shutdown led to a halting of the funding activities of the DOJ and its affiliate organizations. Although the 2019 government shutdown posed a serious threat to funding, it was a temporary barrier that was swiftly overcome through an agreement to end the shutdown.

¹⁰³ Department of Justice COPS, *The Impact of the Economic Downturn on American Police Agencies* (Austin, TX: National Center on Domestic and Sexual Violence, 2011), 2–20, http://www.ncdsv.org/images/COPS_ImpactOfTheEconomicDownturnOnAmericanPoliceAgencies_10-2011.pdf.

¹⁰⁴ Department of Justice COPS, 2.

uphold a certain standard of service regardless of the economic conditions that may impact operational efficiency. Under the circumstances faced by departments following the 2008 financial crisis, no means existed by which the quality of policing could be maintained at pre-2008 standards.

According to information taken from the 2011 report, the DOJ COPS Office immediately recognized the role of federal funding programs in bolstering the operational capabilities of struggling departments.¹⁰⁵ The DOJ recognized the impact of the economic downturn on departmental operations could be an ongoing problem with implications of permanence.¹⁰⁶ It was noted in the 2011 report that the conditions for economic recovery at the county and municipal level differ from what may be observed at the state or federal level.¹⁰⁷ This difference is due to negative trends in the housing market directly impacting the ability of county and municipal governments to collect property-based tax revenue.

In the COPS Office report, three tiers of service are noted that may be identified in local law enforcement. These tiers refer to different categories of service that law enforcement agencies strive to provide for the continued management of local communities. The first tier of law enforcement is the emergency service tier and is considered to be essential and not significantly impacted by economic decline.¹⁰⁸ The second and third tiers, non-emergency response and community improvement, respectively, are significantly impacted by the budgetary restraints associated with economic decline.¹⁰⁹

The purchasing of new forms of technology that may be utilized to improve traffic management is under the third tier of service.¹¹⁰ The question then arises, is the securing of pursuit management technology by local departments a first or third-tier concern? While

¹⁰⁵ Department of Justice COPS, 2.

¹⁰⁶ Department of Justice COPS, 2.

¹⁰⁷ Department of Justice COPS, 2.

¹⁰⁸ Department of Justice COPS, 2.

¹⁰⁹ Department of Justice COPS, 2.

¹¹⁰ Department of Justice COPS, 2.

the deployment of this technology may be considered a community improvement measure, pursuit management devices also directly impact the ability of law enforcement to respond to ongoing emergencies.

To determine whether an investment in pursuit management technology may be considered a funding priority during times of economic decline, it is necessary to examine how the DOJ has treated other forms of policing technology investment in the past. The 2011 report notes that since 1994, the COPS Office has been responsible for the allocation of over \$16 billion to local budgets for the purchasing of law enforcement technology, training of personnel, and employment of new officers.¹¹¹ Despite concerted efforts made by the DOJ to support the acquisition of technology, the majority of local departments made the decision to either significantly reduce or outright eliminate technology-purchasing programs in the wake of the 2008 financial crisis.¹¹²

The majority of departments in the United States began a process of reducing technology acquisition following the economic downturn, while other departments recognized the power of technology as a force multiplier. This specific policy strategy is covered in detail in the following section; however, it is important to mention now, as it overlaps with the funding efforts of the COPS Office. In the 2011 report, DOJ officials explicitly reference the force multiplier strategy as a preferable method for increasing departmental efficiency. This trend in the DOJ's funding practices is promising, as it represents an embracing of technological investment even during times of economic decline. The question, however, is whether this approach to investment has been embraced in recent years.

A recent example of the DOJ's position on technology investment can be found in the Technology Innovation for Public Safety (TIPS) program. TIPS is a funding opportunity for state, local, and tribal departments that provides funding for technology acquisition, so long as said acquisition conforms to DOJ standards regarding its

¹¹¹ Department of Justice COPS, iv.

¹¹² Department of Justice COPS, 20.

deployment. Most notably, the TIPS program provides for the acquisition of information sharing technology with the purpose of collecting data on the opioid crisis, as well as human trafficking.¹¹³ Although the TIPS program does not directly address the use of these funds in the acquisition of pursuit management technology, it does provide evidence that the DOJ remains open to the funding of technology as part of a force multiplier strategy.

In addition to the recent awards through the TIPS program, the DOJ has also developed funding programs to provide for technology acquisition for the express purpose of combatting the illegal arms trade.¹¹⁴ Although this particular funding project has not provided for the acquisition of pursuit management technology, real potential still exists for the DOJ to expand its funding efforts into this specific policy area based on the agency's recent activity. To understand more effectively how the funding framework of the DOJ may provide for the increased access to pursuit management technology by local departments, the following two sections of this chapter examine law enforcement pursuit policy and the policy reform efforts of the DOJ and its affiliate agencies.

B. LAW ENFORCEMENT PURSUIT POLICY

Law enforcement pursuit policy has long been a contentious issue within the United States. Much of the controversy surrounding traditional methods of pursuit is based on notions that the development of pursuit policy is a highly complex process wherein effective strategy must be counterbalanced with public safety and the efficient allocation of resources.¹¹⁵ Certain limitations have arisen in this particular policy area that have further complicated the process. As noted by Alpert and Lum, the problem of law enforcement pursuit policy is both public and organizational.¹¹⁶ Therefore, it is necessary

¹¹³ Bureau of Justice Assistance, *Technology Innovation for Public Safety (TIPS) Addressing Precipitous Increases in Crime FY 2018 Competitive Grant Announcement* (Washington, DC: Department of Justice, 2018), 4–9, <https://www.bja.gov/funding/TIPS18.pdf>.

¹¹⁴ “Department of Justice Will Award More than \$10 Million to Support Crime Reduction Efforts,” DOJ Office of Public Affairs, accessed September 24, 2018, <https://www.justice.gov/opa/pr/departments-justice-will-award-more-10-million-support-crime-reduction-efforts>.

¹¹⁵ Geoffrey P. Alpert and Cynthia Lum, “Police Pursuits: A Complex Policy Arena,” in *Police Pursuit Driving* (New York: Springer, 2014), 1–12.

¹¹⁶ Alpert and Lum, 7.

to examine both the internal structure of law enforcement organizations, as well as the public reaction to pursuit policy to determine effectively how said policy is developed from a strategy formation standpoint.

In 1998, the National Law Enforcement and Corrections Technology Center (NLECTC) published a comprehensive report detailing the issue of police pursuit in the United States from multiple angles of analysis. The report was published through the DOJ and remains the central reference point for the examination of the general structure of pursuit policy development from the DOJ's perspective, as well as that from state, local, and tribal law enforcement. This document examines the various issues pertaining to the problem of pursuit management. These issues include the general philosophy of pursuit, community impact, legal issues, and pursuit management technology.¹¹⁷ At the close of the document, the NLECTC provides a variety of policy recommendations based on research conducted with the aid of the DOJ.

Due to the importance of the NLECTC report in the formation of pursuit policy, this document forms the basis for the critical examination conducted in this section of the chapter. Therefore, it is necessary to examine the document in a linear fashion to allow for a critique of the arguments as they have been systematically developed. The basis for the pursuit policy data presented in the NLECTC report is a comprehensive questionnaire that was provided to 1,420 different departments throughout the United States.¹¹⁸ At the time of the report's development, 419 questionnaires had been completed and returned to the researchers.¹¹⁹ It was noted by the researchers that the return rate exhibited by the departments was impressive compared with previous reports, which therefore indicates an interest in pursuit policy amongst the various heads of departments contacted for participation in the research.¹²⁰

¹¹⁷ Kenneth Bayless and Robert Osborne, *Pursuit Management Task Force Report* (Washington, DC: National Law Enforcement and Corrections Technology Center, 1998), v-vi.

¹¹⁸ Bayless and Osborne, 5.

¹¹⁹ Bayless and Osborne, 5.

¹²⁰ Bayless and Osborne, 5.

The NLECTC report notes that legal issues pertaining to pursuit policy were the major impetus for a renewed interest in pursuit management strategy.¹²¹ The report points out that three-fourths of respondents who completed the questionnaire included a copy of their departmental pursuit policy.¹²² These policies can be divided into three specific categories: restrictive policy, mixed-policy, and minimal policy.

In terms of restrictive policy, some departments had taken steps to either reduce severely or outright eliminate the practice of vehicular pursuit.¹²³ On the other hand, mixed-policy departments made an effort to establish standards of conduct regarding proper strategy in pursuit management while simultaneously allowing a great deal of individual officer control in the application of a specific pursuit strategy.¹²⁴ Finally, those departments taking a minimalist strategy approach provided limited or non-existent oversight regarding the activities of officers in the carrying out of a pursuit.¹²⁵

In terms of the specific strategies employed by law enforcement agencies at the time of the report's formulation, a few basic strategies saw regular deployment throughout the departments analyzed. Those strategies included tire deflation, box-in, channelization, barricading, and ramming.¹²⁶ Of the various common strategies identified, most departments noted tire deflation as the most effective and commonly deployed means of ending a pursuit.¹²⁷

In addition to the common pursuit tactics identified in the report, the NLECTC also identified a general pattern of pursuit strategy presented as the "phases of pursuit." Such

¹²¹ Bayless and Osborne, 5.

¹²² Bayless and Osborne, 5.

¹²³ Esther Seoanes, "Pursuit Policy Types: Restrictive, Discretionary, or Discouraging," PursuitSafety, accessed May 16, 2019, <https://www.pursuitsafety.org/pursuit-policy-types-restrictive-discretionary-or-discouraging/>.

¹²⁴ Seoanes.

¹²⁵ Seoanes.

¹²⁶ Bayless and Osborne, *Pursuit Management Task Force Report*, 8.

¹²⁷ Bayless and Osborne, 8.

phases consist of pre-pursuit, communication, arrival of resources, and post-pursuit.¹²⁸ It is in the arrival of resources phase that deployment of pursuit management technology generally occurs. The deployment of this technology often leads to the halting of the pursuit and the suspect's apprehension.

An examination of the NLECTC reveals the significance of technology within the general framework of the pursuit management process. To understand the significance of technology fully in the formulation of departmental policy, it is important first to examine this issue from a community policing perspective. The NLECTC report was the first major analysis conducted with regard to the public's perception of the utilization of pursuit management technology.¹²⁹ While a concerted effort was made to establish a baseline understanding of the public's stance, those polled exhibited a general lack of knowledge regarding the use or availability of said technology.¹³⁰

In preparing this systematic examination, an attempt was made to identify additional research that explored public perception regarding the use of pursuit management technology. After an extensive search, no such studies were identified. In the 20 years that have passed since the development of the NLECTC's comprehensive report on pursuit policy, interest in the public perception of pursuit management technology has not grown.

The lack of public interest in pursuit management technology, as well as the lack of scholarly analysis of public perception, is significant in the development of understanding around the conditions of society that may either help or hinder the inclusion of technology as a central component of pursuit management practices. If the public is vocal in its calls for the adoption of pursuit management technology, then a greater level of attention will be placed on the allocation of resources toward technology acquisition. If, however, the public remains silent on the issue, less of an impetus for change will result.

¹²⁸ Bayless and Osborne, 11–14.

¹²⁹ Bayless and Osborne, 19.

¹³⁰ Bayless and Osborne, 19.

An example of the potential impact of public awareness campaigns can be seen in the work of Mothers Against Drunk Driving (MADD). MADD has had a significant impact on legal standards pertaining to drunk driving through the public awareness efforts that focus on the benefits of instituting strict standards concerning the treatment of driving under the influence cases in the legal system.¹³¹

In terms of the relative popularity of traditional pursuit methods in the public sphere, the NLECTC report noted that the majority (71%) of the public polled believed pursuit to be a necessary component of a general law enforcement strategy.¹³² From those members of the public who were polled, 59.4% also noted that the decision to pursue must be weighed against the cost of non-pursuit.¹³³ This point is important, as it highlights a general sense of concern regarding the safety and necessity of pursuit at the time that the research was conducted.

An examination of more recent reports on the intersection between public opinion and departmental pursuit policy reveals that public worries regarding the safety of pursuit have continued to be expressed in the media. Notably, questions have arisen regarding the impact of story selection on the formulation of public opinion regarding the safety and relative value of traditional pursuit practices.¹³⁴ For example, a recent report was conducted in the Minneapolis/St. Paul area that examined the factors impacting the decision of local newspapers to provide coverage of pursuit events.¹³⁵ The majority of the stories selected for coverage were noted to have included certain elements of danger, such as property damage, injury, or fatalities.¹³⁶

¹³¹ Nady El-Guebaly, “Don’t Drink and Drive: The Successful Message of Mothers Against Drunk Driving (MADD),” *World Psychiatry* 4, no. 1 (2005): 35.

¹³² Bayless and Osborne, *Pursuit Management Task Force Report*, 21.

¹³³ Bayless and Osborne, 21.

¹³⁴ Steven J. Briggs, “The Selection of Police Pursuits of Fleeing Motorists for Coverage in Newspapers,” *Journal of Crime and Justice* 41, no. 3 (2018): 310–321.

¹³⁵ Briggs, 310–321.

¹³⁶ Briggs, 311.

The negative media coverage of traditional pursuit practices may be considered indicative of a bias against said practices save for the fact that traditional pursuit strategies have been shown as one of the most dangerous elements of policing. As noted in the literature review, traditional pursuit methods have led to many injuries and fatalities. The literature review also revealed a general trend toward the rejection of traditional pursuit methods as an acceptable practice from a departmental standpoint.¹³⁷

The dangers associated with traditional pursuit methods have led to a great deal of controversy at virtually every level of government. For example, recent calls have been made for the Supreme Court to address the practice of law enforcement firing at moving vehicles.¹³⁸ This example is just one of a general push toward an increase in regulations regarding the employment of traditional pursuit strategies. To address the ongoing call for more regulation, some departments have acted in a proactive manner to establish a self-regulating system. For example, departments in Georgia have extended the examination of pursuit policy to encompass multiple categories of risk.¹³⁹ This extension has allowed the development of improved standards regarding the definition of acceptable pursuit practices at the departmental level. It is likely the efforts to adapt policy across the state to align with calls for pursuit alternatives are a response to the increasing threat of heavy federal oversight. By making a concerted effort to develop more effective regulations, local departments have clearly expressed a desire to embrace change in this critical policy area.

Embracing change in the policy area of pursuit management is not only driven by a desire to circumvent federal regulation, but also the prevention of major financial risks associated with pursuit. Recently, a comprehensive study of pursuit practices in the state of California revealed that between 2000 and 2009, hundreds of millions of dollars were

¹³⁷ Pate, “Vehicular Police Pursuits,” 225–238.

¹³⁸ John P. Gross, “Unguided Missiles: Why the Supreme Court Should Prohibit Police Officers from Shooting at Moving Vehicles,” *University of Pennsylvania Law Review Online* 164, no. 1 (2016): 135.

¹³⁹ Lee M. Wade, “High-Risk Pursuit Classification: A Categorical Analysis of Variables from Georgia Police Pursuits,” *Criminal Justice Policy Review* 26, no. 3 (2015): 278–292.

spent on damages caused by pursuit incidents.¹⁴⁰ The financial impetus for the development of alternative pursuit policy is evident. The question is whether departments will be willing to embrace technology as a means of establishing a force multiplier. Furthermore, the question of directing funding in an efficient manner must be considered in the context of achieving force multiplication.

As noted in the previous section of this chapter, the force multiplier concept has been embraced by some departments as a means of saving money. This strategy relies on the deployment of pursuit management technology to reduce costs associated with traditional pursuit. According to Gaither, Gabriele, Andersen, Healy, and Hung, the deployment of pursuit management technology has generally reduced many of the operational costs associated with pursuit at the local level.¹⁴¹ Additional research has revealed the use of pursuit management technology as a means of addressing changing methods of evasion employed by suspects.¹⁴² The end result is a pursuit strategy that is both financially responsible and strategically effective.

Although departments have worked diligently in the past to reduce expenditures wherever possible, the 2008 financial crisis established a new paradigm in departmental budgetary strategy. Following the 2008 crisis, over 60% of local departments in the United States were faced with significant budget cuts.¹⁴³ These budget cuts led to a serious reduction in community policing efforts.¹⁴⁴ The question of whether local departments view pursuit management technology as essential expenditures or non-essential community-based expenditures has yet to be answered. The budgetary constraints that have

¹⁴⁰ Scott E. Wolfe et al., “Characteristics of Officer-Involved Vehicle Collisions in California,” *Policing: An International Journal of Police Strategies & Management* 38, no. 3 (2015): 458–477.

¹⁴¹ Morgan Gaither et al., *Pursuit Technology Impact Assessment, Version 1.1* (Washington, DC: Department of Justice, 2017), 7.

¹⁴² Rick Brown, “Vehicle Crime Prevention and the Co-Evolutionary Arms Race: Recent Offender Countermeasures Using Immobilizer Bypass Technology,” *Security Journal* 30, no. 1 (2017): 60–73.

¹⁴³ Police Executive Research Forum, “63 Percent of Local Police Departments Are Facing Budget Cuts, PERF Survey Shows,” *Subject to Debate* 23, no. 1 (2009): 1–9.

¹⁴⁴ Matthew J. Parlow, “The Great Recession and its Implications for Community Policing,” *Georgia State University Law Review* 28, no. 4 (2013): 1205–1207.

defined the post-crisis era remain relevant. In the final section of the evaluation, the role of the DOJ as a platform for potential policy reform is examined. If pursuit management technology is to be embraced throughout the nation, it will likely be at the behest of the DOJ and the affiliate organizations that offer both funding and training to state, local, and tribal departments.

C. DOJ POLICY REFORM INITIATIVES

In the DOJ's policy reform initiatives, two methods of policy promotion have chiefly been employed to achieve the organization's stated goals. The first method is the provision of funding for the purchasing of technology and the hiring of personnel. The second method is the provision of training with the goal of establishing operational standards that align with the desired practice goals of the DOJ.

From a financial standpoint, the DOJ promotes many of its policy reform goals through COPS Office and JAG grants. Of the financial programs employed by the DOJ, the COPS grants have provided the greatest overall return. In a 2004 report, Zhao and Thurman conducted an analysis of the impact of COPS Office grants on crime rates. Their report revealed that COPS grants were highly effective in the reduction of crime in both small and large communities. For example, the report stated that:

Multivariate analysis shows that in cities with populations greater than 10,000 an increase in one dollar of hiring grants per resident contributed to a corresponding decline of 10.95 violent crimes and 27.88 property crimes per 100,000 residents. Similarly, an increase in one dollar of innovative grant funding per resident was found to contribute to a decline of 4.30 violent crimes and 10.07 property crimes per 100,000 persons.¹⁴⁵

The impact of the COPS grant program on crime has been incredible. According to a report by Evans and Owens, COPS has managed to influence the adoption of certain policing strategies directly through a combination of focused resource allocation and

¹⁴⁵ Jihong Zhao and Quint Thurman, "Funding Community Policing to Reduce Crime: Have COPS Grants Made a Difference?" *Criminology & Public Policy* 2, no. 1 (2004): 1.

strategic training programs.¹⁴⁶ The end result is a policy environment integrated into a central vision as established by the DOJ through the work of COPS and other affiliated agencies. It is through the combination of financial and training structures that COPS has successfully reintroduced community policy into the general strategy of many departments throughout the United States.¹⁴⁷ Perhaps a similar approach may be taken to introduce pursuit management technology to a wider number of departments.

D. BARRIERS TO ANALYSIS

Before the concluding summary of the critical evaluation discussion, it is important to discuss some of the barriers to analysis identified throughout the research process. Notably, the question of pursuit management technology and DOJ funding has received little treatment in scholarly circles. Most of the focus in this area to date has been on research and development programs directly overseen by the DOJ and other federal agencies. As strategic efforts have been undertaken to investigate new methods of controlling pursuits, the DOJ has actively pursued technological answers. The DOJ's involvement in the development of new forms of pursuit management technology takes the focus off the scholarly elements of the developmental process. Due to the limited scholarly treatment of the specific problem of DOJ funding of pursuit management technology, it was necessary to expand the scope of analysis to include multiple data categories. In some ways, the expanded scope of the research is a strength because it allows the formulation of a more comprehensive platform for the development of policy prescriptions. Conversely, the scope of analysis is a hindrance to the research because it requires the bridging of certain gaps in the literature yet to be addressed fully through academic examination.

¹⁴⁶ William N. Evans and Emily G. Owens, "COPS and Crime," *Journal of Public Economics* 91, no. 1 (2007): 181–201.

¹⁴⁷ Ellen Scrivner and Darrel Stephens, *Community Policing in the New Economy* (Washington, DC: Office of Community Oriented Policing Services, 2015), 15.

E. CONCLUSION

This chapter has critically evaluated a variety of sources pertaining to the problem of pursuit management technology and its potential funding by the DOJ. Notably, the DOJ has a strong track record of ensuring law enforcement departments throughout the United States gain access to the resources needed to maintain basic service standards. The importance of the DOJ's involvement in the funding of policing operations at the state, local, and tribal level was made increasingly evident following the 2008 financial crisis. Although departments have worked to maintain basic efficiency since the crisis, the DOJ has successfully promoted major policy reforms through the organization's COPS Office and JAG grants. Accordingly, a similar approach may be employed to promote the adoption of pursuit management technology as a force multiplier in state, local, and tribal departments.

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The evaluation conducted herein provides a comprehensive examination of the present conditions impacting the DOJ's funding of pursuit management technology acquisition. This review was conducted with the purpose of developing policy prescriptions regarding the potential use of DOJ funds to promote the adoption of pursuit management technology in departments throughout the United States. This chapter presents the policy prescriptions developed through the evaluation process. These policy prescriptions are divided into two separate sections. The first section addresses the recommended departmental approach to pursuit management and the second deals specifically with DOJ funding of pursuit management technology. Finally, this chapter concludes the thesis with a summary of the issues discussed herein.

B. PURSUIT MANAGEMENT POLICY PRESCRIPTIONS

When determining the optimum pursuit management policy, it is important to consider that each department will likely experience certain conditions that do not fit the general policy framework presented herein. Therefore, it is necessary to consider these policy prescriptions as general guidelines that may require adaptations to ensure their compatibility with conditions found in specific departments. The information obtained from the evaluation regarding pursuit policy revealed that departments have generally adopted three approaches to pursuit management: strict, mixed, and minimal management.

Due to the importance of pursuit practices from a financial, legal, and strategic standpoint, it is recommended departments adopt a strict and clearly defined pursuit management policy. For pursuit management technology to be integrated effectively into departments, it will be necessary for department managers to align policy with the strategy compatible with it. The only possibility for such alignment to occur lies in the exercising of complete control over the formal steps of the departmental pursuit strategy.

In terms of the adoption of specific devices, the evaluation in this research revealed that StarChase and Road Sentry have provided for major improvements in pursuit management.¹⁴⁸ These devices may be recommended for immediate use. In addition to these devices, the evaluation provided descriptions of other pursuit management systems developed to date. It must be noted that the individual needs of departments should be considered when determining which device provides the greatest benefit. As far as the general application is concerned, both StarChase and Road Sentry may be considered effective and affordable for the acquisition and deployment for many departments. While it is true that some departments may still not be able to access this technology, the point remains that StarChase and Road Sentry are theoretically appropriate for wide deployment.

As a final note, the question of whether pursuit management technology is an appropriate expenditure during times of economic struggle must be addressed. While it is true that budgetary concerns have remained front and center within the American criminal justice system, it is also true that a concerted effort has been made by both the DOJ and state, local, and tribal departments to develop proactive measures for increasing the efficiency of departmental operations. The employment of pursuit management technology as a force multiplier is a significant financial strategy that must be considered. It is recommended that departments divert whatever resources are available for the expansion of departmental infrastructure toward the acquisition of this technology. This funding strategy must be integrated within an overall force multiplier approach as outlined in the critical evaluation.

C. DOJ FUNDING POLICY PRESCRIPTIONS

The DOJ's funding activities have provided a strong foundation for the improvement of U.S. law enforcement services. To continue with the tradition of DOJ-established policy reform, it is recommended that steps be taken to develop a focused funding campaign aimed at the promotion of pursuit management technology integration at the state, local, and tribal level. This campaign may be structured similarly to those

¹⁴⁸ Fischbach, Hadsdy, and McCall, *Pursuit Management*, 6; Boyer, *Project Final Report*, 5.

campaigns managed by the COPS Office and the OJP to promote critical policy reform while providing the necessary financial backing to institute significant change.

The DOJ's funding strategy is strongly influenced by their stated policy goals. Currently, the DOJ is focusing on the problem of the opioid epidemic, as well as human trafficking.¹⁴⁹ These issues are critical and many state, local, and tribal departments have already placed these issues high on their respective priority lists.¹⁵⁰ To affect significant change in the area of pursuit management, it will be necessary for the DOJ to make these departments aware of the benefits associated with pursuit management technology.

For the goal of widespread adoption of pursuit management technology to be accomplished, the DOJ must work closely with the developers of successful systems, such as StarChase and Road Sentry. Through such collaboration, the DOJ may formulate a technology acquisition plan that emphasizes affordability and ease of integration. Such a plan may be integrated into the organizational structure of the existing TIPS program. If these recommendations are followed, it is likely the financial and operational benefits afforded by the integration of pursuit management technology will greatly improve the overall quality of policing throughout the United States.

D. CONCLUSION

The policy recommendations outlined in this chapter are designed to align the DOJ funding system and department pursuit policies with the latest information regarding the most efficient and effective means of developing pursuit strategies. As noted in the chapter, the DOJ has played a central role in the promotion of major improvements in critical policing areas, such as opioid abuse and human trafficking. The combination of directed financial improvements and strategic training offered by the COPS Office has significantly positively impacted the ability of departments throughout the United States to serve the public better. Through this framework of policy reform, the DOJ may be able to expand

¹⁴⁹ Department of Justice Office of Public Affairs, "Department of Justice Will Award More than \$10 Million to Support Crime Reduction Efforts."

¹⁵⁰ Department of Justice Office of Public Affairs.

the reach of departments in the acquisition and deployment of pursuit management technology.

This research provided a clear platform for the development of DOJ funding programs and department policies that could directly address the risks identified in traditional pursuit methods. The literature review provided a summary of the systematic factors that have led to the present conditions faced by law enforcement departments throughout the United States. Key concepts identified in the review include departments' ongoing struggle to balance budgetary concerns with technology acquisition. Furthermore, the literature review identified the many risks associated with traditional pursuit methods.¹⁵¹

By examining the historical background of the issues addressed in the evaluation, this thesis has established a foundation for the effective interpretation of the resources identified as relevant to the present discussion. From a historical perspective, the DOJ has played an integral role in the promotion of policy reform at the state, local, and tribal level.¹⁵² Furthermore, technology has driven the adaptation of law enforcement to reflect the demands of the public better.¹⁵³

The thesis provided a detailed description of the close relationship between the DOJ and the research, and development efforts of firms working to create new pursuit management technology devices and systems. The relationship between the DOJ and developmental firms in this area has established a strong platform for the future promotion of technology acquisition and integration at the departmental level. It is as much a policy reform issue as a financial issue. Of the various federal organizations, the DOJ is the best positioned to achieve the results necessary for the successful embrace of pursuit management technology.

¹⁵¹ Pate, "Vehicular Police Pursuits," 225–238.

¹⁵² Department of Justice Office of Public Affairs, "Department of Justice Will Award."

¹⁵³ Philip Brey, "Theorizing Technology and its Role in Crime and Law Enforcement," in *The Routledge Handbook of Technology, Crime and Justice* (Abingdon-on-Thames, UK: Routledge, 2017), 43–60.

The current research has revealed certain identifiable gaps in the literature that should be addressed by the academic community in the future. This research was developed with recognition of the limited scope of scholarly analysis of the relationship between the DOJ and state, local, and tribal departments in the acquisition of pursuit management technology. This limitation points to the need for additional research. Researchers may utilize this critical evaluation as a foundation to develop future studies that attempt to establish a stronger understanding of the quantitative impact of DOJ funding efforts on the acquisition and integration of said technology.

In addition to DOJ-based research, future studies should also examine the specific barriers to technology acquisition and integration in departments throughout the United States. As noted in this thesis, the acquisition and deployment of pursuit management technology are impacted by individual factors that vary depending on departments' organizational environments. It is the hope of the researcher that the academic community will take a greater interest in this critical policy area. By increasing the level of scholarly scrutiny applied to the problem of law enforcement pursuit policy, the academic community can aid in the progression of the American criminal justice system toward a higher standard of safety and efficiency. An increase in scholarly analysis in this area may provide the impetus for a stronger link between the DOJ and departmental improvement efforts throughout the United States.

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